SPECIFICATIONS

FOR

UCLA 100 Medical Plaza Suite 730 Minor TI

UNIVERSITY OF CALIFORNIA, Los Angeles

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GENERAL REQUIREMENTS

1. GENERAL

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1.2 WORK REQUIRED BY CONTRACT DOCUMENTS

Contractor shall perform minor improvements to an existing approx 1,500 sq ft medical office suite in the UCLA 100 Medical Plaza building. Scope of work includes but is not limited to demolition, millwork, flooring, painting, and patching ceiling tile as per the attached specifications and drawings.

1.3 COST BREAKDOWN

Submit in the form acceptable to the University.
Submit in duplicate with signed Agreement.

1.4 APPLICATION FOR PAYMENT

Submit in the form acceptable to University.
Use Cost Breakdown for listing items in application for payment.

1.5 CHANGE PROCEDURES

University's Field Order form.
University's Change Order form.

1.6 PROJECT COORDINATION

Verify that utility requirement characteristics of operating equipment are compatible with building utilities.
Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practicable.
In finished areas, conceal pipes, ducts, and wiring within the construction.

1.7 PROJECT MEETINGS

University will schedule a preconstruction conference after issuing Notice to Proceed, but prior to commencement of Work.
University's Representative will schedule and administer meetings throughout progress of the Work.
University's Representative will preside at meetings, record minutes, and distribute copies within 2 days to Contractors, Design Professional, and University.

1.8 CONTRACT SCHEDULE

Before commencing Work, submit a Contract Schedule of proposed operations for University's approval. In preparing the Contract Schedule, provide the following:

1. Equipment and material submittals.
2. University review of each submittal.
3. Delivery lead times for equipment.

The Contract Schedule may be in the form of a bar chart or other system approved by University showing starting and completion dates for the various work activities involved, together with such other information relative to progress of the Work as may be requested by University.
Update Contract Schedule as required by University.

1.9 PROPOSED PRODUCTS LIST

Within 7 days after date of commencement specified in Notice to Proceed, submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

1.10 SHOP DRAWINGS

Submit in the form of one reproducible transparency.

1.11 PRODUCT DATA

Submit 3 copies.
Mark each copy to identify applicable models, options, and other data for each Product.

1.12 SAMPLES

Submit samples to illustrate functional and aesthetic characteristics of Products.

1.13 UNIVERSITY'S TESTING LABORATORY

If applicable to the Work of this Project, University will appoint, employ, and pay for services of an independent firm (University's Testing Laboratory) to perform inspection and testing.
University's Testing Laboratory will perform inspections, tests, and other services as required by University.
Cooperate with University's Testing Laboratory and furnish samples as requested.
Cost of re-testing, required because of non-conformance to specified requirements, will be charged to Contractor.

1.14 TEMPORARY ELECTRICITY

Connect to existing power service. Power consumption shall not disrupt University's need for continuous service. University will pay cost of power used.
Provide power outlets for construction operations, branch wiring, distribution boxes, and flexible power cords as required.

1.15 TEMPORARY LIGHTING

Provide and maintain temporary lighting for construction operations.
Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
Permanent building lighting may be utilized during construction provided 48 hours advance notice is given to University.

1.16 TEMPORARY HEAT

Utilize University's existing heat plant; extend and supplement with temporary units as required to maintain specified conditions for construction operations.
University will pay cost of energy used.
Provide and pay for operation, maintenance, and regular replacement of filters and other worn or consumed parts.

1.17 TEMPORARY VENTILATION

Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, and gases.
Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.
When hazardous materials are encountered, specialized ventilation must be furnished so as to not contaminate the existing system.

1.18 TELEPHONE SERVICE

Provide, maintain, and pay for telephone service to field office commencing at time of mobilization, if required by University.

1.19 TEMPORARY WATER SERVICE

Connect to existing water source for construction operations.

1.20 TEMPORARY SANITARY FACILITIES

Provide and maintain required sanitary facilities and enclosures. Existing sanitary facilities may be used.
Maintain sanitary facilities in clean and sanitary condition.

Do not flush construction materials down toilets or sinks.

1.21 BARRIERS AND FENCING

Provide barriers or fencing to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage.

1.22 WATER CONTROL

Maintain Project site free of water. Provide, operate, and maintain pumping equipment. Do not allow excess water to run in streets or gutters.

1.23 INTERIOR ENCLOSURES

Provide temporary partitions as required to separate Work areas from University occupied areas, to prevent penetration of dust and moisture into University occupied areas, and to prevent damage to existing materials and equipment.

1.24 PROTECTION OF INSTALLED WORK

Protect installed Work and provide special protection where specified in individual Specification Sections.

1.25 SECURITY

Provide security and facilities to protect Work, existing facilities, and University's operations from unauthorized entry, vandalism, or theft.

1.26 ACCESS ROADS

Designated existing access roads on the Project site may be used for construction traffic.

1.27 PARKING

Arrange and pay for temporary parking areas to accommodate construction personnel.

1.28 PROGRESS CLEANING

Maintain areas of the Work free of waste materials, debris, and rubbish. Maintain Project site in a clean and orderly condition.

1.29 REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS

Remove temporary above grade or buried utilities, equipment, facilities, materials, and controls prior to final inspection.
Clean and repair damage caused by installation or use of temporary work.

1.30 PRODUCTS

The term "Products" means new material, machinery, components, equipment, fixtures, and systems forming the Work.

1.31 TRANSPORTATION, HANDLING, STORAGE, AND PROTECTION

Transport, handle, store, and protect Products in accordance with manufacturer's instructions.

1.32 SUBSTITUTIONS

When a product, material or equipment specified by brand or trade name is followed by the words “or equal,” a substitution may be permitted if the substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance and if the substitution complies with all other requirements of the plans and specifications.

A request for substitution must be submitted in to the University’s Representative not later than 35 days after the date of commencement specified in the Notice to Proceed. No requests for substitutions of products, material or equipment subject to the 35-day deadline shall be considered unless the request and supporting data is submitted on or before the deadline, except those deemed, in University's Representative's sole opinion, to be necessary because (i) previously specified or approved manufactured products, material or equipment are no longer manufactured, (ii) of University initiated change orders, or (iii) it is in the best interest of University to accept such substitution. The 35-day submittal period does not excuse the Contractor from completing the Work within the Contract Time.

Substitutions are not allowed unless approved in writing by the University’s Representative. Any such approval shall not relieve Contractor from the requirements of the Contract Documents. In addition to complying with all other submittal requirements of the Contract, submit written data demonstrating that the proposed substitution is equal to or superior to the first-named product, material or equipment in quality, utility and appearance and otherwise complies with all requirements of the plans and specifications,

The first-named product, material or equipment specified by brand or trade name and model number is the basis for the Project design and the use of any item other than the first-named one may require modifications of that design. If Contractor uses any product, material or equipment other than the first-named one, Contractor shall, at its sole cost, make all revisions and modifications to the design and construction of the Work necessitated by the use the product, material or equipment. If such revisions or modifications are necessary, the product, material or equipment may be used only if the revisions or modifications are approved in writing by the University’s Representative.

Other products, material or equipment that are specified by brand or trade name and model number are approved for use, provided that Contractor complies with all Contract requirements.
Specification of a product, material or equipment by brand or trade name and model number is not a representation or warranty that the product, material or equipment is available or that it can be used

without modification, to meet the requirements of the plans and specifications; Contractor shall confirm, prior submitting a bid the availability of any product, material, or equipment. If modifications are necessary, Contractor shall, at its sole cost, modify such products, material, or equipment so that they comply with all requirements of the plans and specifications.

1.33 FINAL CLEANING

Execute final cleaning prior to final inspection.
Clean interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces.
Replace filters in operating equipment.
Remove waste and surplus materials, rubbish, and construction facilities from the Project site.

1.34 AS-BUILT DOCUMENTS

Maintain and keep current on the Project site, one set of Contract Documents to be utilized for As-Built documents.

1.35 OPERATION AND MAINTENANCE DATA

Submit 2 sets prior to final inspection, bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.
Prepare binder cover with printed title, "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of Project.
Contents:

1. Directory, listing names, addresses, and telephone numbers of design professional, Contractor, subcontractors, and major equipment suppliers.
2. Operation and maintenance instructions arranged by system.
3. Project documents and certificates.

1.36 GUARANTEES

Article 9 of the General Conditions requires all items to be guaranteed for a period of 1 year.
Guarantees for more than 1 year where indicated in various Specification Sections shall be written on the letterhead of the Contractor, subcontractor, or supplier doing the Work and/or supplying the item to be guaranteed and shall be in the form of the guarantee contained on the following page of this Section.

GUARANTEE

Date: _____

Project Name: _____

_____
Project Number

Project Location: _____

GUARANTEE FOR _____ (the "Contract"), between The Regents of the
(Specification Section); PO#

University of California ("University") and _____ ("Contractor").

_____hereby guarantees to University that
(Name of Subcontractor)

the portion of the Work described as follows:

_____

_____

which it has provided for the above referenced Project, is of good quality; free from defects; free from any liens, claims, and security interests; and has been completed in accordance with Specification Section _____ and the other requirements of the Contract.

The undersigned further agrees that, if at any time within _____ months after the date of the guarantee the undersigned receives notice from University that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the undersigned will, within 10 days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

In the event the undersigned fails to commence such correction, repair, or replacement within 10 days after such notice, or to diligently and continuously prosecute the same to completion, the undersigned, collectively and separately, do hereby authorize University to undertake such correction, repair, or replacement at the expense of the undersigned; and Contractor will pay to University promptly upon demand all costs and expenses incurred by University in connection therewith.

SUBCONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor
License Number: _____

Address: _____

_____

Phone Number: _____

CONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

END OF SECTION

LIST OF DRAWINGS

SHEET NO.	TITLE	DATE
A0.0	Title Sheet / Vicinity Map / Key Plan	12/8/11
BP-1	UCLA Building Permit	12/8/11
A1.0	Construction Plan / ?demolition Plan / Schedules	12/8/11
A1.1	Reflected Ceiling Plan / Schedules	12/8/11
A2.0	Details	12/8/11
A3.0	Existing Public Restrooms Disabled Access Details	12/8/11
A4.0	Parking Level – (E) Bath of Travel	12/8/11
M1.0	General Notes, Schedules Vicinity Map / Key Plan and Details	12/12/11
M2.0	Demolition and New Mechanical Plans	12/12/11
P1.0	Legends, Notes, Schedules, Details, Key Plan and Vicinity Map	12/12/11
P2.0	Demolition and New Plumbing Floor Plans	12/12/11
E1.0	Abbreviations, Symbols List & General Notes	12/12/11
E2.0	Power and Tel/Data Plan	12/12/11
E2.1	Existing and New Lighting Plans	12/12/11
E3.0	Single Line Diagram & Panel Schedules	12/12/11

END OF LIST OF DRAWINGS

SECTION 02060
SELECTIVE DEMOLITION

1. GENERAL

1.0 RELATED DOCUMENTS

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

1.1 DESCRIPTION OF WORK

A. General: The Work to be completed under this Contract shall be as shown, documented and set forth in the Contract Documents.

1. The scope and demolition is defined in the Specifications and indicated on the Drawings. As defined in the Specifications, majority of the space shall be demolished with specific components salvaged, protected, stored and inventoried. Drawings reflect approximate extent of existing Tenant construction. Contractor is responsible for touring all levels of the existing space to determine existing conditions.

2. This Contractor shall have the overall responsibilities for all of the Work specified here in Section 02060. All Work normally defined as "Architectural Finish" and as listed as "Base Space Demolition" shall be completed by this Demolition Contractor. All Work normally defined as "Mechanical Systems" and as listed "Mechanical Space Demolition" shall be completed by a Mechanical Contractor under contract with this Contractor. All Work normally defined as "Electrical System" and as listed "Electrical Space Demolition," shall be completed by an Electrical Contractor under contract with this Contractor.

B. Base Space Demolition: Demolition includes, but is not necessarily limited to, the following:

1. Refer to Drawings for areas of demolition.

2. Contractor shall review during the bid phase and include within the bid to remove old and abandoned wiring, cables, straps and duct that are above the ceiling.

C. Structure: Cut floor slab for new openings. Requires X-raying of decks to ensure avoidance of rebar and electrical conduit.

D. Mechanical Space Demolition: Prior to all mechanical demolition, Contractor shall consult building engineer. (Refer to Drawings and other Specification Sections for additional requirements.)

E. Electrical Space Demolition: All non-reusable data, phone and power wiring shall be removed above the ceiling and back to termination. It is mandatory that the building engineer and data/phone representative be contacted before commencement of such removal for verification purposes. (Refer to Drawings and other requirements in this Section for special conditions.)

F. Salvage: The following items shall be carefully removed and stored neatly in area shown on the Drawing or as directed by the University Representative.

1. Refer to Drawings

G. Codes: Conform to codes and requirements of governing authority.

1. Obtain and pay for all permits for demolition; protection of the public and property; transportation and disposal of debris; and capping of utility services.

1.2 SUBMITTALS

A. Schedule: Submit proposed methods and operations of building demolition to University Representative for review prior to start of work. Include in schedule coordination for shut-off, capping and continuation of utility services.

1. Permits and notices authorizing demolition.
2. Certificates of severance of utility services.
3. Permit for transport and disposal of debris.

A. Provide a detailed sequence of demolition and removal work to ensure uninterrupted progress of University's operations.

1.3 JOB CONDITIONS

A. The demolition subcontractor and the General Contractor's representative will walk through the premises with University Representative for verification of work prior to commencement.

B. University Representative to determine which materials are to be salvaged for reuse.

C. Occupancy: Current tenants will continue to occupy the floors above, below and within the floor space.

1. The Contractor is advised that the existing Tenants are and will continue to occupy portions of the existing floor space adjacent to the Work to be completed.

D. Condition of existing materials: The University assumes no responsibility for actual condition of structures to be demolished.

1. Do not scale drawings, the Contractor is to verify all conditions (i.e. existing corridor locations and dimensions, existing door types and locations, lighting, floor and wall finish locations, etc.) in the field.

E. Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent occupied space, other facilities and persons.

F. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the University.

G. Utility Services: Maintain existing utilities indicated to remain, keep in service and protect against damage during demolition operations. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the University Representative.

H. Special Mechanical System Requirements: The base building ventilation system will remain active at all times. This Contractor shall furnish and install impervious coverings over all return air openings. This Contractor shall close down the damper and fire damper at the core. After the completion of the Work, the Contractor shall be responsible for reactivating all of the dampers.

1. Provide disposable filters for supply air at each main air handler. Filters shall be changed out weekly during all demolition work.

I. Freight Elevator Use: Refer to Division I and Exhibit A.

1.4 RECYCLING

A. Requirements:

1. At a minimum the following construction debris (as applicable) shall be collected and transported to a re-use and or recycling center.

a. Concrete
b. Asphalt
c. Acoustic ceiling tile and suspension wire
d. Electrical conduit and EMT
e. Electric conductors
f. Light Fixtures
g. Gypsum wallboard

h. Lath and plaster
i. Metal studs
j. Hollow metal door and window frames
k. Carpet
I. Carpet pad
m. Misc. ferrous and non-ferrous metals
n. Copper piping and related supports
o. Metal air distribution duct, diffusers, and related supports
p. Wood
q. Reinforcing steel
r. Glass
s. Electronic devices

2. Construction debris shall be qualified by type of material and shall be weighed respectively.

B. Procedure

1. Prior to beginning any demolition or clean up activity submit to the University's Representative a partially completed Waste Management Form.

2. The Waste Management Form shall include a list of expected waste materials and the recycling facilities to which the waste will be taken.

3. Identify all waste material that cannot be recycled or reused and shall be disposed of in a landfill.

4. If the Contractor believes that it will not be able to recycle a minimum of 50% of the project waste, it shall submit written justification to be reviewed and approved by the University's Representative prior to commencing the Work.

C. At completion of Work, submit to the University's Representative a completed Waste Management Form and a copy of the receipt(s) from the recycling and/or re-use center. The receipt shall identify type of waste, as delineated in Article 1.4.A above, and the respective weight(s). These documents must be received and be in proper order prior to approval of any payment application.

D. The Waste Management Form shall include the following information:

1. Project name and number
2. Project description
3. Date(s) the work will be performed
4. Waste destination (Recycling Facilities or Landfill)
5. Amount of waste in Tons

1.5 RESPONSIBILITY FOR COSTS AND REBATES

All costs associated with the requirements of Article 1.4 herein shall be paid by Contractor. All rebates associated with the requirements of Article 1.4 herein shall be the sole property of the Contractor.

2. PRODUCTS

2.1 MATERIALS (Property of the Contractor)

A. All items not otherwise listed or noted as property if the University in this Specification or on the Drawings, become the property of the Contractor.

B. Immediately remove all such items or debris from the site as demolition occurs.

2.2 DUSTPROOF BARRIER

A. Erect an approved barrier where indicated before starting any demolition or construction. Seal in seams and connections to existing construction, walls, ceilings, and areas where the University's personnel and equipment will be in operation during construction. The dustproof integrity of the barrier shall be maintained throughout the work.

3. EXECUTION

3.1 DEMOLITION

A. General Demolition Requirements: All items that are to be reused, shall be stored in a protected area within the Tenant's premises. The intent is to reinstall all reusable items removed.

1. The General Contractor shall remove all wall conduits left after wall demolition, including switch boxes, plates, bridges or any other telephone/electrical wiring or equipment or as otherwise directed by University Representative or the Electrical Contractor.

2. The General Contractor shall remove all existing wall coverings, shades, and carpeting where noted on the drawings to receive new finishes, and patch wall surfaces as required to receive paint. University Representative shall inspect and approve all patched surfaces prior to applications or finish paint.

3. In all areas where demolition (removal or tile, carpeting, tackless, partitions, etc.) causes unevenness in the slab, the Contractor shall patch and/or flash patch to level the slab to receive new finished floor.

4. The General Contractor shall at all times protect the property of the University, including but not limited to windows, floor and ceiling tile, public toilets, elevators, doors, bucks, electrical air conditioning equipment, peripheral enclosures, etc.

5. Electrical and telephone outlets shown to be removed in existing partitions to remain shall have cabling removed and blank cover plates installed.

6. The General Contractor shall cap and flush off behind finish surfaces all projecting plumbing, floor electrical/telephone outlets, and all other projecting items which are being abandoned.

7. All work shall be performed in accordance with all applicable authorities.

8. Remove the existing carpet, pad, adhesive, tack strips, base, ceramic tile, wall coverings and any applied method of attachment from the floor slab or wall surface. Remove and dispose of all waste and debris in an orderly manner from the building and site and properly dispose of in full accord with all applicable codes and governing authorities. Patch and prepare the floor and walls to receive the scheduled finish materials per the manufacturers recommendations.

9. Where existing wall finishes are shown as being removed, patch and prepare remaining existing construction as required for installation of new finishes per finish schedule and partition/finish plans.

10. This Contractor shall, under his Contract, be responsible for ceiling removal, ceiling suspension removal, lighting fixture removal, associate electrical demolition and maintenance of all ceiling mounted fire alarm speakers and devices in those areas (if any) of the premises where such ceiling exists. Refer to Drawings for specific requirements.

11. The Contractor shall disconnect, remove and carefully protect all existing fluorescent and incandescent light fixtures, air diffusers, ceiling tile and panels for new locations as required. Return any unused fixtures, etc. to University.

12. Carefully cut and remove portions of construction required to be removed, in a manner not to disturb adjacent areas of construction to remain.

13. NOTE: This Contractor shall be responsible for providing adequate bracing to the structure above for all remaining ceilings and walls standing after the demolition of adjacent and/or intersecting ceilings and walls.

14. Floor penetration openings shall be sealed , filled and capped to maintain a structurally sound floor. Finish of floor opening and/or cap shall be flush with adjacent floor slab.

15. Where all drywall to remain has been damaged by the removal of abutting or intersecting drywall or other elements, the drywall surface to remain shall be patched by this Contractor, the Patch shall be accomplished with appropriate stud backing in a manner such that the adjacent surfaces to be patched to the patched area are flush, smooth and suitable for taping and floating by another Contractor. Examples of these

conditions would be where partitions to be demolished intersect the core, furred columns or perimeter bulkhead.

16. Where ductwork is removed from sections of ductwork scheduled to remain, the openings shall be permanently sealed by this Contractor to prevent air leaks when the system is pressurized. The cap shall be of like material as that which is to remain and shall be sealed with hard cast or blue glue.

B. Pollution Controls: Use temporary enclosures and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

1. Clean adjacent space(s) and improvements of dust, dirt and debris caused by demolition operations, as requested by University Representative. Return adjacent areas to condition existing prior to the start of Work.

C. Space Demolition: Demolish materials completely and remove from site. Use such methods as required to complete work within limitations of governing regulations.

3.2 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove on a daily basis from site debris, rubbish and other materials resulting from demolition operations.

B. Under no circumstances shall refuse be allowed to block or otherwise impair circulation in stairs, corridors, sidewalks or other traffic areas at any time. Removal and disposal of all debris shall be in accordance with building management's methods, lease, state/local codes/laws, any/all environmental governing agency and any other governmental agency that has jurisdiction over this project.

C. Removal: Transport materials removed from demolished structures and dispose of off site.

D. Time of Demolition Work: General Demolition Work in the new construction area shall be accomplished during normal working hours unless otherwise designated.

1. Work and/or item that will cause noise, requires access, etc. on the floors below, shall be done during off-hours as scheduled and coordinated with the University.

2. All labor and cartage costs shall be included in Bid(s).

E. Recycling: All concrete and steel by piece or component, to be demolished and removed from the site shall be sent to a recycling center. Weight tickets for all debris shall be submitted to the District with a tabulation sheet showing tonnage of recycled vs. landfill.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. Repair all areas of demolition performed in excess of that required, at no cost to the University.

B. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by University Representative or governing authority. Return adjacent areas to condition existing prior to the start of work.

C. Upon completion of the demolition work, the General Contractor shall provide that all areas be left broom clean.

END OF SECTION

SECTION 06200
FINISH CARPENTRY

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide finish carpentry items as shown on the Drawings and as specified, complete.

1. Rough framing for millwork (casework) is shown on the Drawings.

2. Hardware for millwork (casework) is shown on the Drawings.

1.2 QUALITY ASSURANCE

A. Allowable Tolerances:

1. Moisture content for millwork (casework) shall be between 5 and 10%.

B. Reference Standards: Millwork (casework) shall be manufactured in accordance with standards established in the Manual of Millwork of the Woodwork Institute of California (WI), 2001 11th Edition, in the grade or grades herein specified or as shown on the Drawings. If the manufacturer is not a WI licensee, Contractor shall furnish to University's Representative, prior to installation, a Certificate of Reinspection by the WI indicating that the work in question meets the requirements of the WI grade specified. If the manufacturer is a WI licensee, each elevation of work shall bear the WI Certified Compliance grade label indicating the grade specified, and by the completion of the job, WI Certified Compliance Certificates shall have been issued certifying that the installation fully meets the requirements for the grade specified. The foregoing shall not be construed to limit the power and authority of University's Representative to reject any millwork which does not in University's Representative's opinion meet with any one or more of the specifications of this contract.

1.3 SUBMITTALS

A. Refer to Section 01330, SUBMITTAL PROCEDURES for procedures.

B. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Millwork (casework).

2. Trim.

1.4 PRODUCT DELIVERY AND STORAGE

A. Delivery of Materials: Do not deliver millwork (casework) until third mudding of gypsum board has cured for at least fifteen (15) days.

B. Storage of Materials, Equipment and Fixtures: Protect all millwork (casework) and finish against dampness, store in dry and well ventilated areas, and do not subject to extreme changes of temperature or humidity.

2. PRODUCTS

2.1 GENERAL

A. Fabricate and install the work to the Custom Grade classification of WI. Refer to Material Legend on drawing A5.11 for finish materials and colors.

2.2 CABINETS

A. Design: Fabricate and finish as shown on the Drawings.

B. Composite wood and agrifiber products shall contain no added urea-formaldehyde.

2.3 HARDWARE

A. Hardware: In accordance with WIC Approved Hardware Listing, and as follows:

1. Adjustable shelf standards: Hettich 022 737 in pre-drilled holes, Knape & Vogt #256 in pre-drilled holes, or equal.

    a. Wall standards: Knape & Vogt #87, bracket #187, natural aluminum finish, or equal (no known equal).

2. Base adjusters (levelers): National D6009/6005 with cover buttons, or equal (no known equal).

3. Drawer extensions:

    a. Up to 6" depth: Accuride 7432 – full extension; 100# capacity, or equal (no known equal).

    b. Over 6" depth: Accuride 3640 - full extension; 200# capacity, or equal (no known equal).

    c. For file drawers: Accuride 7432 - full extension; 100# capacity, or equal (no known equal).

4. Hanger rods: 1-5/16" o.d., .120" wall thickness, heavy duty, chrome plated steel tubing. Furnish center supports for spans four feet or greater.

5. Wire Pulls: Extruded brushed aluminum, 4”.

6. Catches: Amerock #BP 9783AL, or equal (no known equal) magnetic.

7. Lift top hinges: Stanley 311-1/4, Hager CD 1311, or equal size as required for top thickness.

8. Hinges: Concealed type.

9. Locks:

    a. Doors: National Lock C8123, C8124, C8125. Surface lock with short 3/4" bolt, or equal (no known equal).

b. Drawers: National Lock C8138, C8148, C8149. Surface lock with short 3/4" bolt - same lock turned 90°, or equal (no known equal).

10. Finish: US26D unless noted otherwise.

11. Drawer stops: Provide stops to prevent drawers from hitting face of cabinet body.

12. Label holders: Corbin #1913-1/4H, Garcy #853 or equal.

13. Keyboard drawers: Accuride standard keyboard system Model CBERGO-Tray200 or equal (no known equal).

3. EXECUTION

3.1 INSTALLATION

A. Installation:

1. Standing and Running Trim.

a. Standing and running trim includes cut-to-length and lineal type wood trim, including wood wall base.

b. Interior Trim. Cleanly machine and then mill-sand interior trim to remove all imperfections and tool marks. Back-rout all trim.

2. Millwork (casework).

a. Millwork includes cabinets, cases, counters, paneling, wainscot and enclosures of all kinds, including all doors, plastic laminates and plywood for use therewith.

b. Workmanship and Assembly. Conform to applicable provisions of WIC Manual of Millwork.

1) Work shall be custom grade.

c. Shop assemble all millwork (casework) except for cases too large for entrance into the area in which the casework will be installed. Make the latter in sections with provisions made for job connection in the space. Scribe contacts with adjoining work as required.

3. Closet and Storage Shelving. Provide closet and storage shelving as shown and required by the Drawings. Visible edges of plywood shall be banded with lumber edging, glued under pressure with no nails allowed. Edging shall match the face veneer.

4. Telephone and Electrical Backboards. Install Grade B-B exterior plywood panels, 3/4 inch thick by 4 feet high. After sizing, fire-retardant pressure treat each piece to flame spread of 25 or less and smoke developed of 50 or

less per ASTM E84 test. Secure to walls with stripes of contact adhesive and molly-bolts at 24 inch centers around perimeter of each panel. Set top of backboards at +7'-0" above finish floor. Do not paint backboards.

END OF SECTION

SECTION 07270
FIRESTOPPING

1. GENERAL

Contractor shall submit in advance of using any products, cut sheets and samples of intended products for building engineer review and UCLA fire marshal approvals. Contractor shall ensure actual samples of the used product are kept on site, for physical inspection by the fire marshal.

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and the Division-1 Specification sections, apply to work of this section.

1.1 SUMMARY

A. This Section includes firestop sealant, safing insulation and firestops/firestopping as required by any/all codes and/or laws for the following locations and/or construction.

1. Openings between connecting floors.

2. In walls at raised floors or where shown and required by Code.

3. Below all wood raised floor systems.

4. All pipes, ductwork or conduit penetrating a fire-rated wall or floor assembly.

5. Head of wall firestopping at fire rated full height partitions.

6. Behind all applied wall finishes, panels, millwork, etc.

B. Fire stop mortar not allowed.

1.2 SUBMITTALS

Refer to Section 01340 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B. Product data from manufacturers for each joint firestop sealer grout or safing insulation product required, including instructions for joint preparation and joint sealer application and insulation installation instructions.

C. Certified Tests Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including r-values (aged

values for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

1. Certificates from manufacturers of joint firestop sealers and safing insulation attesting that their products comply with specification requirements and are suitable for the use indicated.

2. Samples of each product.

D. Certificates: Submit certificates from manufacturer and installer.

1. Product test reports for each type of joint firestop sealer evidencing compliance with requirements.

1.3 QUALITY INSURANCE

A. Manufacturers Certificate: Not less than 5 years experience manufacturing types of product specified.

B. Installer Certificate: Engage an Installer who has successfully completed within the last 3 years at least 3 sealer applications similar in type and size to that of this Project and is approved by manufacturer for this type of insulation.

1. Pre-installation conference to be attended by Installer, Contractor and Designer and representatives from affected trades.

C. Warranty: Contractor to warrant that the firestopping system will provide a permanent installation.

1. 4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

C. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

1.5 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of firestop joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by manufacturers.

2. When substrates are wet due to rain, frost, condensation, or other causes.

B. Joint Substrate Conditions: Do not proceed with installation of firestop joint sealers until contaminants capable of interfering with their adhesion as removed from joint substrates.

2. PRODUCTS

2.1 FIRE-RESISTANT JOINT SEALERS

A. General: Provide manufacturer's standard fire-stopping sealant, with accessory materials, having fire-resistance ratings indicated as established by testing identical assemblies per ASTM E 814 by Underwriter's Laboratories, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.

B. Foamed-In-Place Fire-Stopping Sealant: two-part, foamed-in-place, silicone sealant formulated for use in a through-penetration fire-stop system for filling openings around cables, conduit, pipes and similar penetrations through walls and floors.

C. One-Part Fire-Stopping Sealant: One part elastomeric sealant formulated for use in a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.

D. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

1. Foamed-In-Place Fire-Stopping Sealant:

   a. "Dow Corning Fire Stop Foam"; Dow Corning Corp.
   b. "Pensil 851"; General Electric Co.
   c. Or Approved Equal.

2. One-Part Fire-Stopping Sealant:

   a. "Dow Corning Fire Stop Sealant"; Dow Corning Corp.
   b. "3M Fire Barrier Caulk CP-25"; Electrical Products Div./3M
   c. "RTV 7403"; General Electric Co.
   d. "Fyre Putty"; Standard Oil Engineer Materials Co.

e. "Fyre Shield"; Tremco
f. "Fyre-Sil"; Tremco (High Movement)

E. Accessory Materials for Fire-Stopping Sealants: Provide forming, joint fillers, packing and other accessory materials required for installation of fire-stopping sealants as applicable to installation conditions indicated.

F. Environmental Requirement: Select sealants that meet or do not exceed South Coast Air Quality Management District (SCAQMD) standards Rule No. 1168.

2.2 FIRESTOPPING INSULATING MATERIALS

A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

B. Semi-Refractory Fiber Board Safing Insulation: Semi-rigid boards designed for use as a firestop at openings between edge off slab and exterior wall panels at tops of rated walls and as shown, produced by combining semi-refractory mineral fiber manufactured from slag with thermosetting resin binders to comply with ASTM C 612, passing ASTM E 136 for combustion characteristics; r-value of 4.0 at 75º F (23.9º C), meeting point exceeding 2000º F. Supports to be 26 gauge galvanized steel.

C. Manufacturers of Semi-Refractory Fiber Insulation:

1. Manville Corp.
2. United States Gypsum Co.
3. Or Approved Equal.

3. EXECUTION

3.1 EXAMINATION

A. Examine surfaces indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joint immediately before installing joint sealers to comply with recommendations of joint sealers manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealers, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion

and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellents; water; surface dirt.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

B. Joint Priming: Prime joints substrates where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendation. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION

A. General: Comply with manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Installation of Fire-Stopping Sealant: Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

C. At full height fire-rated walls: Install fire safing insulation as shown on the drawings at wall head conditions:

1. Protect all fire safing insulation by installing 22 gauge galvanized sheet metal closure at top and bottom, which complies with the DBC for protection of fire safing insulation.

2. Tool exposed surfaces of mortar or sealants.

3. At plastic pipes penetrating floors provide a gauge galvanized steel sleeve around pipes, fire stop sealant within sleeve.

4. At opening between walls and floors install fire safing insulation per DBC requirements and in accordance with AAMA Tir-A3.

3.4 CLEANING

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

3.5 PROTECTION

A. Protect joint sealers and insulation from contact with contaminating substances or from damage resulting from construction operation or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deteriorated joint sealers immediately and installations with repaired areas indistinguishable from original work.

END OF SECTION

SECTION 07900
CAULKING AND SEALANTS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Furnish and apply caulking and sealants as shown on the Drawings and as specified, complete.

1. Caulking as specified is for installation on the interior of the building unless sealant is indicated on the Drawings.

2. Sealant as specified shall be installed on the exterior of the building, and where sealant is otherwise indicated on the Drawings.

3. Sealants shall comply with USGBC LEED criteria for suitable emissions.

4. Refer to Section 01330 SUBMITTAL PROCEDURES

1.2 GUARANTEE

A. Furnish to University a written guarantee against all defects in materials and workmanship, including against discoloration, sagging, cracking, mildewing and similar defects for two (2) years from date of acceptance.

2. PRODUCTS

2.1 MATERIALS

A. Materials utilized shall be from new cartridges with shelf-life valid during installation. Do not use seconds or remnants.

1. Color shall be as follows:

a. For joints separating two similar materials, match finish surface color.

b. For joints separating dissimilar materials, such as perimeter joints around louvers, door frames, window frames, etc., match wall surface color, except match mortar color in face brick walls.

B. Caulking shall be acrylic latex type caulk.

C. Sealant: Provide two (2) component rubber based compounds complying with Federal Specification TT-S-0027C.

1. Class "A" for non-traffic horizontal surfaces.

2. Class "B" for vertical surfaces.

D. Primer shall be as recommended by the caulking or sealant manufacturer.

E. Filler material shall be as recommended by the caulking or sealant manufacturer.

F. Environmental Requirement: Select sealants that meet or do not exceed South Coast Air Quality Management District (SCAQMD) standards Rule No. 1168.

3. EXECUTION

3.01 PREPARATION

A. Preparation of Surfaces:

1. Joint Preparation. After all cleaning operations on the exterior of the building are completed, rake out all joints between the frames and the masonry walls to remove all loose mortar materials and brush-clean to remove all dust and dirt. Where no backstop occurs to receive the caulking or sealant compound, fill joints with filler material as recommended by the caulking or sealant manufacturer.

3.2 APPLICATION

A. Application: Apply caulking or sealant, and primer in accordance with the printed instructions of the caulking or sealant manufacturer. Apply primer when and where recommended by the manufacturer.

3.3 ADJUSTMENT AND CLEANING

A. Clean and leave free from stains surfaces of all materials adjoining caulked or sealed joints. Remove excess of caulking or sealant on adjoining surfaces in accordance with the caulking or sealant manufacturer's printed recommendations.

END OF SECTION

SECTION 08213

PLASTIC LAMINATE FACED DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Doors for frames specified elsewhere.

B. Doors for pre-hung door and frame units.

1.2 RELATED SECTIONS

A. Section 08105 - Adjustable Metal Door Frames: Door frames for pre-assembled door and frame units.

1.3 REFERENCES

A. AWI P-200 - Architectural Woodwork Quality Standards Illustrated; 1997, Seventh Edition, Version 1.0.

B. WDMA NWWDA I.S.1-A - Architectural Wood Flush Doors; 1997.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Door and frame schedule.

D. Selection Samples: Provide Plastic Laminate samples to match adjacent door finishes in suite.

E. Specimen Warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Mark packages with size, swing, and door tag or opening number.

1.6 WARRANTY

A. Provide manufacturer's written warranty that doors will be free of defects for the period specified under normal use. Adhere to manufacturer's requirements to avoid voiding warranty.

PART 2 PRODUCTS

2.1 MATERIALS

A. Non-Fire-Rated Solid Core Doors: Flush wood doors faced with 0.050 inch (1.3 mm) thick high pressure plastic laminate.
   1. Type: Particleboard core type, complying with AWI Type PC-HPDL-3 and WDMA NWWDA I.S.1-A; with average 30 pcf (480 kg/cu m) density core complying with ANSI A208.1 Grade LD-1.
      a. Crossbanding: 1/10 inch (2.5 mm) thick 3-ply wood crossbanding.
      b. Face Backer: 1/10 inch (2.5 mm) thick hardboard face backer.
      c. Environmental Requirements: Particleboard shall contain no urea-formaldehyde. Laminate adhesives used to fabricate on-site and shop applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resins.
   2. Facing Color: Color and pattern selected to match adjacent existing doors.
   3. Facing Color: TBD.
   4. Edge Banding: Matching laminate.
   5. Total Thickness: 1-3/4 inches (44 mm).
   6. Core Edges: Structural composite lumber.
   7. Stiles and Rails: Solid hardwood lumber.
   8. Stile Width: 1-3/8 inches (35 mm) before trimming.
   9. Top Rail Height: 1-3/8 inches (35 mm) before trimming.
   10. Bottom Rail Height: 1-3/8 inches (35 mm) before trimming.
   11. Adhesive: Type II, water-resistant.
   12. Face Plane Tolerance (Telegraphing): Variation in surface of face not more than 1/100 inch (0.25 mm) from true plane in any 3 inch (75 mm) span.
   13. Warp Tolerance: Bow, cup, and twist not more than 1/4 inch (6 mm) in any 42 inches (1066 mm) wide by 84 inches (2133 mm) high area, or less, if door dimensions are smaller; excluding doors less than 1-3/4 inch (44 mm) thick that are over 36 inches (914) wide or 84 inches (2133 mm) high and doors with cutouts exceeding manufacturer's specified limits.
   14. Provide life-of-installation warranty.

B. Hardware:
   1. Door Pull: Trimco 1069

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install doors in frames plumb and true, without rack, slide easily into and out of pocket

C. Install doors with all hardware specified.

D. Adjust door and frame for free operation without binding, rack, or warp.

3.2 PROTECTION

A. Protect installed products until completion of project.

B. Clean, touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION

SECTION 08710
FINISH HARDWARE

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide finish hardware as shown on the Drawings, as specified and as scheduled, complete.

1. Provide hardware templates as required for metal doors and frames and other work to be factory-prepared for the installation of hardware.

2. Furnish additional items of hardware which are necessary to make a complete installation.

3. Only one (1) manufacturer for each category of finish hardware shall be furnished throughout the project.

4. Prior to submitting or ordering new doors, frames or hardware, and prior to prepping new doors, verify with building engineer for correct back-set, lock operation / lockset function etc. Incorrect assumptions will not be grounds for compensation. A submittal of lockset functions shall be submitted.

B. Definitions: Finish hardware is hereby defined to include all items known commercially as builders' hardware, as required for swing-types of doors, and all cylinders for special doors as itemized herein.

1.2 SUBMITTALS

A. Refer to Section 01340 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Product Data: Submit complete product data.

C. Prior to delivery of hardware, submit hardware shop drawings and a hardware schedule of all hardware required. The schedule shall follow the requirements of the specifications and list type, manufacturer's name and number, finish and location. In addition, furnish a schedule fully identifying all abbreviations and symbols used.

1. Furnish with each set of shop drawings, one (1) copy of the standard mounting heights for hardware, published by the DHI.

2. Furnish a graphic keying chart of the project depicting the keying system of the building.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Packing and Marking: Package each item of hardware and each lockset separately in individual containers, complete with necessary screws, keys, instructions and installation template for mortising tools. Mark each container with item number corresponding to number shown on Contractor's hardware schedule.

2. PRODUCTS

2.1 MATERIALS

A. Finishes: Hardware shall have the following standard finishes:

1. Hardware and Finishes to Match Building Standards – Contractor to verify Building Standards prior to submitting hardware submittal and revise hardware schedule to conform to building standards as required.

2. US3 (BHMA No. 605), unless otherwise specified.

3. US26D (BHMA No. 626), when used in toilets.

4. For exposed surfaces of surface-type door closers and closer arms, paint to match hardware finish on remainder of door. Refer to Section 09900, PAINTING.

5. Metal astragals and metal door edges, including factory-painted units, paint to match door frame.

B. Description of Hardware: The following paragraphs describe individual hardware items to establish the design intent and function of required hardware. Contractor to verify building standards prior to submitting hardware submittal and revise hardware schedule to conform to building standards as required.

1. ADA Approved Pocket Door Pulls and Grips shall be Trimco Brand.

a. Trimco 1069: Pocket Door Passage

2. Door seals at door head and jambs shall be provided where scheduled and shall be brush-type; color as selected by University's Representative.

D. Labeled Hardware:

1. Provide hardware which meets the requirements of NFPA Publication No. 80 and of UL and Warnock Hersey for all fire-rated doors and frames.

E. Fasteners:

1. Provide all required fasteners of type, size, quantity and finish for installation with each hardware item. Provide Phillips flat head screws except where otherwise indicated. Finish of exposed fasteners shall match hardware finish or, if exposed upon surfaces of other work, shall match the finish of such other work as closely as possible.

2. Machine screws and expansion shields shall be used for attachment of hardware to concrete or masonry. Toggle bolts shall be used for attaching hardware to gypsum wallboard or plaster surfaces.

3. Provide fasteners which are compatible with both the unit to be fastened and the substrate, and which will not cause corrosion or deterioration of hardware, base material or fasteners.

a. Fasteners exposed to the weather in the finished work shall be brass, bronze, aluminum or stainless steel, as applicable to match the item being fastened. Where these materials cannot be used, steel fasteners shall be zinc or cadmium-plated in accordance with ASTM B633, Type SC3 or ASTM A165, Type NS, respectively.

2.2 MANUFACTURERS

A. Furnish items of hardware required to complete the work in accordance with these specifications and the manufacturers' instructions. Items of hardware not specified shall be provided even though inadvertently omitted from this specification. Items shall be of equal quality and type.

B. Where the exact types of hardware specified are not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having as nearly as practicable the same operation and quality as the type specified, subject to Architect's approval.

C. Carefully inspect Project for the extent of the finish hardware required to complete the Work. Where there is a conflict between these specifications and the existing hardware, furnish finish hardware to specification.

3. EXECUTION

3.1 PREPARATION

A. Hardware for installation on metal doors, frames or other work shall be factory-prepared for hardware installation and shall be made to standard templates of the hardware manufacturer. Drilling and tapping for hardware installation shall be done in the field.

3.2 INSTALLATION

A. Install hardware items in compliance with the manufacturer's printed recommendations.

B. Do not install surface-mounted items until finishing operations have been completed on the substrate.

3.3 FIELD QUALITY CONTROL

A. Mount hardware items at heights indicated in DHI "Recommended Locations for Builders Hardware," and in accordance with the "Regulations for Accommodation of the Disabled in Public Accommodations" in the California State Building Code, Title 24, Parts 2, 3 and 5.

3.4 ADJUSTMENT AND CLEANING

A. Adjust and check each operating item of hardware to ensure correct operation and function of all units.

1. Lubricate moving parts with type of lubrication recommended by manufacturer. Utilize graphite-type if no other lubrication is recommended.

2. Replace units which cannot be adjusted or lubricated to operate freely and smoothly as intended for the application specified, as approved and at Contractor's expense.

END OF SECTION

SECTION 09150
ACOUSTICAL CEILINGS

1. GENERAL

1.1 SECTION INCLUDES

A. Acoustical lay-in panels.

1.2 RELATED SECTIONS

A. Section 09130 - Acoustical Suspension Systems.

B. Division 15 - Mechanical.

C. Division 16 - Electrical.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings showing specific methods of application, in coordination with related work. Provide reflected ceiling plans indicating layout of lighting fixtures and other items which are to be integrated with the ceiling.

B. Manufacturer's Data: Submit technical data on material properties, textures and finishes.

C. Samples:

1. Submit a minimum of one 6" x 6" sample of the specified ceiling panels, and manufacturer's standard size samples of other textures and colors from the same group of the selected panels.

1.4 QUALITY ASSURANCE

A. Conform to CISCA requirements.

B. Certifications:

1. Provide certifications that proposed materials are UL-listed or approved under Class "A" designation for fire-resistancy.

2. Submit a written statement, signed by the manufacturer, certifying that acoustical materials are as specified for the proposed ceilings as shown on prepared shop drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened cartons and packaging, with manufacturer's labels and nomenclatures, and fire rating as applicable, legible and intact.

B. Store materials in original cartons and packaging to prevent soiling and physical damage.

C. Do not begin installation until sufficient materials are received for a complete

area or room installation.

1.6 PROJECT CONDITIONS

A. Do not install acoustical materials until interior finishing work has been completed, and all mechanical and electrical work above the ceiling line are integrally installed and functioning with ceiling suspension system work of Section 09130.

B. Do not install materials until a uniform temperature is continuously maintained between 60 and 80 degrees F, with a relative humidity not exceeding 70%, through the operational condition of the HVAC system.

1.7 EXTRA MATERIALS

A. Extra Maintenance Materials: Furnish extra supply of materials in unopened, clearly marked cartons equal to 1.0% to 2.0% of each type of acoustical tile and panel to be installed.

2. PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Armstrong World Industries.

B. USG Corporation.

C. BPB Celotex.

2.2 MATERIALS

A. Ceiling systems shall consist of lay-in acoustical ceiling panels and suspension systems manufactured by the same company.

B. Acoustical Ceiling Panels: ACT-1

1. Panel Name: Armstrong Optima Open Plan 3251 (Or Acceptable Equal)

2. Panel Size: 2 foot x 2 foot.

3. Panel Thickness: 3/4 inch.

4. Edge Detail: Beveled tegular.

5. Light Reflectance: 0.89 minimum, in accordance with ASTM E 1477.

6. CAC: Minimum 35, UL Classified, complying with ASTM E 1414.

7. Class: Class A, in accordance with ASTM E 1264.

8. NRC: Minimum 0.65, UL Classified, complying with ASTM C 423.

9. Color: White.

10. Recycled Content: 74 percent minimum.

11. Mold and Mildew Resistance: All panel faces shall be treated with a biocide paint additive to inhibit mold and mildew or an anti-microbial solution.

C. Suspension System:

1. Suspension System Name: Refer to Finish Schedule as indicated on the Drawings.

2. Fire Class: Class A.

3. Duty: Heavy Duty.

4. Color: Match acoustical ceiling panels.

D. Brace Attachment Clip: Manufacturers' standards to fit system furnished for acoustical panels, as indicated.

E. Vertical Strut: USG Donn Compression Post, or equal, or as indicated; types and designs complying with requirements of authorities having jurisdiction and seismic requirements.

F. Hanger Wire: No. 12 gage (9 gage for pendant fixtures), galvanized carbon steel per ASTM A 641, soft tempered, prestretched.

3. EXECUTION

3.1 EXAMINATION

A. Collaborate the work of this Section with related work, for the proper and functional integrations of ceiling panel with the grid system; lighting fixtures and other electrical accessories; and facilities for heating, venting and air-conditioning.

B. Prior to commencing work, ensure that related job conditions are perfectly suited for ceiling application. Do not proceed with the work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install acoustical ceilings in accordance with CISCA standards, directionally as shown on reflected ceiling plans, in coordination with related work.

B. Install acoustical ceiling units from a three carton mix to obtain uniform distribution of surface variations.

C. Neatly scribe acoustical ceiling units at abutting surfaces and at all penetrations or projections when moldings are not acceptable.

D. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.

E. Cut acoustic units to fit irregular grid and perimeter edge trim.

F. Provide accessibility in the exposed grid ceiling, except where light fixtures and other equipment are installed.

3.03 CLEANING

A. Clean minimally affected surfaces after installation with cleaning solutions as recommended by the manufacturer of acoustical material.

B. Remove and replace soiled damaged, and improperly installed units. Complete acoustical ceiling shall be free from all defects.

C. Remove cartons, containers, rubbish and waste materials as they accumulate, and upon completion, from the Project site.

END OF SECTION

SECTION 09250
GYPSUM WALLBOARD SYSTEMS

1. GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and the Division-1 Specification sections, apply to work of this Section. Refer to Section 01330 – SUBMITTAL PROCEDURES

1.1 DESCRIPTION OF WORK

A. The extent of the gypsum wallboard work is shown on the Drawings and in schedules, and is hereby defined to include gypsum board work with a tape-and-compound joint treatment system known as "drywall finishing" work.

B. Work Included: Furnish and install all gypsum drywall construction, including light-gauge metal stud non-load bearing wall framing and furring, gypsum wallboard, acoustical batt insulation, all required accessories, and taping and joint finishing, as shown on the Drawings and specified herein or as required to complete the Work.

C. The types of work required include the following:

1. Gypsum wallboard including screw-type metal support system
2. Gypsum wallboard finishing (joint tape-and-compound treatment and skim-coating)
3. Acoustical insulation
4. Sealants and Caulking

D. Related Work Specified Elsewhere:

1. Section 06100: Rough Carpentry
2. Section 08116: Aluminum Metal KD Frames
3. Section 08200: Wood Doors
4. Section 08800: Glass and Glazing
5. Section 09265: Gypsum Wallboard Shaft Wall System
6. Section 09510: Acoustical Ceilings
7. Section 09900: Painting

1.2 QUALITY ASSURANCE

A. Fire-Resistance Rating: Where work is indicated for fire-resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities including UL and A.I.A.

B. Industry Standard: Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association,

except where more detailed or more stringent requirements are indicated including there commendations of the manufacturer.

C. Reference Standard: Comply with requirements of ASTM C754, except where more detailed or more stringent requirements are shown including the recommendations of the manufacturer.

D. Requirements of Regulatory Agencies: Comply with the applicable requirements of all governing codes and authorities, unless otherwise shown or specified.

E. Manufacturer: Obtain gypsum boards, trim accessories, adhesives and joint treatment products from a single manufacturer or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.3 PRODUCT HANDLING

A. Deliver gypsum wallboard materials in sealed containers and bundles, fully identified with manufacturer's name, brand, type and grade; store in a dry, well ventilated space, protected from the weather, under cover and off the ground.

1.4 JOB CONDITIONS

A. Maintain ambient temperatures at not less than 50 F, for the period of twenty-four (24) hours before wallboard finishing during installation and until compounds are dry.

B. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment.

1.5 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate installation and finishing of gypsum board systems with insulation, painting, wall covering, mechanical and electrical, or other Sections whose work is dependent upon or related to gypsum board. do not enclose walls or partitions until all required framing, insulation, mechanical, and electrical inspections have been made and approved.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Furnish products manufactured by Eagle Gypsum Products, Domtar Gypsum, Georgia-Pacific, Gold Bond, or U.S. Gypsum.

2.2 METAL SUPPORT MATERIALS

A. General: To the extent not otherwise indicated, comply with ASTM C754, "Installation of Steel Framing Members to Receive Screw-Attached Gypsum

Wallboard" (as specified and recommended) for metal system supporting gypsum drywall work.

B. Ceiling suspension Main Runners: 1-1/2" 16 gage Cold Rolled steel channels, 0.475 lb. per foot.

1. Hanger Wire: ASTM A641, soft, Class 1 galvanized, pre-stretched; sized in accordance with ASTM C754.

2. Hanger Anchorage Devices: Provide concrete inserts, clips, bolts, screws and other devices applicable to the indicated method of structural anchorage for ceiling hangers. Size devices for 3x calculated load supported, except size direct-pull concrete inserts for 5x calculated load.

C. Sheet Steel: Conform to applicable provisions of ASTM A568, minimum yield strength 33 ksi for thickness less than 20 gauge and 40 ksi for 20 gauge and heavier, with zinc coating conforming to ASTM A525.

D. Studs:

1. Interior Partitions: Minimum 25 gauge electro-galvanized steel, screw type, with minimum 1-1/4" hemmed legs and pre-punched webs, width as indicated, and complying with applicable provisions of ASTM C645.

2. Design Requirements: Thickness or gauge of studs is subject to height limitations recommended by manufacturer, based on maximum deflection of L/240 when partition or wall assembly is subjected to a 5 psf uniform lateral load at interior partitions.

3. ASTM C645; 20 gauge x 1-5/8", 2-1/2", 3-5/8" deep, except as otherwise indicated.

E. Stud Tracks:

1. Interior Partitions: Minimum 25 gauge electro-galvanized steel, screw type, minimum 1" unhemmed legs, width same as studs for indicated partition, and complying with applicable provisions of ASTM C645. Where studs heavier than 25 gauge are indicated or required, provide track of same gauge as studs.

2. Stud System Accessories: Provide stud manufacturer's standard clips, shoes, ties, reinforcements, fasteners and other accessories as needed for a complete stud system.

F. Metal Furring Channels: DWC Hat shaped, 7/8" (22mm) high, 25 ga. (0.53mm), galvanized per ASTM A164.

G. Furring Anchorages: 16 ga. (1.6 mm) galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws as recommended by furring manufacturer and complying with ASTM C754.

2.3 BOARD MATERIALS

A. Fire Rated Gypsum Wallboard: UL-rated 1/2" or 5/8" thick, 4'-0" wide x minimum 8'-0" long, tapered edge, fire-resistant core gypsum wallboard with manila paper finish, complying with applicable provisions of ASTM C36 and FS SS-L-30D, Type III, Grade X, Class 1.

B. Gypsum Backing Board: Equal to U.S. Gypsum Co. "Sheetrock" backboard, 5/8" thick, Type 'X', unless otherwise indicated, 4' width.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum wallboard work of the type and grade recommended by the manufacturer of the gypsum board.

B. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils, 0.13 perms.

C. Laminating Adhesive: Special adhesive or joint compound specifically recommended for laminating gypsum boards.

D. Gypsum Board Fasteners:

1. Metal Framing to Structure: Power driven fasteners providing 190 lb. (86.2 kg) single shear resistance and 200 lb. (90.7 kg) bearing strength.

2. Metal to Metal Within Drywall Systems: 3/8" (9.5 mm), Type S or S-12, pan head.

3. Gypsum Wallboard to Metal Framing: Lengths as required Types S or S-12, bugle head.

4. Powder Actuated Fasteners: Hilti Type SDF22 or Equal, as recommended by framing manufacturer.

5. Impact Anchors: Hilti HPS Series or equal, as recommended by framing manufacturer.

E. Trim Accessories: Provide trim accessories of the sized required for the drywall applications (i.e.: all exposed outside corner, edges, openings, etc.) as indicated, shown and specified, fabricated from galvanized steel and of the following types:

1. Provide metal corner bead at external corners with smooth rigid nose and perforated and knurled flanges.

2. Provide metal casing bead trim for protection of exposed drywall edges around openings, with square or round nose, joint compound treatment required.

3. Provide beaded nose with exposed flange knurled for joint treatment.

4. Where kerfed jambs are shown, provide trim with special leg designed for insertion into jamb slot.

5. Refer to Drawings for special head track reveal and trim. All trim pieces shall be spackled, taped and finished unless otherwise noted.

6. Where drywall abuts or intersects dissimilar construction, provide square edge casing bead, joint compound treatment necessary.

7. Where control joints are shown or required in drywall areas, provide one-piece joint assembly of non-corrosive metal with continuous unperforated expansion strip for insertion into joint.

F. Edge Treatment: Galvanized steel type 200 "L" bead, 1/2" or 5/8" thick, with minimum 7/8" wide flange.

G. Corner Treatment: Galvanized steel corner bead with 1-1/4" wide flanges.

H. Control Joints: Galvanized steel type 093, minimum overall width 1-3/4", with tape-protected 1/4" wide reveal.

I. Fasteners: Type S bugle-head drywall screws minimum 1" long for 1/2" wallboard, 1-18" long for 5/8" wallboard, and 1-5/8" long for double thickness wallboard or 1" shaft liner panels.

J. Joint Treatment Materials:

1. Joint Tape: Reinforced, perforated paper tape designed specifically for drywall joint treatment, as recommended by wallboard manufacturer, minimum 2" wide. Provide manufacturer's recommended woven glass fiber joint tape at tile backer board.

2. Joint Compound: Pre-mixed, vinyl-based general purpose joint compound containing no asbestos, as recommended by wallboard manufacturer.

3. Finishing Compound: Pre-mixed, vinyl-based topping compound containing no asbestos, as recommended by wallboard manufacturer.

K. Concealed Acoustical Sealant: Sealant shall be "Tremco Acoustical Sealant", a non-drying, non-skinning, non-staining, permanently resilient, synthetic rubber-based acoustical sealant with "gunning" characteristics at 20 F (-7 C) as manufactured by the Tremco Mfg. Company of Cleveland, Ohio.

1. Acoustical Sealant: Tremco, Presstite No. 579.64, W.W. Henry No. 313B, or approved equal.

2. Backing Rod: Closed-cell, bead or rod polyethylene foam.

L. Concealed Acoustical Tape: Foam type; Norton Sealants Division; Norseal V-730.

M. Special Acoustical Sealant: Provide one Component Silicone Sealant, "Silpruf" by General Electric co. (Sound rated walls).

N. Sheet caulking for junction boxes: "Lowry's Electrical Box Sealer."

O. Acoustical Insulation:

1. Acoustical Wall Insulation: Thermafiber sound attenuating blankets complying with FS HH-1-521; Type I; density of not less than 2.5 pound per cubic foot. Unfaced, self-supporting, semi-rigid blanket or sheet for units to be self-supported by friction fit. Provide 1-1/2", 2-1/2", 3-1/2" nominal thickness or as indicated on the Drawings.

Products/Manufacturers: Thermafiber Blanket; U.S. Gypsum or Owens Corning.

P. Environmental Requirements: 1. Select Adhesives that meet or do not exceed current South Coast Air Quality Management District (SCAQMD) standards Rule No. 1168. 2. Aerosol adhesives must comply with current Green Seal Standard for Commercial Adhesives GS-36. 3. Select sealants that meet or do not exceed current South Coast Air Quality Management District (SCAQMD) standards Rule No. 1168

3. EXECUTION

3.01 INSPECTION

A. Installer shall examine the substrates and the spaces to receive gypsum wallboard and the conditions under which it is to be installed; and shall notify the Contractor, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

B. General:

1. Construction Tolerances for Gypsum Drywall Work: Do not exceed 1/8" (3.2mm) in 8 ft. (2.4 m) non-accumulative variation from plumb or level in any exposed line of surface, except at joints between units.

(a) Do not exceed 1/16" (1.6 mm) variation between planes of abutting edges or ends. Shim as required to comply with specified tolerances.

2. Cutting, Fitting and Trimming: Accurately measure and precut gypsum drywall units for all penetrations, prior to installation. Make all cuts from face side by scoring and snapping away from face side or by sawing. Completely cut paper on backface; do not break paper by tearing. Maintain close tolerances for accurate fit at joints between sheets and at framed openings and to allow for covering of edges of cutouts with plates and escutcheons. Cut edges smooth as required for neat and accurate fit.

3. Screws: Apply drywall screws with a positive-clutch electric power-driven screwdriver equipped with an adjustable screw depth control head and a Phillips bit. Drive screws not less than 3/8" (9.5 mm) from ends of edges of wallboard and to a uniform depth not over 1/32" (0.8 mm).

3.2 INSTALLATION OF METAL SUPPORT SYSTEMS

A. General: To the extent not otherwise indicated, comply with ASTM C754, and manufacturer's instructions. Coordinate with Mechanical and Electrical Work. Do not attach or support metal framing to ducts, pipes or conduit.

3.3 INSTALLATION OF STEEL FRAMING FOR SUSPENDED CEILINGS

A. Do not bridge building expansion joints with support system, frame both sides of joints with furring and other support as indicated.

B. Space ceiling suspension main runners 4'-0" o.c., and space hangers as indicated, or if not otherwise indicated, at 4'-0" o.c. along runners; coordinate with structure.

C. Level main runner channels to a tolerance of 1/8" (3.2 mm) in 12 ft. (3.6 m) measured both lengthwise on each runner and transversely between parallel runners.

D. Space ceiling furring members 16" o.c., except as otherwise indicated.

E. Wire-tie or clip furring members to main ceiling runners and to other structural supports as indicated.

F. Fit tight to conduits, duct work, other work concealed by ceiling and/or sound rated walls. Seal all around by packing with "Duxseal" and caulked with "Silpruf".

G. Install supplementary framing, runners, furring, blocking and bracing at opening and terminations in the Work and at locations required to support fixtures,

equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported directly on gypsum board alone.

H. Provide furring and framing to conceal all pipes, ducts, conduits and raceways not indicated a exposed.

I. Drive screws only through pre-punched holes in channels.

J. Resilient channels are to be attached with mounting flanges facing in only one direction on ceilings and with the gap between the channel and stud faces oriented upward on walls.

K. Hold back ends of channels one to three inches from intersecting surfaces.

L. Locate channels so that gypsum board will not be cantilevered more than 6" from vertical surfaces.

3.4 INSTALLATION - PARTITION METAL FRAMING AND FURRING

A. General: Install metal studs, tracks, furring channels in accessories in strict compliance with manufacturer's installation procedures. Anchor all components firmly into position, and plumb to within 1/8" throughout their height or horizontal plane of any run.

B. Stud Tracks: Attach tracks in continuous runs to floor and overhead structure or ceiling grid as indicated. Use suitable fasteners as recommended by framing manufacturer. Space fasteners maximum 24" o.c., beginning 2" from each end. Bed tracks in two continuous 1/4" beads of acoustical sealant at sound-rated walls or partitions.

C. Studs: Position studs vertically into tracks at uniform 24" spacing unless otherwise indicated, with open sides facing in same direction. Rotate into position for friction fit, and fasten to tracks with self-tapping screws. Screws shall penetrate flanges of both stud and track. Attach both flanges of studs and tracks at top. Install studs in continuous lengths wherever possible; if necessary to splice studs, provide minimum 8" nested lap, with two screws per stud flange.

1. Install 20 gauge studs at each jamb for openings up to 4'-0" wide and with doors 200 lbs or less.

2. Install 2-20 gauge studs at each jamb for openings to 4'-0" wide with doors 200 lbs to 300 lbs.

3. Spot grout jambs anchors for solid core doors over 2'-8" wide.

4. Extend partition stud system through acoustical ceilings where indicated and elsewhere as indicated to the structural support or substrate above the ceiling.

5. Terminate partition stud system at ceilings where shown on Drawings. Provide matching stud diagonal bracing to structure above for partition stability. (4'-0" o.c.. alternate sides.)

6. Partitions shall be continuous over doors or openings same as adjacent walls.

D. Openings and Block-Outs: Install double studs at all door jambs, and continuous track at door heads. Provide continuous framed support at all four sides of openings or block-outs for duct or other penetrations through walls or partitions. Verify required sizes for all openings or block-outs, and provide space for shims as required.

E. Ceiling Framing: Space 1/1-2" cold-rolled suspension channels at maximum 24" o.c. using specified wire hangers. Fasten furring channels to suspension channels at 24" o.c. using pre-formed wire clips or 18 gauge tie wire.

F. Bracing and Support: Provide overhead or diagonal bracing as indicated or as required to secure framing plumb, rigid, and in alignment. Construct bracing from standard stud and track members unless otherwise indicated. Coordinate bracing with ductwork and other overhead systems or utilities to avoid conflicts.

G. Fire-Rated Partitions: Verify stud sizes, gauges, and widths at fire-rated partitions to ensure compliance with specified rating. Provide breakaway anchor clips at intermediate floor framing.

H. Sound-Rated Partitions: Install floor and overhead tracks in continuous beads of acoustical sealant as specified. Provide resilient channels at furring, ceilings, or partition framing as required to achieve the designated sound ratings.

1. Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support free from axial loading.

2. Provide continuous tracks sized to match studs. Align runner tracks accurately to the partition layout at both floor and ceiling. Secure runner tracks as recommended by the stud manufacturer for the floor and ceiling construction involved except do not exceed 24" (0.6 m) o.c. for other types of attachment. Provide fasteners at all corners and ends of runner tracks.

3. Provide steel channel framing secured to floor for low height walls for stability. Alternate return wall 4" perpendicular to partition (4").

3.5 ACOUSTICAL INSULATION

A. General: Comply with applicable provisions of Gypsum Association Publications GA-216-85, Recommended Specifications for the Application and

Finishing of Gypsum Board, and GA-600-88, Fire Resistance Design Manual, Unless otherwise noted herein.

B. Non-Rated Partitions: Apply wallboard to framing members horizontally or vertically, at Contractor's option, with joints occurring over framing members. Space fasteners 12" o.c.

C. Fire-Rated Partitions: Apply type X wallboard in single or double layers as required to achieve the specified or required fire rating. Comply with GA Fire Resistance Design Manual regarding thickness orientation of wallboard, placement of joints, and spacing of fasteners.

D. Ceilings: Apply wallboard to ceilings with factory edges occurring over framing members. Stagger end joints approximately 1/2 the panel length. Space fasteners 8" o.c. throughout. Comply with applicable requirements of GA Fire Resistance Design Manual at rated ceiling assemblies.

E. Installation: Install gypsum drywall board with face side out. Do not install imperfect, damaged or damp drywall boards. Butt boards together for a light contact at edges or ends with not more than 1/16" (1.6 mm) open space between boards.

1. At hollow metal door frames, cut boards to fit around hardware reinforcement or mortar boxes. Spot grout frames with a quick setting grout or compound at each jamb anchor clip just prior to insertion of boards into frame. Insert boards into frame so that its edge is fully bedded against inside surfaces of the frame. Butter the edge of boards with joint compound if necessary to achieve full bedding.

2. Locate edges or end joints over supports except in horizontal applications or where intermediate supports or gypsum board backblocking is provided behind end joints. Position boards so that tapered edge joints abut and mill-out or field-cut end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partition walls.

3. Provide additional framing and blocking as required to support gypsum drywall at openings and cutouts and to support built-in anchorage and attachment devices for other work.

4. Neatly cut wallboard at joints, intersections, wall openings, switches and outlet boxes. Excessive Joint with or oversize cuts at openings (greater than 1/8") will be cause for rejection.

5. Where chase walls are shown with metal stud construction, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum drywall braces not less than 1/2" (12.7 mm) thick x 12" (0.3 mm) wide and cut to width of chase. Locate at quarter points in wall

height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.

6. Install wall/partition boards vertically only, unless otherwise approved by the University Representative. Comply with the method stated in GA-600 for the tested assembly. Install boards long enough to allow for probable variance(s) in level of concrete floor slabs.

7. Form control joints in drywall construction on 30 ft. (9.1 m) centers unless otherwise shown. Allow 1/2" (12.7 mm) continuous opening between edges of adjacent drywall boards to allow for insertions of control joint trim accessory specified.

8. Do not locate joints within 8" (0.2 mm) of corners of openings, except where control joints are shown at jamb lines or where openings occur adjacent to exterior or interior angles of an area. Wherever possible, cut boards so that single vertical joint occurs over center of door openings.

9. Cover both faces of studs with gypsum board in concealed spaces (above ceilings, etc.), unless otherwise shown in the Details.

10. Isolate perimeter of non-load-bearing wallboard partitions at structural abutments. Provide 1/4" to 1/2" space and trim edge with J-type semi-finishing edge trim. Seal Joints with acoustical tape and sealant.

F. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board with "floating" internal corner construction, unless isolation of the intersecting boards is indicated or unless control or expansion joints are indicated.

1. Bottom edge of wallboard shall not be greater than 3/8" from finished floor. Apply finish, tape and float to bottom edge of wallboard.

G. Tile Backer Board: Install reinforced cementitious tile backer board at showers, tub enclosures, and all other areas subject to direct exposure to water. Space fasteners 6" o.c. at ends, edges, and along intermediate supports.

H. Double-Layer Application: Install ceiling base layer of gypsum backing board prior to wall/partition board installation, and install face layer of exposed gypsum board subsequently. Apply both base and finish layers vertically to walls and partitions.

1. Fasten both layers with screws. Offset joints between layers not less than 10".

3.7 SOUND RATED DRYWALL APPLICATION

A. Where sound-rated wallboard work is indicated, including double-layer work and work on resilient furring, seal the work at perimeters, control and expansion

joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with manufacturer's recommendations for location of beads and close off sound-flanking paths around or through the work including sealing of partitions above acoustical ceilings.

1. At partition walls, provide continuous beads of sealant at juncture of both faces of runners or plates with floor and ceiling construction and wherever drywall abuts dissimilar materials. Seal prior to installation of drywall boards.

2. At ceilings, provide continuous beads of sealant wherever drywall abuts dissimilar materials.

3. At control joints, provide continuous bead of sealant at all faces of control joints. Seal prior to installation of surface-applied control joint accessories and locate at proper depth in joint to allow for insertion of expansion portion of control joint accessory.

4. Seal partition air tight to the metal deck above with continuous acoustical caulking. Where partition runs perpendicular to direction of metal deck flutes, scribe gypsum board to deck and caulk.

5. After installation of drywall base layers, cut face layer sheets 1/2" (12.7 mm) less than floor-to-ceiling height and position with 1/4" (6.35 mm) open space between drywall and door, ceiling and dissimilar vertical construction. Fill 1/4" (6.35 mm) open space with continuous sealant beads after installation of face layer.

6. At openings and cutouts, fill open spaces between drywall and fixtures, cabinets, outlet boxes, piping ducts and other flush or penetrating items, with continuous bead of sealant.

7. Seal sides and back of electrical boxes with a minimum 1/8" (3/17 mm) layer of sealant to completely encase box and joints.

8. Outlet and switch boxes for telephone, electrical or computer cables in partitions shall not be placed back to back. Stagger on opposite sides of partition at least one stud space. Seal back of boxes with outlet box pads.

B. Sound Flanking Paths: Where sound-rated partition walls intersect non-rated drywall partition walls, extend sound-rated construction to completely close sound flanking paths through non-rated construction. Seal joints between face layers at vertical interior angles of intersecting partitions.

1. Where partition intersects window mullion, overlap gypsum board on mullion to within 1/2" glass. Attach gypsum board to mullion with mastic and fill voids as necessary. Place metal corner mold at end of gypsum board and paint flat black. Compress backer rod between end of gypsum board and glass.

2. Supply and return air slots shall not be continuous through partition.

3. Sound flanking paths above ceiling between spandrel beams and exterior building wall shall be closed off and sealed air tight with gypsum board or plaster.

4. Gypsum board at intersection with adjoining partitions shall not run continuous through partition on office side.

5. Where demising partition intersects column furring, furred gypsum board shall not run continuous through partition.

6. Install sound attenuation blankets in all sound-rated partition walls. Completely fill space between studs to full height of partition wall. Fit carefully behind electrical outlets and other work which penetrates partition wall. Attach to back face of drywall in accordance with drywall manufacturer's instructions.

3.8 ACOUSTICAL SEALANT INSTALLATION

A. Use acoustical sealant to form an airtight seal at all penetrations and perimeter of sound rated partitions, floors and ceilings. Gypsum Wall Board. Use backer rod where gaps to be sealed exceed 3/8".

B. Use sheet caulking to seal the back and sides of all junction boxes recessed in acoustically rated partitions.

3.9 DRYWALL ACCESSORIES

A. Edge Treatment: Install metal corner beads at all external corners. Unless otherwise indicated, install "L"-beads at exposed ends of wallboard panels and at abutting joints with other materials, leaving a minimum 1/8" reveal for caulking.

B. Control Joints: Install metal control joints at approximately 30'-0" o.c. in large expanses of walls, at 50'-0" o.c. maximum in ceilings and at other locations indicated on the Drawings.

C. Special Accessories and Trim: See Drawings for location, size, and type of special trim pieces, such as reveals and bullnoses.

3.10 INSTALLATION OF WALLBOARD FINISHING

A. General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Joints: Center paper joint tape over joints and embed in uniform layer of joint tape of sufficient width and depth to provide firm and complete bond. Apply skim coat of joint compound over tape. Feather edges of joint compound evenly onto adjacent surface of wall board.

C. Interior Corners: Treat interior corners which do not terminate with "L"-beads by folding reinforcing tape to conform to adjacent surfaces and to true, straight angles. Embed tape in joint compound.

D. Metal Accessories and Trim: Conceal metal flanges with at least two coats of joint compound. Feather compound out 8" to 10" beyond nosing of metal trim pieces.

E. Fasteners, Dents and other Depressions: Fill dimples, gauges, and other depressions with joint compound, feathered smooth to match adjacent surfaces.

F. Top or Finish Coat: Sand joint compound as required to obtain uniform, smooth surface prior to application of finishing compound. Apply first coat of finishing compound over joint compound, feathering out beyond edge of joint compound. Allow to thoroughly dry (at least 24 hours), then apply second coat, feathering edges out slightly beyond first coat.

G. Skim Coat: After final sanding of joint and fastener treatment surfaces, apply thin skim coat over entire surface of wallboard to minimize suction and porosity or other variations between treated areas and face paper surfaces, and to improve fastener and joint concealment.

3.11 PROTECTION

A. Completed Work: Protect completed drywall surfaces from injury or damage from work of other trades. Repair any areas damaged prior to final completion and acceptance of the Work, at no additional cost to the University.

3.12 CLEAN-UP

A. Clean floors of drywall debris and leave broom clean. Remove excess material, scaffolding, tools and other equipment upon completion of work.

END OF SECTION

SECTION 09650
RESILIENT FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Provide resilient inlaid sheet flooring and resilient wall base, including accessories, as shown on the Drawings and as specified, complete.

1.02 SUBMITTALS

A. Refer to Section 01340, Shop Drawing, Product Data and Samples.

B. Submit (4) 6” x 6” samples for review and verification of finishes and colors by Architect..

C. Maintenance Data:

1. Maintenance Instructions. Submit to University's Representative two (2) current copies of manufacturer's printed instructions for recommended maintenance practices for each type of accessory and resilient flooring.

1.03 QUALITY CONTROL

A. Refer to Section 01400, QUALITY CONTROL.

B. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer’s installation instructions, and layout.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer.

1.05 MAINTENANCE

A. Refer to Section 01740, Guarantees, Warranties, Bonds, Service & Maintenance Contracts.

B. Deliver to The University 2% extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Inlaid Sheet Flooring type SV1:

1. Manufacturer: Mannington Commercial, Inc.

2. Product: Magna Multiflec Inlaid Sheet Flooring, in colors as indicated on the Drawings:

   a. Width: 72 inches (1.83 meters)

   b. Gage: .055”

   c. Adhesive: per manufacturer’s recommendations.

3. Linoleum sheet flooring shall have a minimum coefficient of friction of 0.60 per ASTM D2047.

4. Materials shall have the following flammability ratings, according to ASTM E 84:

   a. Flame Spread: 75 or less.

   b. Smoke Density: 450 or less.

B. Resilient Wall Base type RB-1:

1. Manufacturer: Burke Mercer. (Or Acceptable Equal)

2. Product: BurkeBase 4” rubber base.

3. Materials shall have the following flammability ratings, according to ASTM E 84:

   a. Flame Spread: 75 or less.

   b. Smoke Density: 450 or less.

PART 3 - EXECUTION

3.01 INSTALLATION / APPLICATION – INLAID SHEET FLOORING

A Contractor shall prepare floor substrate in accordance with manufacturer's instructions.

1. Substrate shall be smooth, flat, level, dry, and clean and free of foreign materials.

2. Where filling or leveling is required, use a high quality cementitious-based underlayment. Do not install over gypsum-based leveling or patching materials.

3. Do not use chemical adhesive removal products.

4. Perform tests for excessive moisture (ASTM F 1869), humidity (ASTM F 2170) and pH levels (ASTM F 710). Provide means for passing these tests per manufacturer's instructions.

C. Sheet flooring shall be cut for minimum number of seams and for pattern match between adjacent abutting edges. Refer to the Drawings for color and pattern.

1. Inlaid sheet flooring to run under all casework.
2. Heat weld all joints (color to match flooring)

3.03 INSTALLATION / APPLICATION – RESILIENT WALL BASE

A. Apply resilient base to walls, columns and pilasters in rooms or areas where base is shown on Drawings.

1. Install wall base in as long lengths as practicable with preformed corner units.

2. Install base at casework as indicated on the Drawings.

3.04 ADJUSTMENT AND CLEANING

A. Cleaning and Protection:

1. Clean all flooring, base, adhesive residue and other accessories in accordance with the manufacturer's printed recommendations.

2. In addition to any factory-applied floor coatings, apply two (2) coats of wax finish, recommended by the flooring manufacturer to linoleum sheet flooring and base. Each application shall be polished with a mechanical buffer. Apply and buff the first coating following cleanup of the floor. Final waxing and buffing techniques shall be approved by University's Representative.

3. Following first waxing, provide 36-inch (900 mm) wide rosin-sized building paper, running from door-to-door and to windows. Maintain the paper until such time as the final waxing is approved.

4. Curing times for vinyl wood floor will vary, but should not be less than 72 hours from installation. Light to moderate traffic, as well as placement of furniture may commence after that.

END OF SECTION

SECTION 09900
PAINTING

1. GENERAL

This specification section is modified specifically for UCLA Tenant Improvement Projects. A good faith effort to comply with the USGBC "LEED" protocol is required. All products submitted shall be environmentally friendly and shall comply with all South Coast Air Quality Management District (SCAQMD) standards and comply with USGBC requirements for products of that intended use. If there are questions with a product, Contractor shall submit them as an RFI during the bid process for University clarification. Although the LEED certification process is not being followed, compliance with the LEED protocol is required relating to product selection, documentation, application and close-out.

Refer to finish schedule if Scuff-Master paint is required over new or existing HM doors and/or frames. Ensure adequate prep and application per manufacturers guidelines. Ensure suitable floor prep is carried out. Refer to building rules. Due to the prep and noxious smell, Scuff-Master painting work shall only be done Friday after hours until Sunday midnight..

A. Standard paint on drywall shall also be after hours but may be Mon – Friday as well as weekends. Refer to building rules.

B. Comply with LEED / Green Documents.

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and the Division-1 Specification sections, apply to work of this Section

A. Work included:

1. Submittals.
2. Preparation of surfaces.
3. Painting of all interior surfaces, except as otherwise specified.
4. Painting of all exterior surfaces, except as otherwise specified.

B. Related Work:

1. Shop prime coats and factory finishes.
2. Painting specified as Work of other Sections.
3. Sealants and caulking.
4. Water repellent sealer.
5. Anti-graffiti coating.

C. Surfaces Not To Be Painted:

1. Non-ferrous metal work (other than zinc-coated surfaces) and plated metal, unless particular items are specified to be painted.
2. Integrally colored concrete block.
3. Portland cement plaster scheduled to receive elastomeric coating unless otherwise shown or scheduled.
4. Sandblast finished concrete.
5. Exterior concrete walls and surfaces unless otherwise scheduled.
6. Surfaces concealed in walls and above solid ceilings.
7. Non-metallic walking surfaces unless specifically shown or specified to be painted.
8. Factory finished surfaces.
9. Ceramic tile and plastic surfaces.
10. Resilient flooring and base.
11. Elastomeric coatings.
12. Galvanized gratings.
13. Surfaces indicated not to be painted.
14. Surfaces specified to be finish painted under other Sections.

1.2 AQMD RULES

Furnish paint materials that conform to the current rules and regulations of all governing Air Quality Management Districts and other public environmental control and protection agencies having jurisdiction. If any paint materials specified herein do not conform to said rules and regulations, paint manufacturer of proposed paint materials shall prepare a list of non-conforming specified painting materials and proposed substitute conforming paint materials; Contractor shall deliver the list to the University Representative for review. Refer to Section 01340 for basic substitution requirements.

1.3 SUBMITTALS

Refer to Section 01340 for procedures. LEED Submittals: refer to 01350. Product data for Credit EQ 4.2: For paints and coatings, including printed statement of VOC content and Chemical components.

A. List of Paint Materials: Prior to submittal of Samples, submit a complete list of proposed paint materials that identifies each material by manufacturer's name, product name and number, including primers, thinners, and coloring agents, together with manufacturers' catalog data fully describing each material as to contents, recommended usage, and preparation and application methods. Identify surfaces to receive various paint materials. Do not deviate from approved list.

B. Color Samples: Prior to submittal of Samples obtain Architects color and gloss selections and instructions. Using materials from approved list, prepare and submit 8-1/2" by 11" Samples of each complete opaque paint finish.

C. Natural or Stain Finish Samples: Prepare these Samples on 12" squares of the same species and appearance of wood as used in the Work.

1.4 JOB CONDITIONS

A. Protection: Protect all painting while in progress and cover and protect adjoining surfaces and property of others from damage. Exercise care to prevent paint contacting surfaces not to be painted. During painting of exterior work, cover windows, doors, concrete, and other surfaces not to be painted.

B. Weather Conditions: Apply paint to clean, dry, prepared surfaces. Do not apply exterior paint during rainy, damp, foggy, or excessively hot and/or windy weather. Arrange for temporary heat and ventilation for interior painting.

C. Precaution: Place oily rags and waste in self-closing metal container and remove from site at the end of each day. Do not let rags and waste accumulate.

D. Cover all return air grills with a visqueen barrier during any painting preparation work and actual painting. Ensure all doors remain closed during preparation and painting process.

2. PRODUCTS

MATERIALS: Use the paint products of only one paint manufacturer unless otherwise specified or approved. In any case, primers, intermediate, and finish coats in each painting system shall all be the products of the same manufacturer, including thinners and coloring agents, except for materials furnished with shop prime coat by other trades. To the maximum extent feasible, factory mix paint materials to proper color, gloss, and consistency for application. Furnish paints from one of the following manufacturers: Frazee Paint Company products specified herein designate the intended types and qualities.

A. Frazee
B. Benjamin Moore Pristine (Eco Spec product)
C. Dunn Edwards Ecoshield (Current University Standard)
D. Or approved equal.

Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
Flat Paints and Coatings: VOC content of not more than 50 g/L.
Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
Anticorrosive Coatings: VOC content of not more than 250 g/L.
Varnishes and Sanding Sealers: VOC content of not more than 275 g/L.
Stains: VOC content of not more than 100 g/L.
Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
Restricted Components: Paints and coatings shall not contain any of the following:
Acrolein.
Acrylonitrile.
Antimony.

Benzene.
Butyl benzyl phthalate.
Cadmium.
Di (2-ethylhexyl) phthalate.
Di-n-butyl phthalate.
Di-n-octyl phthalate.
1,2-dichlorobenzene.
Diethyl phthalate.
Dimethyl phthalate.
Ethylbenzene.
Formaldehyde.
Hexavalent chromium.
Isophorone.
Lead.
Mercury.
Methyl ethyl ketone.
Methyl isobutyl ketone.
Methylene chloride.
Naphthalene.
Toluene (methylbenzene).
1,1,1-trichloroethane.
Vinyl chloride.

3. EXECUTION

3.1 INSPECTION

Examine all surfaces to be finished under this Section and verify satisfactory condition. Report to University Representative in writing all those conditions that prevent or interfere with correct preparation and application of Work of this Section. Do not proceed with painting and finishing on involved surfaces until all reported conditions are corrected. Application of the first coat of any finishing system constitutes acceptance of the surface by Painting Subcontractor. This does not relieve the Contractor from proper preparation of surfaces.

3.2 WORKMANSHIP

Apply paint materials in accordance with the manufacturer's instructions by brush or roller; spray painting is not allowed without specific approval in each case. Apply each coat at the proper consistency, free of brush or roller marks, sags, runs, or other evidence of poor workmanship. Do not lap paint on glass, hardware, and other surfaces not to be painted; apply masking as required. Sand between enamel coats.

3.3 PREPARATION

Properly prepare surfaces to receive finishes.

A. Concrete: Fill all cracks, holes and other blemishes with portland cement patching plaster or a stiff paste mixed of finish paint and fine sand, finished to match adjoining surfaces. Remove surface glaze by sanding, wire brushing, or light brush-off sandblasting. Neutralize all alkali conditions according to the paint manufacturer's directions. Dry surfaces to receive a breathing type latex paint at least two weeks, free of visible moisture, and dry surfaces to receive oil, alkyd, or epoxy based paint until the moisture content does not exceed 8% when tested with an electronic moisture-measuring instrument.

B. Masonry: Repair minor holes and cracks with a stiff paste of finish paint and fine sand or vinyl type block filler. Report major or unsightly defects to the University Representative for correction. Neutralize all alkali and efflorescence according to paint manufacturer's directions.

C. Gypsum Wallboard: Touch-up minor defects with spackle and sand smooth and flush. Report other defects for correction as specified.

D. Shop Coated Metal: Degrease and clean of foreign matter. Clean and spot paint field connections, welds, soldered joints, burns, or abraded portions with same material used in shop coat. After complete hardening, sand entire surfaces for coat to follow.

E. Uncoated Ferrous Metal: Degrease and clean of dirt, rust, mill scale, and all other foreign matter using rotary brushes, solvent, or sandblasting. Remove pits and welding slag, and clean surfaces to bright metal before priming. Apply metal primer not more than three hours after preparation.

F. Galvanized Metal: Degrease and clean of foreign matter. Apply specified pretreatment and immediately apply primer paint as soon as pretreatment is dry.

G. Enameled Woodwork: Sand smooth with grain and dust clean. After priming, putty nail holes, cracks, or other defects with putty matching color of finish paint. Cover knots and sappy areas with shellac or approved knot sealer. Sand each base coat smooth when dry. Use extra care for wood doors to level grain and repair defects so doors, when fully painted, do not show any evidence of wood grain or defects when viewed under any lighting condition or angle.

H. Transparent Finished Woodwork: Sand smooth with the grain and dust clean. Repair all defects with filler tinted to match stain or wood color, as required, after first coat of sanding sealer and remove all smears.

I. Fixtures, Equipment, and Hardware Items: Cooperate with other trades and coordinate removal of fixtures, equipment, and hardware as required to perform painting. Items to be removed include, without limitation: signs and graphics;

switch and receptacle plates; escutcheons and like plates; all surface-mounted equipment; free-standing equipment blocking access; grilles and louvers at ducts opening into finished spaces; and other items as required and directed.

J. Surfaces Not Mentioned: Prepare surfaces according to recommendations of the paint manufacturer and as approved.

3.4 COATS AND COLORS

The number of paint coats specified to be applied are minimum. Ensure acceptable paint finishes of uniform color, free from cloudy or mottled areas and evident thinness on arises. "Spot" or undercoat surfaces as necessary to produce such results. Tint each coat a slightly different shade of finish color to permit identification. Conform to the approved Samples. Obtain approval of each coat before applying next coat; otherwise, apply an additional coat over entire surface involved at no additional cost to University.

3.5 EXTERIOR PAINTING

(Use the following manufacturers or approved equals)

A. Concrete Block Masonry - 100% Acrylic Flat:

1st Coat:	262 Block Filler
2nd Coat:	203 Duratec

B. Metal - Ferrous - 100% Acrylic Gloss Enamel:

1st Coat:	561 Metal Prime or 168 Prime Plus
2nd Coat:	143 Mirro Glide Gloss
3rd Coat:	143 Mirro Glide Gloss

Exception: On exposed surfaces of steel stairs, including steel pipe or tubing railings on stairs or separately on walls, and on exterior and interior sides of steel doors and frames, apply 2 coats of 648 Aro-Plate Industrial Enamel or approved equal in lieu of the 2nd and 3rd Coats above.

C. Metal – Ferrous and Galvanized - 100% Acrylic Semi-Gloss Enamel:

1st Coat:	561 Metal Prime or 168 Prime Plus
2nd Coat:	128 Satin Glide II
3rd Coat:	128 Satin Glide II

D. Metal - Galvanized: Treat with Jasco Prep N'Prime pre-treatment before priming.

1st Coat:	561 Metal Prime or 168 Prime Plus
2nd Coat:	143 Mirro Glide Gloss
3rd Coat:	143 Mirro Glide Gloss.

Exception: On roof and wall flashings, wall louvers, and other sheet metal flashings to be painted and visible on building exterior surfaces, apply two coats of 203 Duratec or approved equal in lieu of the 3rd Coat above (total of four coats in addition to vinyl wash primer).

E. Wood - Opaque Semi Gloss Acrylic Paint:

1st Coat:	168 Prime Plus
2nd Coat:	128 Satin Glide II
3rd Coat:	128 Satin Glide II

F. Wood - Stain Finish: Apply one coat of Frazee 385 Madera Semi Transparent stain, or one coat of UGL Zar Rain Stain Semi-Transparent oil type semi-transparent or approved equal as selected.

3.6 INTERIOR PAINTING

Provide paint finishes as scheduled on the Drawings or directed, gloss of finishes as scheduled or, where not scheduled, as designated by the University Representative (Use the following manufacturers or approved equals).

A. Enamel Finishes: Of following glosses:

1. Gloss 100% Acrylic Enamel(non-blocking for doors, trim):143 Mirro Glide
2. Semigloss 100% Acrylic Enamel (non-blocking for doors, trim): 032 Envirokote
3. Semi Gloss Acrylic Co-Polymer Enamel (for walls): 032 Envirokote
4. Eggshell Acrylic Co-Polymer Enamel (for walls): 029 Envirokote

B. Enamel - Drywall:

1st Coat:	061 Aqua Seal or approved equal.
2nd Coat:	Enamel, gloss as scheduled or designated
3rd Coat:	Enamel, gloss as scheduled or designated

C. Latex – Drywall Ceilings:

1st Coat:	W101 Vinylastic or approved equal.
2nd Coat:	W401 Decovel or approved equal.
3rd Coat:	W401 Decovel or approved equal.

D. Enamel - Concrete and Plaster:

1st Coat:	168 Prime Plus or approved equal.
2nd Coat:	Enamel, gloss as scheduled or designated
3rd Coat:	Enamel, gloss as scheduled or designated

E. Enamel - Wood:

1st Coat:	168 Prime Plus or approved equal.
2nd Coat:	Enamel, gloss as scheduled or designated

F. Stain and Polyurethane: FOR VERY LIGHT STAIN OR UNSTAINED WOOD:

1st Coat:	685 Wood Stain (where stain is scheduled)
2nd Coat:	2002 Frazee/Flecto Satin Polyurethane or approved equal.
3rd Coat:	2002 Frazee/Flecto Satin Polyurethane or approved equal.

G. Stain and Polyurethane: FOR MEDIUM TO DARK STAINED WOOD:

1st Coat:	685 Wood Stain (where stain is scheduled)
2nd Coat:	McCloskeys Urethane, Semi-Gloss or approved equal.
3rd Coat:	McCloskeys Urethane, Semi-Gloss or approved equal.

H. Flat - Metal: Treat galvanized metal with Jasco Prep N'Prime or approved equal.

1st Coat:	561 Metal Prime or 168 Prime Plus
2nd Coat:	002 Majestic or approved equal.
3rd Coat:	002 Majestic or approved equal.

I. Enamel - Metal: Treat galvanized metal with Jasco Prep N'Prime or approved equal.

1st Coat:	561 Metal Prime or 168 Prime Plus or approved equal.
2nd Coat:	Enamel, gloss as scheduled or designated
3rd Coat:	Enamel, gloss as scheduled or designated

Exception: On exposed surfaces of steel stairs, steel pipe or tubing railings on steel stairs or separately on walls, and all surfaces of steel doors and door frames, apply 2 coats of 628 Aro-Plate Semigloss Enamel in lieu of the 2nd and 3rd Coats above.

3.7 MISCELLANEOUS PAINTING

A. Duct Interiors: Paint with flat black fire-retardant paint to the extent visible through grilles and `registers in finished rooms and spaces.

B. Fire Extinguisher and Fire Hose Cabinets: Apply 2 coats of paint finish, inside and out, matching finish and color of adjoining areas, unless otherwise noted or directed.

C. Color Coding: In mechanical and electrical equipment rooms, paint ducts, piping, conduit, equipment, and machinery, except such items having a complete factory finish, as specified for interior metal, colors as directed. Not more than 8 colors will be required.

D. Weather stripping or Sound Seals: Paint all exposed metal surfaces of the seals to match the door frame, whether or not unfinished, furnished with factory prime coat, or factory treated for paint adhesion.

E. Mechanical and Electrical Work: Carefully review Divisions 15 and 16 of these Specifications regarding painting performed hereunder and other painting required to be performed under this Section. Perform painting of mechanical and electrical equipment and materials not expressly specified to be painted as part of Work of Divisions 15 or 16, including required identification and color code painting, stenciling, and paint banding.

F. Miscellaneous: For any items not specifically indicated or specified that require a paint finish, apply 3 coats of paint as directed.

3.8 CLEAN-UP PROTECTION

A. Clean-Up: During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

1. Upon completion of painting work, make a detailed inspection of paint finishes, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping using care not to scratch or otherwise damage finished surfaces. Touch-up and restore all damaged or defaced painted surfaces. after all painting is completed make good all damage caused by cleaning. Carefully touch-up all abraded, stained or otherwise disfigured painting, as approved, and leave entire painting in first-class acceptable condition

B. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing and repainting as acceptable to the University Representative.

1. Provide "Wet Paint" signs as required to protect newly painted finishes. remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

END OF SECTION

SECTION 12306
PLASTIC FACED CASEWORK

1. GENERAL

1.0 RELATED DOCUMENTS

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

1.1 DESCRIPTION OF WORK

A. The extent of plastic faced casework is shown on the Drawings.

B. The Work includes the fabrication and installation of custom plastic faced casework composed of base cabinets, wall cabinets, counter tops, storage cabinets, shelf units and other miscellaneous units.

C. Related Work Specified Elsewhere:

1. Section 06100: Rough Carpentry
2. Section 06400: Architectural Woodwork
3. Section 07270: Firestopping
4. Section 07900: Caulking and Sealants

1.2 QUALITY ASSURANCE

A. Quality Standards: Except as otherwise shown or specified, comply with provisions of the Architectural Woodwork Institute (AWI) "Quality Standards," Revised 1990. Highest grade applicable.

B. Plastic Laminate Casework: AWI Section 400, premium grade except use premium standard for orientation of laminate grain.

1. Use medium density (forty-five [45] lbs./cu. ft.) particle board for all core materials. (3/4" thick U.N.O.)

C. Plastic Laminate:

1. Details, Sections, etc., may only show and/or indicate finished face or exposed plastic laminate for design and/or detailing purposes. General Contractor and Millwork Contractor is required to provide install, etc., all plastic laminate to cover all other exposed areas, cabinet interiors, edges, etc., and to provide all required balance matching. All color finish and graining to match face color, typical.

1.3 WORKMANSHIP

A. Quality of workmanship shall be the highest known "cabinetmaker or furniture quality." All miter joints shall be tight with no gaps or open spaces. Loose joints shall be hairline, flat, in single plane, with no exposed fasteners. All dimensions, reveals and joints shall be exact.

1.4 DESIGN RESPONSIBILITY

A. The Drawings and Specifications indicate the design intent of this Work and define special required elements.

B. When various details or requirements are vague, or in contradiction, this Contractor shall immediately request a clarification.

1.5 WARRANTY

A. This Contractor agrees to warrant his work for two years against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming., This Contractor further warrants the overall effective integration and correctness of individual parts, the whole of the system(s) and compatibility with adjoining substrates, materials and work by other trades.

B. Contractor shall repair or replace defective work to the satisfaction of the University.

1.6 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fixtures with lines thereto. Show details and location of anchorages and fitting to floors, walls and base.

1. Include layout of units with relation to surrounding walls, doors, windows and other building components.

2. Coordinate Shop Drawings with other work involved.

B. Samples: Submit two (2), 2"x3" samples of manufacturer's plastic laminate colors, patterns and textures for exposed and semi-exposed materials for University Representative's selection. Samples will be reviewed by University Representative for color, texture and pattern only. Compliance with other specified requirements is the exclusive responsibility of the Contractor.

C. Refer to Section 01340 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, for procedures.

1.7 PRODUCT HANDLING

A. Deliver plastic faced casework only after wet operations in building are completed.

B. Store completed plastic faced casework in a ventilated place, protected from the weather, with relative humidity therein of 50% or less at 70oF.

C. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.8 JOB CONDITIONS

A. Humidity and Temperature Controls: Advise Contractor of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.

2. PRODUCTS

2.1 MATERIALS

A. Definitions: The following definitions apply to plastic faced casework units:

1. Exposed: Surfaces visible when doors and drawers are closed. Bottoms of casework more than 4' above floor. Backs and edges of hinged door.

2. Semi-Exposed: Surfaces that become visible when drawers and doors are opened. Tops of casework 6'-6" or more above floor.

3. Concealed: Surfaces permanently hidden after installation, such as backs of cabinets against walls.

4. Semi-concealed: Knee spaces on work units and tables.

B. Board Products:

1. Particle Board: Medium density (minimum forty-five [45] lbs.'cu./ft.) minimum wood chip and phenolic resin binders, compressed board, 3/4" thickness unless otherwise indicated. (Use where noted on Drawings as plywood.)

2. Hardboard: PS 58, Class 1 (tempered), smooth one side or both sides where indicated, 1/4" thickness unless as otherwise indicated.

3. Environmental Requirements: Particle Board and Hardboard shall contain no added ureaformaldehyde.

4. Environmental Requirements: Particleboard shall contain no urea-formaldehyde. Laminate adhesives used to fabricate on-site and shop applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resins.

C. Plastic Laminate: Comply with NEMA LD3; Type 2, .050" thickness.

D. Design and Construction Features: Comply with the details shown for profile and construction of plastic faced casework. Where not otherwise shown, comply with applicable Quality Standards, with alternate details (indicate on shop drawings) as Fabricator's option.

E. Pre-Cut Openings: Fabricate plastic faced casework with pre-cut openings, wherever possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth the edges of cut-outs and, where located in countertops and similar exposures, seal the edges of cutouts with a water-resistant coating. Color approved by University Representative.

1. Grommet(s): Provide for all pre-cut openings and/or where shown on the drawings.

F. Measurements: Before proceeding with fabrication of casework required to be fitted to other construction, obtain field measurements and certify dimensions and Shop Drawings details as required for accurate fit.

1. Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of casework for accurate fit.

G. Material Thickness: The following thickness for cabinet work shall apply except when shown thicker on the Drawings:

1. Tops, Bottoms, Ends, Divisions: 3/4" thick.

2. Face Plates: Equal to door thickness with 3/4" minimum.

3. Web Frames: 3/4" minimum.

4. Drawer Bottoms: 1/4" KorTron II, "Color as selected." Drawers over 24" wide require center bottom support. Weight all drawers.

5. Drawer Fronts: Provide double fronts equal to door thickness. 3/4" minimum.

6. Drawer Backs and Sides: 1/2", full dovetail construction.

7. Shelves: 3/4" to 28"; 1" to 40"; 1-1/2" to 60" maximum unsupported lengths. Where shelving is to receive plastic laminate, cover front and back edges, top and bottom of shelf with plastic laminate.

8. Storage Shelving: Plastic laminate or KorTron.

H. Bases: Finishes as indicated on Drawings. Design to space as shown on drawings.

I. Doors (Cabinet): 3/4" minimum thickness except doors over 36" wide and 60" high to be 1-1/4". Use overlay type except where shown otherwise on Drawings. The finish on door fronts, backs and edges to be the same.

J. Plastic Laminate: Plastic laminate colors, finishes and patterns:

1. Manufacturers: As noted on Drawings.

K. Finishes:

1. Plastic laminate for horizontal surfaces: NEMA Type 2, 0.050" thick, General-Purpose Type (high pressure).

2. Plastic laminate for postforming: NEMA Type 3, 0.042 thick, Postforming Type (high pressure).

3. Plastic laminate for external vertical surfaces: NEMA Type 4, 0.028" thick, General-Purpose Type (high pressure).

4. Plastic laminate for cabinet linings: 0.020" thick.

5. Plastic laminate for concealed panel backing: 0.020" thick, Backer-Type (high pressure).

L. Fabricate exposed edges of casework, including edges and inside faces of doors, and drawers when open, with matching plastic laminate, except as otherwise indicated.

M. Plastic Laminate Countertops: Except as other wise indicated, provide separate plastic laminate countertops (installed on other casework or other support system as indicated) to comply with the requirements for casework for plastic laminate finish.

2.2 CABINET HARDWARE AND ACCESSORY MATERIAL

A. General: Provide cabinet hardware and accessory materials associated with plastic faced casework except for units which are specified as "finish hardware" in Section 08710 or in other sections of these Specifications.

B. Hardware Standards: Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware."

C. Hinges: Number per leaf as per plans. Full or half overlay as required spring loaded for ease of door operation as required.

1. Blum, European style concealed hinges per plans

2. Lamp surface hinges per plans

D. Pulls:
1. Tydex Wire Pulls

E. Bi-fold X-Ray Door Guides: top and bottom
1. Hafele: Leporello

2.3 FABRICATION

A. Fabricate plastic faced casework to dimensions, profiles and details shown. Comply with AWI 400B Premium Grade.

B. Assemble units in the shop in as large components as practicable to minimize field cutting and jointing. Mortise and tenon, glue and screw joints for maximum strength using precision jigs and clamps to insure square corners and plumb vertical surfaces.

C. Provide 1-1/2" (minimum) lumber edges (glued to core prior to laminating) on the hinge side of all doors. Provide the same lumber edge on the leading edge of cabinet divider for hinge attachment. For hardware installation, drill pilot holes and use full-threaded screws.

3. EXECUTION

3.1 INSPECTION

A. Examination: This Contractor shall examine the substrates and conditions under which the Work is to be installed, and notify the University Representative, in writing, of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to this Contractor.

3.2 PREPARATION

A. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of the time substrates are to be built.

B. Prior to installation of casework, examine shop fabricated work for completion and complete work as required including removal of packing.

3.3 INSTALLATION

A. Install the work plumb, level, true and straight with no distortions.

B. Shim, as required, using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including counter tops) and with 1/32" maximum offset in flush adjoining surfaces, 1'8" maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor casework to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with casework and matching laminate.

E. Casework and/or cabinets: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned.

1. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

F. Countertops: Anchor securely to base units and other support systems as indicated.

3.4 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

A. Repair damaged and defective casework wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace casework. Adjust joinery for uniform appearance.

B. Clean hardware, lubricate and make final adjustments for proper operation.

C. Clean casework on exposed and semi-exposed surfaces. Wet wipe inside of all drawers. Touch-up shop-applied finishes to restore damaged or soiled areas.

D. Protection: This Contractor shall provide protection and maintain protection necessary to ensure that the Work will be without damage or deterioration at the time of acceptance. Method as approved by the University Representative.

1. Instruct University of adjustments and preventive maintenance (i.e., cleaning methods, materials).

2. This Contractor shall be required to conduct a site walk through and adjust all casework six months after installation.

END OF SECTION

SECTION 15410
PLUMBING PIPING

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide potable water and sanitary, as indicated on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data:

1. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

2. The following list includes the required shop drawings that shall be submitted:

a. All pipe and fittings for each system.

2. PRODUCTS

2.1 MATERIALS

1. Above-Grade Hot and Cold Potable Water Piping:

2. All piping shall be hard drawn copper tubing, ASTM B 88, Type K. Fittings for copper tubing shall be wrought copper for standard joints and wrought copper solder for brazed joints.

3. All exposed piping in finished rooms used in connection with plumbing fixtures shall be chromium-plated brass pipe with plated cast brass fitting.

B. Sanitary Drainage Piping:

1. All sanitary drainage and vent piping 1 1/2 inches and smaller shall be cast iron pipe with black cast iron no-hub fittings or copper drainage tube (DWV) with cast bronze or wrought copper drainage fittings. All sanitary drainage and vent piping above ground larger than two inches shall be service weight cast iron soil pipe and no-hub fittings.

3. EXECUTION

3.1 INSTALLATION

A. Potable Water Piping:

a. Piping shall be balanced, vented and adjusted to provide circulation to all fixtures and to prevent water hammer.

B. Sanitary Piping:

1. Ream all pipe to full diameter after cutting and clean before erection. Run all piping as direct as possible, and conceal piping in finished rooms unless shown or specified otherwise.

2. All horizontal sanitary drainage and vent piping of 3-inch diameter and less shall be installed with a fall of not less than 1/4 inch per foot (2%). All horizontal sanitary drainage and vent piping larger than 3-inch shall be installed with a fall of not less than 1/8 inch per foot (1%).

3.2 FIELD QUALITY CONTROL

A. Piping System Leak Tests:

1. Potable Water Piping:

a. General: After completion of the Work, but before final acceptance is made, Contractor shall run a test over a four-hour period of time to prove that the capacity and performance of all apparatus fittings and the system as a whole meets the requirements of the Specifications.

b. Pressure Tests: Make pressure tests in the presence of University's Representative.

1) Cold and hot water services within the building shall be tested at 120 psi for a period of 4 hours. Any joints showing visible leakage shall be cut out and remade; peening of joints shall not be permitted. Sections of pipework containing remade joints shall be retested. Tests shall be carried out using Bristol recording device. Data disc shall be given to University's Representative after successful completion of test.

3.3 ADJUSTMENT AND CLEANING

A. Potable Water Piping: After piping is erected, flush all piping before sterilizing the potable water system.

3.4 FIELD QUALITY CONTROL

A. Piping System Leak Tests:

1. Potable Water Piping:

a. General: After completion of the Work, but before final acceptance is made, Contractor shall run a test over a four-hour period of time to prove that the capacity and performance of all apparatus fittings and the system as a whole meets the requirements of the Specifications.

b. Pressure Tests: Make pressure tests in the presence of University's Representative.

1) Cold and hot water services within the building shall be tested at 120 psi for a period of 4 hours. Any joints showing visible leakage shall be cut out and remade; pinning of joints shall not be permitted. Sections of pipes containing remade joints shall be retested. Tests shall be carried out using Bristol recording device. Data disc shall be given to University's Representative after successful completion of test.

3.5 ADJUSTMENT AND CLEANING

A. Potable Water Piping: After piping is erected, flush all piping before sterilizing the potable water system.

B. Disinfection of Domestic and Laboratory Hot/Cold Water Systems and Fire Lines.

1. General: All newly installed water systems and lines shall be disinfected by a Contractor-furnished commercial water line chlorinator. The commercial chlorinator shall also take water samples for bacteriological analysis. These samples shall be submitted to a California state licensed testing laboratory by the chlorinator.

2. Incurred Costs: All expenses that may result from the disinfection and testing of water systems and lines, and the taking and analysis of water samples shall be borne by Contractor.

3. Advance Notice: Contractor shall notify University's Representative and the UCLA Office of Environment, Health and Safety (EH&S), at least 72 hours in advance of all disinfection and testing procedures. All disinfection and testing procedures shall occur in the presence of an EH&S representative. Notification shall include location, number of chlorination and tests, day and time.

4. Labor and Materials: Contractor's chlorinator shall furnish labor, equipment, materials and transportation needed to correctly disinfect and test domestic and laboratory hot/cold water systems and fire lines and to take water samples for bacteriological analysis. This includes all items needed to facilitate the introduction of the disinfecting agent into the water systems/lines such as service cocks and valves.

5. Disinfecting Agents: Chlorine is approved for water system disinfection and may be used in gaseous or liquid form. Other types of disinfecting agents may be used only with the prior approval of University's Representative.

6. Disinfecting Procedure: The disinfection of water systems and lines shall be in accordance with the requirements of Title 22, California Code of Regulations (CCR) and the American Water Works Association (AWWA) standards. The disinfecting procedure shall include the following:

   a. Post signs on all water outlets of the system being disinfected reading "Water System Being Chlorinated - Do Not Drink" or a similar warning.

   b. With system full of water and under "main" pressure, open all faucets to permit simultaneous trickle flow.

   c. Introduce the disinfectant into the system until a test of the water at each outlet shows a free chlorine residual concentration of:

      1) 25 parts per million (ppm). This chlorine concentration shall be held in the pipes for a 24 hour period; or

      2) 100 ppm. This chlorine concentration shall be held in the pipes for a 3 hour period.

   d. The test made of the water after the retention time shall indicate a chlorine residual concentration of not less than half of the original concentration. Repeat the disinfection procedure until this standard is attained.

   e. After satisfactory completion of the above test, flush out system until diethyl-p-phenylenediamine (DPD) tests at the water outlets reveal that the free chlorine residual is less than 0.5 ppm or equal to the flushing water chlorine residual.

7. Water Samples for Bacteriological Analysis:

   a. Water samples for bacteriological analysis shall be collected by Contractor's chlorinator in sample bottles prepared as required by Title 22, CCR and AWWA standards. Samples shall be taken from a representative number of water outlets so as to ensure an accurate sampling of the water system/line. Water samples shall be taken in the presence of an EH&S representative (University may also collect a sample).

   b. The water samples shall be delivered by Contractor's chlorinator in a timely manner to a California state approved water analysis laboratory. The samples must test negative for coli form organisms and less than 500 for a Standard Plate Count (HPLC).

   c. If the results are positive, the above steps 6(a) through 6(f) shall be repeated. Two consecutive negative tests must be obtained prior to using the water system.

8. Final Results: Submit a copy of the laboratory analysis to University's Representative and EH&S. If the analysis results do not meet the standards specified, the disinfecting procedure shall be repeated until the

specified standards are met, at no additional cost to University. The complete procedure may take up to 4 days if negative results are obtained. This procedure will be longer if the results are positive.

END OF SECTION

SECTION 16010
ELECTRICAL GENERAL PROVISIONS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. This Section supplements all Sections of this Division and shall apply to all Work specified, indicated in the Drawings, and as required to provide for a complete installation of electrical systems for the Project. Review all sections of the Specifications for related work and coordinate the work of this Section with all other Sections (refer to Section 01041, PROJECT COORDINATION).

B. Furnish all labor and services, and provide all materials, tools, equipment, appliances, facilities, and transportation necessary for and incidental to performing the Work complete, as shown on the drawings and specified herein. All electrical systems and equipment shall be in proper operating order upon completion of the work. Work includes the following:

1. Contractor shall perform all incidental work required to provide a complete properly operating system.

2. Contractor shall provide the following:

a. All construction power and lighting and all power for testing of equipment and systems through final acceptance tests.

b. A complete system of, conduits, outlet boxes, switches, receptacles, plates and wiring for power and light.

c. Emergency power system, branch circuit wiring, and outlet devices.

d. Outlet, junction and pull boxes, plaster rings, plates, conduit only and pull lines for the public telephone system and data system.

e. All lighting fixtures and lamps, complete.

f. Outlet, junction and pull boxes, conduits, wiring and connections of all motors and equipment for all heating, ventilating and cooling equipment.

g. A complete grounding system for power system neutrals and equipment.

h. Testing, adjusting and cleaning of the completed work.

i. All line-voltage (120-V.) control system conduit and wiring and all low-voltage control conduit only, with pull lines, required for the automatic temperature control systems.

j. Access panels, fire rated as required, in the ceilings and walls where necessary for access to electrical equipment, junction boxes, pull boxes, conduit stubs, etc., located in the walls or furred ceiling spaces.

k. Cutting and patching of the building structure required by Contractor in the performance of the work.

l. All sleeves, hangers, supports, inserts, anchors, bolts, etc., required for the installation of this work.

m. Shop drawings and technical data; instructions and maintenance manuals.

n. "As-built" drawings.

1.2 REFERENCE STANDARDS

A. The following abbreviations apply to all sections of Division 16:

AC: Alternating Current.
ADA: Americans with Disabilities Act.
AISI: American Iron and Steel Institute.
ANSI: American National Standards Institute.
ASTM: American Society for Testing and Materials.
AWG: American Wire Gauge.
CCR: California Code of Regulations.
CBM: Certified Ballast Manufacturers.
CEC: California Electrical Code.
DC Direct Current.
ETL: Electrical Testing Laboratory.
FS: Federal Specification.
HID: High Intensity Discharge.
HP: Horsepower.
ICEA: Insulated Cable Engineers Association
IEEE: Institute of Electrical and Electronic Engineers.
NEC: National Electrical Code.
NEMA: National Electrical Manufacturers' Association.
NETA: National Electrical Testing Association, Inc.
NFPA: National Fire Protection Association.
OSHA: Occupational Safety and Health Act.
PVC: Polyvinyl chloride.
UBC: Uniform Building Code.
UL: Underwriters' Laboratories, Inc.

1.3 QUALITY ASSURANCE

A. General Requirements:

1. Work performed under this Division shall be installed by craftsmen skilled in the trade involved, and apprentices as indicated in the General Conditions.

2. Provide all control equipment for electrically operated equipment except when equipment is furnished with control equipment.

3. Provide all electrical Work required for the service and connection of electrically operated and controlled equipment specified in other Divisions of the Specification.

4. All electrical power, signal, alarm and communication systems shall be complete and ready for use.

B. Requirements of Regulatory Agencies:

1. Codes and Ordinances: In addition to the requirements of Section 01060, REGULATORY REQUIREMENTS, all materials shall bear the UL label.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES for procedures.

1.5 LOCATION AND ROUTING

A. The Drawings indicate diagrammatically the desired location or arrangement of conduit runs, outlets, equipment, etc., and shall be followed as closely as possible. Execute the Work so as to secure the best possible installation in the available space and overcome local difficulties due to space limitations or interference with structural conditions.

B. Locations shown on architectural ceiling Drawings or on wall elevations shall take precedence over electrical drawing locations.

C. Contractor shall verify dimensions and the correct location of equipment before proceeding with the roughing-in of connections.

D. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any Work, check and verify all dimensions, sizes, etc., with the Drawings to see that the equipment being installed will fit into the spaces furnished.

E. Locations of Openings. Locate all chases, shafts and openings required for the installation of the electrical Work during framing of the structure. Do any cutting and patching required due to incorrectly located or omitted openings as approved and at no additional cost to University. Cutting or drilling in any structural member is prohibited without prior written approval of University's Representative.

F. Access to Equipment. Locate starters, switches, receptacles, and pull boxes to provide easy access for operation, repair, and maintenance and, if concealed, provide access doors.

G. Rough-in locations for all electrical equipment shall be determined from approved shop drawings or from the equipment itself.

1.6 MATERIAL STANDARDS

A. All materials and equipment shall be new.

B. All Work shall meet the requirements of the governing codes as listed in Section 01060, REGULATORY REQUIREMENTS, and the requirements of the following:

1. NEMA.
2. ANSI.
3. IEEE.
4. ICEA.
5. NEC.
6. UL.

C. Items for similar application shall be of the same manufacturer.

D. The label of listing by UL shall appear on all materials and equipment for which standards have been established by the agency.

E. Where codes listed in Section 01060, REGULATORY REQUIREMENTS, establish label or approval requirements, furnish all materials and equipment with either the required labels affixed or the necessary written approval.

F. Contractor shall provide the type and quantity of electrical materials and equipment necessary to complete Work and all systems in operation, tested and ready for use.

G. Contractor shall provide all incidental items that belong to the Work described and which are required for complete systems.

1.7 TESTING

A. Upon completion of the work and adjustment of all equipment, conduct an operating test for each system approval. Conduct the test in the presence of University's Representative and University's Electrical Inspector. Demonstrate all systems and equipment to operate in accordance with all requirements of the Contract Documents and to be free from all electrical and mechanical defects. Provide all systems free from short circuits and incorrect grounds and show an insulation resistance between phase conductors and ground not less than 250,000 ohms. Test all circuits for correct neutral connection.

B. Prior to energizing any motors, measure the service voltage for phase balance and report immediately to University's Representative if unbalances exceed 1% from mean.

C. Measure the three-phase voltage at no load and at maximum load conditions.

D. Complete all tests prior to final field observation of Project, including corrective Work based on the results of the tests.

2. PRODUCTS

2.1 GENERAL

A. Whenever possible, all materials and equipment used in the installation of the work shall be of the same brand or manufacturer for each class of material or equipment.

3. EXECUTION

3.1 INSTALLATION

A. Install electrical equipment as specified in individual specification sections, and in accordance with manufacturers' recommendations.

3.2 DEMOLITION

A. General:

1. The scope of work involves demolition of existing conduit, conductors and equipment.

2. Architect and electrical drawings show demolition, relocation, removal or rerouting of existing equipment.

3. All demolished or Contractor removed materials become the property of the Contractor, unless otherwise indicated. Contractor shall be responsible for removing such materials from the job site. Refer to Section 01710.

B. Equipment: All the existing equipment to be removed from building shall be disassembled or cut into pieces to allow removal through available existing openings.

C. Conduits (feeder and branch):

1. Conduit shall be capped for all abandoned installations.

3.3 SERVICE CONTINUITY

A. Refer to Section 01500, CONSTRUCTION FACILITIES & TEMPORARY CONTROLS, for "shut-down" information.

3.4 PROTECTION AND CLEANING

A. Protection: Fully protect all finished parts of the materials and equipment against physical damage from whatever cause during the progress of this work and until completion.

B. During construction, cap all conduits so as to prevent the entrance of sand and dirt.

C. Cleaning: After installation has been completed, the Contractor shall clean all systems as follows:

1. Equipment with Factory Finish: Clean exterior thoroughly to remove grease, oil, plaster, cement and dirt, and leave surfaces clean and polished.

2. Equipment to be Painted: Clean exterior of piping and equipment exposed in completed structure, removing rust, plaster, cement and dirt by wire brushing. Remove grease, oil and similar materials by wiping with clean rags and solvents.

3.5 PAINTING

A. Painting is specified in Section 09900, PAINTING.

3.6 CUTTING AND PATCHING

A. Sleeves and Inserts: Provide all sleeves, inserts, and openings necessary for the installation of the Electrical Work.

B. Openings for all electrical equipment shall be field verified:

1. Special forming, recesses, chases, and curbs, as necessary for the correct reception and installation of the electrical equipment, as shown on the Drawings, are specified in other Divisions.

2. The Contractor shall examine all Drawings to ascertain that correct provisions have been made for the work. If such provisions are not made in time, the Contractor shall bear all extra costs incurred in later cutting and patching to accommodate this work.

END OF SECTION

SECTION 16110
CONDUITS AND RACEWAYS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide conduits and raceways as shown on the Drawings and as specified.

2. PRODUCTS

2.1 MATERIALS

A. Rigid Metallic Conduits and Fittings: Standard weight steel that is hot-dipped galvanized, or sherardized both inside and out, with threaded connectors and couplings. Electrogalvanizing is not permitted. Intermediate Metal Conduit (IMC) is not permitted.

B. Electric Metallic Tubing (EMT) and Fittings: Tubing of high grade steel with exterior protective coating of zinc, applied by the electrogalvanized process. Interior of surface coated with aluminum lacquer or enamel. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc over galvanized surface. Fittings shall be watertight compression type, wrench tightened connectors and couplings.

C. Aluminum Conduits: Standard weight conduit, conforming to FS WW-C-540, with threaded connectors and fittings.

D. Flexible Steel Conduits: Conduit manufactured from single strip, standard weight steel galvanized on all four sides prior to conduit fabrication. Flexible aluminum conduit will not be allowed.

E. Flexible Conduit Connectors and Couplings: Die cast fittings of the type that screw into the inside of the conduit with threaded edges at 90º to the fitting body to insure a force fit.

F. Flexible Liquid tight Steel Conduits and Fittings: Manufactured from single strip standard weight steel, galvanized on all four sides prior to conduit fabrication, and provided with an extruded PVC cover. Use liquid tight fittings to achieve positive ground continuity including ground conductor. Manufacturer shall be seal title flex type “UA”, Columbia flex seal type “XL”, or equal, with fittings by Appleton “ST”, T & B 5200 series, or equal. Flexible conduit shall be cut at right angles for installation.

G. No conduit shall be smaller than 3/4-inch unless otherwise indicated on the Drawings.

H. Sleeves shall be zinc coated galvanized steel pipe or 18 gauge galvanized sheet metal as described under Paragraph 3.1 herein.

I. Sealant: Fire rated equal to wall or ceiling penetrated as manufactured by Silicon foam Dow Corning No. 2001, Geco, Pensil # 851, or equal.

J. Anchors not cast into concrete shall be expansion shield type, Phillips “Redhead”, Hilti, or equal.

K. Conduit seals shall be Crouse Hinds “Eyes”, Appleton, or equal, with sealing compound as recommended by the manufacturer for hazardous or refrigerated areas.

L. Expansion couplings shall be Oz Gedney “AX”, Crouse Hinds “XS”, or equal, complete with bonding jumper.

M. Conduit unions shall be T & B 600, Oz Gedney type 4, or equal.

3. EXECUTION

3.1 INSTALLATION

A. General:

1. The size of the conduits for the various circuits shall be as indicated on the Drawings and as required by NEC for the size and number of conductors to be pulled therein. NEC requirements shall prevail where fill is not shown on Drawings.

2. Open ends of conduits shall be capped or plugged until ready to pull in conductors.

3. Deliver conduits to site in standard length and store where protected from moisture and weather.

B. Rigid Steel Conduits:

1. Use for all sizes where directly exposed to weather; where subject to abnormal conditions of heat, cold, moisture, humidity, fumes and hazardous elements; where installed exposed below 7-1/2 feet, in areas where subject to mechanical injury. Use for all conduit in all electrical and mechanical equipment rooms; for high voltage (above 600 volts) and low voltage (up to 600 volts) feeders inside of building and in concrete slabs on grade.

2. For all bends in conduits 1-1/4-inch and larger, use large radius factory made bends or field fabricate with a power bender.

3. Cut threads on conduits to standard taper and to a length such that all bare metal exposed by the threading operation will be completely covered by the couplings or fittings used. Securely tighten all threaded connections. The ends of all conduit shall be cut square and reamed to full size with a tapered burring reamer. Treat any exposed threads at box hubs with protective coating to prevent corrosion, but maintain ground continuity.

4. Use conduit unions to connect two rigidly held conduits. Running thread will not be accepted.

C. Electrical metallic Tubing (EMT) and Aluminum Conduits: Use for all sizes up to and including 1-1/2 inches maximum trade size in dry locations as in stud partitions and furred ceiling spaces. Conduits shall be continuous from outlet to outlet to panel except where rigid steel conduits are required or indicated. EMT shall not be run exposed. Neither aluminum nor EMT shall be installed in concrete. EMT and aluminum conduits shall not be used for, feeders to panelboards, motor control centers and switchboards. EMT shall not be used in mechanical and electrical equipment rooms.

D. Flexible Steel Conduits:

1. Install only where indicated and for short motor or vibrating equipment connections, minimum 36 inches long, or for connections to recessed fixtures from junction or pullboxes. Maximum length for any application shall be 6 feet.

2. Provide liquidtight flexible conduits with separate insulated, stranded copper equipment ground conductors for connections in areas exposed to the weather, damp or wet locations and connections to motors, transformer enclosures, and other vibrating equipment regardless of location.

3. Cut flexible conduits at right angles for installation.

E. Conduit Placement:

1. Support conduits 1-inch and larger with pipe clamps either suspended from structural slabs with a rod at least 3/8-inch diameter with adjustable pipe ring, or mounted on wall from channel supports. Attach to concrete with Phillips "Redhead", Hilti, or equal drilled anchors. Where two or more conduits 1-1/2-inch and larger are suspended from ceiling, use trapeze type hanger suspended from rods.

2. Where rigid metal conduits and electrical metallic tubing are supported from building members, supports shall be installed as follows:

   a. Conduit Sizes:

      1) 3/4" to 1-1/4" Inclusive: Within 18" of each outlet and on either side of couplings and fittings and at a spacing not to exceed 8 feet.

      2) 1-1/2" and Larger: Within 3 feet of each junction or pullbox and terminal cabinet and at a spacing not to exceed 8 feet.

   b. When rigid conduits are supported from trapezes, the supports shall be spaced not more than 8 feet apart.

   c. Conduit trapezes shall consist of unistrut, kindorf, or equal channels and fittings, in accordance with the manufacturer's printed recommendation.

3. Secure exposed conduit runs on concrete, plaster or other construction in place with cast conduit clamps affixed with metallic expansion anchors or toggle bolts and cadmium plated machine or lag screws.

4. Do not strap or fasten rigid conduits to mechanical equipment, or to equipment subject to vibration or mounted on shock absorbing bases.

5. Use insulated bushings and locknuts on all conduits where entering pullboxes, junction boxes, outlet boxes, cabinets and similar enclosures, and for all signal and telephone conduits terminated in cabinets or backboards.

6. Where conduit termination is subject to moisture or where conduits penetrate exterior wall above grade or roof seal with Manville "Dux seal, 3M putty 33, or equal.

7. Provide nylon or polypropylene ropes, 3/8" 0.D., rated at 2,000 pounds minimum tensile strength, in all conduits more than 5' in length left empty for future use. Fasten each rope to plugs or caps at each end with a 5' minimum slack. The rope shall be in one continuous length through each duct with no cuts and ties allowed.

8. Tag all empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit and the location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16 gauge tags or lead tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags, with steel punch dies, clear and complete identifying information.

9. Provide expansion and deflection fittings where two rigidly supported conduits may move in relation to each other at expansion or seismic joint crossings.

10. From each panel which is flush mounted in a wall, stub from top of the panel, a minimum of (4) 3/4-inch conduits to the nearest ceiling space or other accessible location and cap for future use.

11. Furnish independent support for all conduits rising from floor for motor connections if over 18 inches above floor. Do not support to motor, to ductwork or mechanical equipment.

12. Conduits which are installed above dry type suspended ceilings shall not be secured to ceiling support wires. Support such conduit independent of ceiling suspension systems.

13. Keep bends and offsets in conduit runs to an absolute minimum. Replace all deformed, flattened or kinked conduits at Contractor's expense.

14. Ream the ends of all conduits.

15. Paint fire alarm conduits with a 1-inch wide red band every 5 feet of run.

16. Seal all conduits from exterior outlets at first interior junction to prevent moisture from entering the building through the conduits. Slope exterior conduits away from the building.

17. Install all exposed conduits parallel to and perpendicular to the building structure.

18. Conduit size shall be minimum 3/4-inch.

19. Conduits 1-inch and smaller, in metal and stud partitions, shall be tied to the furring channels with No. 12 gauge galvanized tie wire spaced not more than 5 feet apart. Conduits 1 inch and smaller for service to lighting fixtures (other than home runs) may be supported in the same way. Conduits above metal channel lath and plaster ceilings for other services and lighting home runs shall be supported as indicated in Paragraph 3.1.G.1 herein.

20. Conduit clamps and hanger rods attached to concrete structures shall be secured by machine bolts or rods screwed into anchors. Anchors not cast into the concrete shall be of the expansion shield type, Phillips “Redhead”, Hilti, or equal.

21. A separate conduit shall be installed for each homerun indicated on the Drawings.

22. Sleeves. Wherever conduits pass through concrete walls, suspended slabs or metal deck floors, provide sleeves of ample size to permit installation of conduits. Sleeves shall be installed prior to pouring of concrete and shall have ends flush with the wall or extend 2 inches above floor surfaces. Verify locations with University's Representative.

23. Finish Around Sleeves: Rough edges shall be finished smooth. Space between conduits and sleeves where conduit passes through exterior walls shall be sealed to permit movement of conduit, but prevent entrance of water. Space between conduit and sleeves where conduits pass through fire rated interior walls and slabs shall be sealed with approved materials to provide a fire barrier conforming to the requirement of the codes as listed in Section 01060, REGULATORY REQUIREMENTS.

24. Wherever conduits extend through roof, provide galvanized sheet metal flashing. Flashing shall extend six inches above roof.

25. Install conduit seals in all conduits entering or leaving hazardous areas, refrigerated rooms and clean rooms. Use seals as described in Paragraph 3.1.G.22 above.

26. Except as otherwise indicated on the Drawings, bends in conduits 2 inches or larger shall have a radius of curvature of the inner edge, equal to not less than ten (10) times the internal diameter of the conduit. Any deviations from this radius shall be approved by University's Representative. Wire or cable bends in junction or pull boxes shall be made with a "U" shape against the inside surface of the manholes, junction or pull boxes to provide extra length for future redevelopment. Bends for 600-volt cable shall have a radius of not less than five (5) times the diameter of the cable. Shielded cables rated above 600 volts shall have a bending radius of not less than twelve times the cable over all diameters. Nesting of conduits shall be made when two or more conduits are run in parallel. High voltage feeder conduit runs (above 600 volts), telephone and closed-circuit television conduit runs shall not have more than two 90º radius bends. All other conduit runs (below 600 volts) shall not have more than three 90º radius bends between pull boxes, junction boxes or terminal cabinets.

27. Conduit shall not be run closer than 6 inches to any hot water pipe, steam pipe, heater flue or vent.

28. Provide condulets for exposed runs of conduits where junctions, 90º bends or offsets are required, whether such condulets are indicated on the Drawings or not. Conduit bends will not be permitted around the corners of beams, walls or equipment. All condulet covers shall be accessible. Condulets 2 inches or larger shall be Crouse-Hinds “LBD”, Appleton “LBD, or equal.

29. All control apparatus, outlet boxes, junction and pull boxes, and other similar equipment shall be installed and maintained in accessible positions and locations.

30. Conduits in furred spaces shall be routed to clear access openings.

31. Where steel conduits enter a concrete floor below a surface mounted panelboard, they shall be encased in a concrete curb of sufficient height to match the height of the finished base tile.

32. Holes for conduits through existing concrete walls or floors shall be made by the "core-drill" method.

F. Seismic Bracing:

1. Provide seismic bracing for conduits 2" and larger, wherever conduit is suspended more than 12" to the bottom of the conduit from its anchoring point on the structure. All such bracing as described herein or below shall be run from the raceway to the structure, and anchored to the latter in an approved manner.

G. As-builts

1. Contractor shall produce as-built drawings indicating all deviations from the design drawings.

3.2 FIELD ACCEPTANCE TEST

A. Upon completing the installation of conduits, all conduits including spares shall be tested by a cylindrical mandrel drawn by hand through each conduit without any mechanical assistance. The contractor is responsible for replacing any conduit section which the

mandrel will not pass. Replaced conduits shall be mandreled again. After successful mandreling, conduits shall be swabbed to remove all foreign materials and plugged or capped until ready to pull wires or cables.

B. Visual and mechanical inspection:

1. Inspect for physical damage.

2. Inspect conduit bracings.

3. Inspect conduit bends.

4. Inspect conduit seals and plugs or caps.

5. Inspect whether the specified ropes are placed in the spare conduits.

6. Inspect whether the specified tags are placed on both ends of the spare conduits.

END OF SECTION

SECTION 16121
CONDUCTORS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide conductors as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Tests and Reports (Test Requirements are detailed in Paragraph 3.1 M below).

1. Testing laboratory shall submit Megger Test Report to University's Representative who will approve or disapprove Contractor's Work.

B. Shop Drawings and Product Data: The following list includes the required shop drawing information that shall be submitted.

1. Wire and cable.
2. Splice details.
3. Connectors.

C. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES for procedures.

2. PRODUCTS

2.1 MATERIALS

A. Insulated wire conductors for circuit voltage, 600 volts or less, shall be copper, minimum size #12 AWG. Control wiring may be #14 AWG minimum except where otherwise shown.

B. Conductors shall have UL approved 600 volt insulation of type specified below or elsewhere in the Specifications.

1. Branch Circuits - Lighting and Power.

a. #10 AWG and smaller, solid wire type THW or THHN/THWN, THHN.

b. #8 AWG and larger, stranded type THW or THHN/THWN.

2. Feeders: Lighting and power, type THW or THHN/THWN.

3. Connectors for #10 conductor and smaller UL listed for 600 volts, UL approved for use with copper, cone shaped, expandable coil spring insert, insulated with a nylon shell and two wings placed opposite each other to serve as a "built-in" wrench. Shell shall be molded one-piece as manufactured by Ideal Wingnut, 3M Scotchlock, or equal.

4. Connectors for #8 AWG and larger shall be screw pressure lugs made of high strength structural aluminum alloy and UL approved for use with copper wire as manufactured by Burndy “Versitaps”, T&B Locklite, or equal.

5. All conductor insulation shall be color coded to indicate phase leg, voltage and use. If color coded wire is unavailable, color banding (minimum 2" wide) shall be required where conductors are visible. This color coding is acceptable only in size AWG #8 and larger.

6. Conductor insulation type, size and UL approval shall be printed with permanent white paint on all conductor insulation continually repeating.

7. Wiring through fluorescent fixtures in continuous rows shall be type THHN.

8. Provide all conductors used for power, lighting, control signal and communications systems, operating at 600 volts and below, with a minimum insulation rating of 600 volts.

9. Minimum Size Conductors: #12 AWG copper, unless otherwise indicated.

10. All conductors shall be new and shall have been manufactured within 12 months of the date of delivery to the Project site and continuously stored where protected from the heat or weather.

11. Vertical cable supports shall be OZ Gedney Type M, Appleton, or equal.

12. Deliver all conductors to the Project site on their original cable reels or in their original unbroken packages.

13. Provide all conductor packages and cable reels plainly marked or tagged with UL labels, AWG size, voltage rating, insulation type, type of standing, manufacturer's name, and month and year when manufactured.

14. Insulating Tape - Plastic Self-adhering. 3M Scotch #33, Manville #166, or equal.

15. Conductor tags shall be premarked, self-adhesive wrap-around cloth type. Manufacturer T&B Easy Code, Brady Perma Code, or equal.

16. Conductor ties shall be plastic with cinching holders. Manufacturers T&B Tyrap, Panduit Rap-Pan, or equal.

17. Conductor sealant shall be silicone type Dow Corning #795, GE # SCS 1000, or equal.

3. EXECUTION

3.1 INSTALLATION

A. The following color code prevails for all branch circuits and feeders:

1. Neutral: White for 208/120, white for 480/277.
2. Ground: Green.
3. Phase A: Black for 208/120, brown for 480/277.
4. Phase B: Red for 208/120, yellow for 480/277.
5. Phase C: Blue for 208/120, purple for 480/277.
6. Three-way travelers - orange.
7. Switch legs same color as phase leg.

B. Identify all feeders as to phase or leg in each panelboard with identifying tape a minimum of two inches wide color coded according to Paragraph 3.1.A above.

C. For conductors installed in areas subjected to temperatures exceeding 140ºF, including terminating in incandescent lighting fixtures and installed through or into housing containing ballasts, furnish type THHN.

D. For conductors installed in exposed conduit outside of buildings and conduit within or just under roofing material, furnish type THHN.

E. Control Circuits for Mechanical Equipment: Use 600 volt UL type THWN conductors except where subject to abnormally high temperatures such as on or near boilers. Under these conditions, use UL type THHN.

F. Make all branch circuit and fixture joints for #10 AWG and smaller wire with connectors as specified in Paragraph 2.1 A.3 above.

G. Make all branch circuit joints of #8 AWG and larger with screw pressure lugs as specified in Paragraph 2.1 A.4 above, and insulate with electrical tape to 150% of the insulating value of the conductor insulation.

H. Tape all connections made with non-insulated type connectors with insulating tape to 150% of the insulating value of conductor insulation.

I. Each circuit shall correspond to the branch circuit number indicated on the panel schedule shown on the Drawings unless otherwise approved by University's Representative.

J. For control wiring, conform to the wiring diagrams shown on the mechanical Drawings and the manufacturer's wiring diagrams to control the equipment in the manner specified in Division 15 of the Specifications. Color code all control wiring.

K. Where conductors in conduit pass through exterior walls, a sealing compound of moisture-resistant material shall be applied in the ends of the conduits to seal around the conductors. Sealant shall be Dow Corning #795, GE # SCSI 1000, or equal.

L. Tag all conductors of power circuits and the various signal and sound systems. Conductors shall be tagged in each junction box, pull box, wireways or auxiliary gutter and at each device, motor outlet, panelboard, switchboard or other conductor termination. Tag shall show feeder number, size, phase and origin.

M. Megger tests shall be taken on all feeder conductors and on all conductors for motors over 15 HP. Tests shall be made prior to connection of equipment. Conductors testing below manufacturer's standard, shall be replaced at Contractor's expense.

N. Wiring within all equipment enclosures shall be neatly grouped and tied together.

O. Pigtails shall be extended from branch wiring in outlet boxes for attachment to devices. Loops in through wiring will not be acceptable.

P. Conductors in outlet boxes shall have a minimum of 8 inches of extra conductors.

Q. Tag all conductors in junctions boxes, pull boxes, and wireways, indicating panel board and circuit number.

END OF SECTION

SECTION 16130
OUTLET AND JUNCTION BOXES

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide outlet and junction boxes as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

B. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Outlet and junction box construction, size and finish.

2. PRODUCTS

2.1 MATERIALS

A. Outlet boxes and covers shall be galvanized pressed steel and plugged holes, and shall be hot dipped galvanized or sherardized. All boxes shall be of NEC size for the number of wires or conduits passing through or terminating therein, but in no case shall any box be less than 4 inches square by 2-1/8 inches deep, unless specifically noted as smaller on the Drawings. For boxes concealed in walls or ceiling, provide the solid gang, galvanized or sherardized pressed steel knockout type. Sectional boxes shall not be used.

B. Light fixture outlet boxes shall be equipped with fixture-supporting device, as required by the unit to be installed.

C. Exposed boxes in mechanical areas or exposed to weather shall be cast iron weatherproof boxes with grounding terminal, threaded hubs and gaskets, Type "FS" or "FD" Series, manufactured by Crouse-Hinds, Appleton, or equal. Pot metal boxes are not acceptable.

D. Telephone and intercom outlets shall be a minimum of 4-11/16 inches square by 2-1/8 inches deep.

E. Outlet boxes in hazardous areas shall be cast metal with threaded hubs, approved for class of hazardous area where installed.

F. Switch Outlets: Use solid gang boxes for three or more switches for mounting behind a common single plate.

G. Fire alarm boxes shall be 4 inches square with plaster rings to suit type of device. Special boxes shall be as specified in Section 16720, FIRE ALARM LIFE/SAFETY SYSTEM.

H. Condulets shall be cast iron with threaded hubs. Type "FS" or "FD" series, manufactured by Crouse-Hinds, Appleton, or equal.

I. Floor boxes shall be cast metal with adjustable height boxes. Manufacturer: Hubbell #B2537, Walker, or equal.

J. Acoustic pads shall be pliable, putty-like pads, 1/4-inch thick. Manufacturer: Harry A. Lowrey Assoc., Nelson Electric, or equal.

3. EXECUTION

3.1 INSTALLATION

A. Furnish all boxes necessary for installation of the electrical Work in compliance with NEC requirements.

B. Secure recessed boxes for ceiling outlets with galvanized steel bar hangers, specifically manufactured for the purpose, to ceiling channels to permit the installation of the box.

C. Single gang wall outlet boxes located at metal studs shall be screwed to the stud with sheet metal screws.

D. Single or multiple wall outlet boxes located between studs shall be secured in place to bar hangers between studs.

E. Nails shall not be used to support outlet boxes.

F. Secure recessed, pressed steel boxes in place with steel hangers specifically manufactured for the purpose. Fully or partially hammer driven screws are not permitted.

G. Use extension rings with blank covers for making exposed conduit connections to flush wall or ceiling boxes.

H. For boxes not specified or indicated, use boxes and mounting height as required by equipment and recommended by equipment manufacturer.

I. For outlets flush in exterior walls, use weatherproof joints and connections all around. Outlets shall have cast covers and be fitted with gaskets.

J. Do not locate outlet boxes not containing a circuit device in any public space. Place these boxes in storage rooms, electrical closets, or above accessible ceilings.

K. Place boxes which must be exposed to public view in a location approved by University's Representative. Provide covers or plates to match adjacent surfaces as approved by University's Representative.

L. Covers for flush outlets shall finish flush with plaster or other finished surface.

M. Where both emergency and normal circuits feed a single light fixture, provide an outlet box for each system.

N. For boxes installed in concrete, provide the type specifically designed for the purpose to prevent entrance of concrete and to permit placement of box and conduit without displacing reinforcing steel.

O. Use boxes sized to legally accommodate all devices and conductors contained therein. Use no box smaller than 4 inches square by 2-1/8 inches deep, unless otherwise indicated.

P. Securely fasten all outlet boxes to the structural members. In concrete or drywall construction, set recessed boxes so that the front of the plaster ring or front of the box for those without plaster rings is not more than 1/4 inch behind the final finished surface. Set all recessed boxes in other types of construction so that the fronts are flush with the finished surface. Where these settings are not achieved, provide a 24-gauge or heavier galvanized steel liner flush with finished surface.

Q. Provide UL approved factory made knockout seals in the boxes where unused knockouts are not intact. Provide recessed threaded plugs in all unused hubs of cast boxes.

R. Label the cover of each accessible junction box with panel and circuit designation and function.

S. Multiple gang boxes containing 277 volt switches shall have a barrier between each switch.

T. Paint the outside and inside of all boxes containing fire alarm devices with red paint.

U. Boxes shall not be mounted back-to-back in any wall; minimum offset shall be 16 inches.

V. Provide acoustic blanket or membrane around all outlet boxes and switches located in party walls of offices.

W. Provide and maintain sufficient access and working space to permit access and safe maintenance to all boxes.

END OF SECTION

SECTION 16131
INTERIOR PULLBOXES AND WIREWAYS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide interior pullboxes and wireways as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data: The following list includes the required shop drawing information that shall be submitted.

1. Pullbox construction, size and finish.

B. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

2. PRODUCTS

2.1 MATERIALS

A. Sheet steel pullboxes shall be fabricated of the gauge of sheet metal required by the NEC, galvanized after fabrication, furnished with required knockouts and removable screw cover. Finish with prime coat ready for painting, where exposed to public view; ANSI 61 light gray in other locations. Covers for pullboxes larger than 30" shall be two sections with handles.

B. Provide cast iron pullboxes with gasketed screw cover and drilled and tapped holes as required. Provide boxes as manufactured by OZ Gedney, Russel and Stoll, or equal.

C. Provide galvanized sheet metal wireway and gutters with standard factory finish. Provide wireways with hinged coverplate and accessories as required for full cable access, manufactured by Circle AW, Wireguard, or equal.

D. Dimensions of pullboxes for high-voltage cables shall be a minimum of 25% larger than standard NEC code size boxes for 600-volt wire.

3. EXECUTION

3.1 INSTALLATION

A. Pullboxes shall be installed in all conduit runs wherever indicated, and where necessary to facilitate the pulling of wires and cables.

B. Securely fasten to structural members or channel supports.

C. Do not install pullboxes in public areas unless specifically indicated on Drawings.

D. Install sheet metal pullboxes in dry protected locations.

E. Install cast iron pullboxes in wet and damp locations. Boxes shall be flush with grade or slab.

F. Furnish tight fitting bore or punch holes, through which rigid conduit shall be secured to boxes with a double lock nut and bushing.

G. Label covers of interior wireways and pullboxes. Tag all conductors to identify circuits and origin.

END OF SECTION

SECTION 16140
WIRING DEVICES

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide wiring devices as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Each device indicating FS number, amperage and voltage rating, materials, color and manufacturer's catalog sheet.

2. Each device plate indicating materials and thickness or gauge of materials, color and manufacturer's catalog sheet.

B. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

2. PRODUCTS

2.1 MATERIALS

A. All devices shall conform to NEMA standards, shall be UL listed and labeled, and shall be "Specification Grade," meeting the requirements of FS WC-596-F and switches meeting the requirements of FS WS-896-E.

B. Switches:

1. Wall switches shall be fully enclosed, quiet type tumbler switches rated 20 amperes, I20 or 277-volt, bakelite or composition.

2. Quiet switches, 20 ampere type, may be used in quiet locations at full rating for inductive or non-inductive loads and incandescent or fluorescent lighting loads.

3. Single Pole Quiet Switches: Hubbell 1221-I, P&S No. 20 ACI, or equal.

4. Double Pole Quiet Switches: Hubbell 1222-I, P&S No. 20 AC2-I, or equal.

5. Three-way Quiet Switches: Hubbell 1223-I, P&S No. 20 AC3-I, or equal.

6. Wall switch and pilot lights shall be flush mounted combination wall type with switch and pilot light equipped with a 6-watt, 125-volt candelabra base lamp. The pilot light shall have a green jewel with brass rim flush mounted in the wall plate.

7. Control switches for lighting shall be 3-way, normally open, momentary contact, tumbler switches, Hubbell 1223-I Series, P&S No. 20 AC3-I, or equal. The switch shall be wired so that the lights will be "ON" when the switch is moved to the "UP" position.

8. Remote control motor switches shall be standard duty, momentary contact, push button, or selector switches, with pilot lights and jewels. Manufacturer shall be Square D, Allen Bradley, or equal.

C. Manual motor control switches for single-phase motors shall be flush or surface mounted, as required, full-voltage type with thermal overload protection and with pilot light and jewel where specified. Manufacturer shall be Allen Bradley, G.E., or equal.

D. Remote control switches shall be standard duty, momentary contact, push button or selector switches, equipped with pilot light and jewel, where specified. Manufacturer shall be Allen Bradley, G.E., or equal, and shall be mounted in the NEMA type enclosure most applicable for the location.

E. Limit switches shall be Allen Bradley, G.E., or equal.

F. Door switches shall be Allen Bradley, G.E., or equal.

G. Contactors for the control of lighting circuits shall be mechanically held, NEMA Size 2 or larger, with the number of poles as required by the schedules or diagrams. Contactors shall have coil clearing contacts. Manufacturers shall be Allen Bradley, G.E., or equal.

H. Manual Dimmers:

1. Fluorescent dimmers shall be 120 or 277 volts as required for circuit wiring. Rating shall be based on quantity of lamps controlled. Lamp ballast shall be as recommended by dimmer manufacturer. Lutron, Lightolier, or equal.

2. Incandescent dimmers shall be 120 volts and up to 2000 watts rating. Lutron, Lightolier, or equal.

3. Dimmers shall be rotary knob type or slider type with built-in switch and radio/T.V. interference filter. Dimmers shall be solid-state type.

I. Receptacles:

1. Single and duplex convenience receptacles shall be U-grounded type, 125 volts, side and back wired with binding screws only. Rating 15 or 20 amperes as indicated, Hubbell 5361 and 5362, Woodhead 5361DW and 5362DW, or equal.

2. The grounding contact shall be internally connected to the frame with ground terminal for external ground.

3. Special receptacles shall be as indicated on Drawings by NEMA configuration.

4. Ground fault receptacles shall be 20 amperes, 125 volt, duplex, three wire grounding with pilot light and test and reset buttons. Suitable for feed-through wiring, color to be as selected by University's Representative from manufacturer's standard colors, Hubbell GF 5362, Leviton Sure-Gard III , or equal.

5. Wiring devices in exposed weatherproof boxes shall be the devices specified in this Section, and shall be installed in "FS" or "FD" series condulets with weatherproof cast metal covers, and gaskets as required.

J. Plates:

1. Provide plates for all switches, receptacles, junction boxes, telephone and other outlets.

2. Provide engraved or etched plates for all lock switches, pilot switches, switches from which equipment or circuit controlled cannot be readily seen, three or more switches under a common plate and for switches as indicated.

3. Stainless steel plates shall be AISI Type 302, with beveled edges, 0.040" thick with satin finish. Hubbell "S" Series, Leviton, or equal.

4. Where outlets are indicated to be weatherproof, provide a AISI Type 302 stainless with double hinged covers.

5. Galvanized steel plates shall be square or rectangular and hot dipped galvanized or sherardized, beveled edges and 0.040" thick.

6. Provide plates equipped with close fitting openings for the exact device to be used. Provide plates for telephone outlets equipped with bushed openings.

7. Dimmer plates shall be custom type.

8. Finish of plates and devices shall be as follows:

   a. Plates: Plates for emergency lighting and receptacles shall be red.

9. Finish of plates and devices shall be as follows:

Location	Plate	Device Color*
General Interior Finished Areas and Laboratories	Stainless Steel	Brown
On Exterior Spring Loaded Cover	Stainless with	Brown
In Equipment Rooms or Other Generally Unfinished Areas	Stainless Steel	Brown
Janitor and Utility Rooms	Stainless Steel	Brown
Toilet (Public)	Stainless Steel	Brown
Emergency Circuits	Nylon	Red

* NOTE: Device colors except for emergency (red) may be changed at University's Representative's request if desirable to match building color scheme.

K. All pilot lights shall be transformer type.

3. EXECUTION

3.1 INSTALLATION

A. Mount switches 4 feet above finished floor and vertically in all locations unless indicated otherwise.

B. All convenience and telephone outlets mounted 15" above the floor shall be installed vertically. Install receptacle with the grounding terminal up. All 3-wire duplex receptacles mounted more than 15 inches above the floor shall be installed horizontally with the grounding terminal to the left.

C. NEC sized (#12 minimum) bonding jumper shall connect grounded outlet box to receptacle grounding terminal on all flush mounted units.

D. Align and plumb all devices and plates. Plates shall fit flat against wall and tight against device surface without strain on plate.

E. Each class of device shall be furnished by one manufacturer for total Project. Mixing devices of different suppliers will not be permitted.

F. Ganged switches on 277 volt circuits shall have a barrier between each switch.

G. Manual dimmers shall be installed in individual outlet boxes. Do not install in ganged boxes with other devices.

END OF SECTION

SECTION 16141
NAMEPLATES AND WARNING SIGNS

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide nameplates and warning signs as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Complete data.

B. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

2. PRODUCTS

2.1 MATERIALS

A. Fabricated nameplates shall clearly state the following:

1. Manufacturer's name and equipment design ratings including current, voltage, KVA, HP, bus bracing rating or as applicable.

2. System usage and purpose, system nominal voltage, equipment rating KVA, amperes, HP and RPM as applicable. Designation data per Drawings or supplied with shop drawings.

3. Panel designation, voltage and phase.

B. Manufacturer's Device Nameplates: Device usage, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:

1. Circuit Breakers: Voltage, continuous current, maximum interrupting current and trip current.

2. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics."

3. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically held" or "electrically held."

4. Motors: Rated voltage, full load amperes, frequency, phases, speed, horsepower, code letter rating, time rating, type of winding, class and temperature.

5. Controllers: Voltage, current, horsepower and trip setting of motor running overcurrent protection.

C. Equipment nameplate material shall be engraved, laminated, plastic or Micarta type with white letters engraved through the black background, except on emergency systems background shall be red and include the word "EMERGENCY." Letters shall be 3/16" high for devices, and minimum 1/4" high for equipment and enclosures. Adhesives are not acceptable. All plates for receptacles on emergency circuits shall be engraved "Emer. 120V" with 3/8" black filled letters.

D. Other equipment nameplates or warning signs required by the Contract Documents, or added at the equipment manufacturer's or Contractor's discretion, shall be fabricated and installed according to the guidelines specified in this Section.

3. EXECUTION

3.1 INSTALLATION

A. Nameplates shall be mounted by self-tapping, threaded screws and bolts, or by rivets.

B. Signs shall be permanently mounted with cadmium plated, steel screws or nickel-plated brass bolts.

END OF SECTION

SECTION 16170
SWITCHES, DISCONNECT AND SAFETY

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide switches, disconnect and safety, as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data: The following list includes the required shop drawings that shall be submitted.

1. Complete equipment shop drawings.

B. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

2. PRODUCTS

2.1 MATERIALS

A. All disconnect switches shall be the "Heavy Duty" type and shall meet the latest edition of FS W-S-865.

B. Provide all disconnect switches with devices enabling the switch to be locked in the open and closed positions.

C. Manual motor starters shall be motor rated tumbler switches rated 3 HP 208 or 480 volts, three-phase with overload heaters as specified or shown to protect equipment served.

D. Externally operable safety switches shall have quick-make, quick-break mechanism, capable of switching 10 times the switch rating, and with cover interlocks with defeat mechanism for maintenance. Provide switches with number of poles, ampere, voltage and HP rating, types of enclosures and fusible or nonfusible as indicated and as required for the particular application. Disconnect switches shall be heavy duty type unless otherwise indicated. Provide NEMA I enclosures for interior locations and NEMA 3R enclosures for exterior or wet locations unless otherwise indicated. Switches having a dual rating when used with dual element fuses shall have rating so indicated on the metal plate. Fuses, where required, shall be UL listed current limiting type RK5.

E. Manufacturers: G.E. , Square D, or equal.

F. Disconnect switches:

a. Fused or nonfused as noted.
b. Voltage as required.
c. Heavy duty, except as noted.
d. Horsepower rated for motor loads.
e. Toggle type:

1) Non-fused, load breaks.
2) Maximum ratings:

a) 20 amp at 600 volts.

b) 30 amp at 250 volts.

3) 2 pole: Equal to Arrow-Hart, No. 6808F.
Square D Class 2510
4) 3 pole: Equal to Arrow-Hart, No. 7810F.
Square D Class 2510

f. Knife-blade type:

1) Load break, quick-make-quick break, UL Class 4 up to 600 amp.
2) Maximum rating except as noted: 800 amp.
3) Arc quenchers.
4) Individually mounted: Equal to General Electric "TH", Square D H32 series, or equal.
5) Panelboard or switchboard mounted: Equal to General Electric "QMR", Square D "QMB" or equal.

g. Enclosures: Dead Front, NEMA Type 1, except as noted.

2.2 Fuses: Match building standard:

A. Match existing.

B. For motor and transformer loads:
1) Current limiting, dual element, time delay type, maximum rating: 600 amp at required voltage.
2) 200,000-amp IC, UL Class RK5: Equal to Bussmann Fusetron FRN or FRS or Lo-Peak LPN or LPS.

C. For other loads: Match building standards:
1) Current limiting, fast acting type.
2) 200,000-amp IC (UL Class RK5, up to 600 amp; Class RK1, over 600 amp). (Equal to Bussmann Limitron KTN, KTS, or KTU)

D. All fuses: Same manufacturer.

E. Provide 1 spare matching fuse for each set of 3.

2.3 Circuit breakers:

A. Molded case:

1) Thermal-magnetic, quick-make-quick-break.
2) Manually operated with insulated trip-free handle.
3) Multi-pole types: With internal trip bar.
4) Terminals: UL listed for 75 degree C and suitable for copper or aluminum cable.
5) Enclosures: Dead front, NEMA Type 1, except as noted.
6) Frames, IC and interchangeable trips:

a) 120/240 volts, 100-amp frames.

(1) Interrupting capacity: 10,000 amps.
(2) 1, 2 and 3 poles

b) 240 volts, 225-ampere frame:

(1) Interrupting capacity: 25,000 amps.
(2) 3 poles.

c) 277 volts, 100-amp frame:

(1) Interrupting capacity: 14,000 amps.
(2) 1 pole.

d) 480 volts, 100-amp frame:

(1) Interrupting capacity: 20,000 amps.
(2) 2 and 3 poles.

e) 480 volts, 225-amp frame:

(1) Interrupting Capacity: 30,000 amps.
(2) 2 and 3 poles.
(3) Interchangeable Trip

3. EXECUTION

3.1 INSTALLATION

A. Install switches, disconnects and safety, where indicated on the Drawings.

B. Securely fasten to structural members or channel support.

C. Install manual motor starters flush mounted for switching motors 3 HP and smaller in finished areas.

D. Install manual motor starters surface mounted in equipment rooms and nonfinished areas. Where installed above ceilings, access panels shall be provided.

END OF SECTION

SECTION 16510
LIGHTING FIXTURES

1. GENERAL

1.1 DESCRIPTION OF WORK

A. Provide lighting fixtures, lamps, and ballasts as shown on the Drawings and as specified, complete.

1.2 SUBMITTALS

A. Shop Drawings and Product Data: The following list includes the required shop drawing information that shall be submitted.

1. Manufacturer's catalog sheets of standard fixtures, indicating materials, gauges, dimensions, standard finishes available, weights, and UL approval of fixtures.

2. Shop drawings of special fixtures shall contain the same information as required for standard fixtures.

3. Pictures or cuts of all lighting fixtures, with distribution curves and complete photometric data.

4. Structural calculation for fixture hangers and supports of decorative fixtures in excess of 25 pounds.

5. Manufacturer's catalog sheets indicating input and load electrical characteristics, ambient temperature rating, noise level rating, mounting methods and UL listing for use with required lamps.

B. Refer to Section 01340, SHOP DRAWINGS, PRODUCT DATA & SAMPLES, for procedures.

1.3 GUARANTEE

A. Furnish to University a written guarantee for lighting fixture ballasts against all defects in materials and workmanship, including failure to operate as specified for two (2) years from date of acceptance. Refer to Section 01740, GUARANTEES, WARRANTIES, BONDS, SERVICE & MAINTENANCE CONTRACTS, for submittal form.

2. PRODUCTS

2.1 MATERIALS

A. Lighting fixtures shall have all parts and fittings necessary to completely and correctly install the fixtures. All fixtures shall be equipped with lamps of the size and type specified. All fixtures shall be the standard product of fixture manufacturer unless otherwise shown, and shall be UL approved.

B. Where both catalog number and description, either narrative or pictorial are indicated, the requirements of the description shall take precedence and prevail.

C. All fixtures of one type shall be of one manufacturer and of identical finish and appearance.

D. Complete units and all electrical components for high intensity discharge, fluorescent, incandescent, and special fixtures shall bear the UL label. Labels shall not be placed on fixtures at locations where installation of unit labels is visible.

E. Fixture types shall be as indicated on the Drawings.

F. All plastic panels shall be 100% pure virgin acrylic, shall be completely de-staticized and shall be free from dust, dirt, grease, paint, debris, etc.

G. Recessed fixtures in suspended ceilings shall be free of light leaks above and below ceiling. Temperature of fixture shall not exceed UL Standards.

H. Reflectors, cones or baffles shall be free of spinning lines, ripples or any marks or indentations caused by riveting or other assembly techniques. No rivets, springs or other hardware shall be visible after installation.

I. Lamp sockets shall be rigidly and securely attached to the fixture enclosure or husk to insure safe operating temperature in accordance with lamp manufacturer's printed recommendation.

J. All exposed metal parts of exterior lighting fixtures shall be stainless steel, anodized aluminum or have 4 mil zinc coating applied after fabrication and before finish. Screws and fastening shall be stainless steel. Painted finishes shall be as specified in schedules.

K. All industrial type fluorescent lighting fixtures shall have a porcelain enamel finish.

L. Lamps:

1. Lamps shall be new and of wattage and type indicated or as required for the particular fixture installed.

2. Incandescent lamps shall be 130 volt 2500 hour rating, inside frost, with medium base for lamps 200 watts and smaller and mogul base for 300 watts or larger, except as noted on Drawings.

3. Fluorescent lamps shall be rapid start type. All lamps shall be warm white, except as noted, and shall have minimum rating of 2850 lumens. Lamps shall be Bi-Pin, T8. Length of lamps as shown on the Drawings. Four foot lamps shall be low energy type, 32 watts as manufactured by G.E., Sylvania, or equal.

4. 34 or 35-watt energy saving lamps shall not be used for dimming applications or where temperature is apt to fall below 60ºF. This includes outdoor applications and storage rooms.

M. Ballasts:

1. Provide all fluorescent fixtures with electronic ballasts which are ETL approved, CBM certified, high power factor, Class P thermally protected by dual system, and with "A" sound rating. Provide fluorescent fixture ballasts designed to accommodate T8 lamps, except where specified otherwise.

2. Ballasts for exterior fixtures shall be low temperature type for operating at -20ºF.

N. Office Area Specifications:

1. 277 volt, except as noted.
2. Shall be certified by the manufacturer to comply with Title 24.

(A)	2 x 4 Fixtures: (2-lamp)	Lightolier QHE 2 G PF OP 2 32 277 SO, 3500K T8 Lithonia 2AV G 2 32 MDR 277 GEB , 3500K T8 Daybrite 2 AV G 2 32 PMW 277 1/2EB, 3500K T8
(B)	2 x 2 Fixtures:	Lightolier QHE 2 G PF OP 2 FT 277 SB, 3500K T8 Lithonia 2AV G 2 CF40 MDR 277 GEB , 3500K T8

Daybrite 2 AV G 2 CF40 PMW 277 1/2EB, 3500K T8

(C) 2 x 4 Fixtures: (3-lamp)
Lightolier QHE 2 G PF OP 3 32 277 O3, 3500K T8
Lithonia 2AV G 3 32 MDR 277 GEB , 3500K T8
Daybrite 2 AV G 3 32 PMW 277 1/2EB, 3500K T8

(X) Exit Signs:
Lightolier LT N 1 R W (single face)
Lightolier LT N 2 R W (double face)
Lithonia LQMSW3R 120/277 (single/double face)

3. Fixture catalog numbers used to illustrate equipment type do not necessarily denote required mounting equipment or accessories. Provide accessories to suit.

3. EXECUTION

3.1 INSTALLATION

A. All fixtures installed in gypsum board ceilings or plaster soffits shall be furnished with metal frames. Fixtures in concrete shall be steel housing with bitumastic paint finish and approved for use in concrete. Fixtures shall be compatible with type of ceiling.

B. All adjustable lighting fixtures shall be aimed and set in the presence of University's Representative.

C. Stem hung fixtures shall be provided with ball swivels, located at the canopies, and rockers, at the fixtures, allowing a minimum 45-degree swing from the vertical. Stems shall be of 3/8-inch ID minimum pipe and shall be finished to match the lighting fixture.

D. Exterior fixtures requiring exposed exterior boxes shall be mounted on cast boxes equipped with gaskets as specified in Section 16130, OUTLET AND JUNCTION BOXES.

E. Backing for surface mounted or stem hung fluorescent fixtures shall be structural channel or angle iron with 5/16-inch bolts, except where mounted directly to concrete structures, in which case anchors and suspension shall be used. The exact method of support shall be as approved by University's Representative.

F. Stems: Each 4-foot and each 8-foot individually mounted fixture shall be supported by two (2) stems. For fixtures mounted in continuous rows where individual fixtures are mounted on common mounting channels, or otherwise rigidly fastened together, provide one stem for each 4-foot lamp length and two for each 8-foot lamp length. Stems shall be evenly spaced and not more than 50 inches apart. Before the ceiling mounted stem supports are installed, the exact stem spacing shall be determined in conjunction with University's Representative. Provide all metal shims, spacers and mounting bolts or devices, where necessary, in order to permit surface mounted fixtures to be pulled tight to ceiling supports or backing without causing ceiling tiles to be raised out of place.

G. Fluorescent lighting fixtures which are to be mounted in continuous rows of two or more fixtures shall have at least two bolts or other interlocking devices, as approved by University's Representative, at each connection to furnish for positive and true alignment of the fixtures.

H. Louvers, diffusers or lenses shall not be installed in lighting fixtures until such time as all glazing has been completed and all construction work involving plastering, grinding, sanding, painting, etc., and final clean-up sweeping and dusting have been completed.

I. Reflector surfaces and lamps in all lighting fixtures shall be cleaned of accumulated dust, dirt, plaster, paint, etc., before the installation of the louvers, diffusers, or lenses.

J. Recessed fluorescent lighting fixtures shall be independently supported by #12 AWG wires to specified anchors in the slab above. A 2-foot x 4-foot fixture shall require four (4) wires; a 1-foot x 4-foot fixture shall require four (4) wires. One (1) wire shall be attached to surface mounted fixtures. All wires shall have 1-inch slack.

K. Exit lights shall be provided with one lamp connected to an emergency lighting source and one lamp connected to a general lighting source. The homeruns to both sources shall be run in separate conduits.

L. Provide all lighting fixtures recessed in a ceiling which has a fire resistant rating of one hour or more with box enclosures which have a fire rating equal to that of the ceiling. The space from the fixture to the enclosure shall be 1-inch for fluorescent and 3-inch for incandescent fixtures.

M. Verify weights and recommended mounting methods of all decorative fixtures with manufacturers, and provide supports. Fixtures weighing more than 20 pounds shall be supported independently of the outlet box.

N. ceiling. The installation of luminous ceiling diffusers shall be in accordance with drawing details and as described in these Specifications.

O. Provide lamps in all fixtures:

1. Replace all lamps used during construction with new lamps prior to final acceptance of the project.

2. Clean all lamps after installation.

P. After the installation is completed, remove and replace any ballasts which are judged by University's Representative to be excessively noisy.

Q. Clean up and repair any damage to the finished building caused by installation of the light fixtures.

END OF SECTION