
Technical Specifications

LEON COUNTY JUDICIAL COMPLEX UPGRADE ELEVATORS NO. 6 AND 7

Prepared for

Leon County Board of Commissioners

Leon County Facilities

CONSTRUCTION DOCUMENTS

March 7, 2011

Set No. _____

**LEON COUNTY JUDICIAL COMPLEX
UPGRADES TO ELEVATORS NO. 6 AND 7
LEON COUNTY FACILITIES**

100% CONSTRUCTION DOCUMENTS
March 7, 2011

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SECTION 01005 – GENERAL REQUIREMENTS

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General Conditions and Supplementary General Conditions sections and other Divisions Specification sections apply to work of this section.

PRIME CONTRACTOR

The General Contractor shall be the Prime Contractor for all work included in this contract and shall be referred to as the General Contractor or the Contractor.

SCOPE AND INTENT

The work to be done consists of the furnishing of all labor, materials, and equipment, and performance of all work included in this Contract.

PLANS AND SPECIFICATIONS

Drawings are generally diagrammatic in nature and do not show in every detail all devices and incidental materials necessary to accomplish their intent. Therefore, the Contractor shall understand that such devices and incidental materials required shall be furnished at no cost to the Owner.

Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements that govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

All work called for in the Specifications applicable to this Contract, but not shown on the Plans, or vice versa, shall be of like effect as if shown or mentioned in both.

SUBSTITUTIONS

If the Contractor or supplier wishes consideration of equipment, materials or field devices other than that specified, he shall make a submittal to the Engineer not less than 10 days after Notice to Proceed. The Engineer may approve such substitution as an alternate, providing the Contractor has demonstrated to his satisfaction that it is equal or superior to the product specified.

COORDINATION

All work shall be coordinated with the Project Manager. At the beginning of each week, the Contractor shall present a schedule to the Project Manager showing what work will be taking place and on what days.

DRAWINGS

The Contractor is responsible for verifying that no conflicts exist at the job site that will prevent the successful completion of work under this section.

DAMAGE

The Contractor shall exercise due care when working in overhead or finished areas, shall take all necessary protective measures, and shall repair all surfaces which are damaged as a result of his work.

The Contractor shall be bound by the requirements of the general specification paragraph for the security and protection of personnel, materials, and equipment on site.

CODES

All work, materials, and equipment provided under this specification shall be in compliance with the applicable sections of the latest editions of the following codes and standards.

- a. Occupational Safety and Health Regulations.
- b. National Fire Codes.
- c. Florida Standard Building Codes.
- d. Standards of the National Board of Fire Underwriters.

GUARANTEE/SERVICE

The Contractor shall guarantee all new equipment and work installed under this Division for a period of one year from final acceptance without expense to the Owner.

DELIVERY AND STORAGE

Equipment and materials shall be properly stored and adequately protected and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored, and protected in accordance with the manufacturer's recommendations.

Damaged or defective items, in the opinion of the Engineer, shall be replaced at no cost to the Owner.

INSTRUCTION TO OPERATING PERSONNEL

The Contractor shall furnish without additional expense the services of competent instructors who will give full instruction to the designated personnel in the adjustment, operation and maintenance, including pertinent safety requirements, of the equipment and systems. The instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work-week after the equipment or system has been accepted.

Two man-hours of instruction shall be furnished.

ACCEPTANCE

Prior to final acceptance the Contractor shall complete all work and install all equipment required by the drawings and this specification and shall provide the following:

- a. Written certification that all work has been completed.
- b. An operation and maintenance manual for each system, except as otherwise specified herein, and for each piece of equipment shall be furnished by the Contractor. Three (3) copies of the manual bound in hardback binder, or an approved equivalent shall be provided to the Owner. One complete manual shall be furnished prior to the substantial completion and the remaining manuals shall be furnished before the contract is completed. The following identification shall be inscribed on the cover: the words "OPERATING AND MAINTENANCE MANUAL", the name

and location of the project, and the name of the Contractor. The manual shall include the names, addresses, and telephone numbers of each subcontractor installing equipment and systems and of the local representatives for each item of equipment and each system. The manual shall have a table of contents and be assembled to conform to the table of contents with tab sheets placed before instruction sheets shall be legible and easily read. The manual shall include, but not be limited to, the following: safety precautions, diagrams and illustrations, test procedures, performance data, and parts lists. The parts lists for equipment shall indicate the sources of supply, and the service organization that is reasonably convenient to the building site. Where data in the manual refers to more than one model, or refers to optional equipment, the model number installed and the options included shall be clearly marked.

- c. Three (3) print sets of the As-Built condition, clearly marked and signed and dated by the Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01040 - COORDINATION

PART 1 - GENERAL

WORK INCLUDED

Contractor shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills as may be necessary to perform the work in accordance with the Contract Documents.

Contractor shall be solely responsible for all means, methods, techniques, sequences and procedures of construction, and for providing adequate safety precautions and coordinating all portions of the work under the Contract Documents.

Contractor shall be responsible to see that the finished work complies accurately with the Contract Documents.

Contractor shall be responsible for all project coordination.

RELATED REQUIREMENTS

Bidding Conditions

Contractual Conditions

Section 01010 – General Provisions

Section 01200 - Project Meetings

Section 01700 - Contract Closeout

DESCRIPTION

Coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

Maintain reports and records at job site:

- a. Maintain Daily Log of progress of work and other pertinent data. Maintain log accessible to Owner, Architect/Engineer and his representative.
- b. Assemble documentation for handling of any claims or disputes that may arise.

Inspections and Testing:

- a. Inspect the work to assure that it is performed in accordance with the requirements of the Contract Documents.
- b. Arrange with the Engineer or Owner as applicable for special inspections or testing required.
- c. Reject work that does not conform to requirements of the Contract Documents.

Coordinate sequence of work to insure proposed completion dates are met.

Construction Schedule:

- a. Prepare detailed schedule of Contractor's operations and for all subcontractors on the project.
- b. Monitor schedules as work progresses.
- c. Identify potential variances between scheduled and probable completion date.
- d. Recommend to Engineer any adjustments in schedule to meet required completion date.
- e. Provide monthly summary reports of each monitoring.
- f. Observe work to monitor compliance with schedule.
- g. Verify that labor and equipment are adequate to meet and maintain the schedule for the work.
- h. Verify that product deliveries are adequate to meet and maintain the schedule for the work.
- i. Report any non-compliance to Engineer, with recommendations for remedy.
- j. Verify that adequate services are provided to comply with requirements for work and climatic conditions.
- k. Verify proper maintenance and operation of temporary facilities.
- l. Administer traffic and parking controls for construction workers. Construction traffic shall not interfere with surrounding traffic movement.

Coordination of Subcontractors:

- a. Coordinate work of all subcontractors and relationship between them.
- b. Establish on-site lines of authority and communication. Schedule and conduct progress meetings among Owner and Engineer representatives and subcontractors.
- c. Ensure that specified cleaning is done during progress of the work and at completion of contract.

MEETINGS

In addition to progress meeting specified in Section 01200, hold coordination meetings and pre-installation conferences with personnel and subcontractors to assure coordination of work.

COORDINATION OF SUBMITTALS

Administer processing of shop drawings, product data, and samples.

Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

Coordinate Testing Laboratory Services:

- a. Notify laboratory of test schedule.

- b. Verify that required personnel are present.
- c. Verify that specified tests are made as scheduled.
- d. Verify compliance of the test results with specified criteria. Determine need for re-testing and submit recommendations to Engineer. Administer and pay for required re-testing.

Coordinate with Sub-contractors as required:

- a. Provide temporary utilities (electric, water) required by the Subcontractors in the performance of their work.
- b. Provide designated location where the Subcontractors may place construction debris for removal by the Contractor.

Coordinate requests for changes to assure compatibility of space, of operating elements, and effect on work of other sections.

- a. Recommend necessary or desirable changes to Engineer.
- b. Review subcontractor's requests for changes and substitutions. Submit recommendations to Engineer.
- c. Process Change Orders in accord with General Conditions and Change Order Procedures.

COORDINATION OF SPACE

Coordinate uses of project space and sequence the installation of subcontractor work that is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

INTERPRETATION OF CONTRACT DOCUMENTS

Consult with Engineer to obtain interpretation or clarifications for any portions of the contract documents that are unclear or ambiguous. Transmit all requests for interpretation in writing.

Assist in the answering of any questions which may arise.

Transmit written interpretations to Sub Contractors, Suppliers and others whose work may be affected by the clarification.

Interpretations shall be based on the Engineers review of the Contract Documents. In case of conflicting data, assumption shall be made that the item of greater quality, cost of quantity was bid.

START-UP

Direct the check-out of utilities, operational systems, and equipment.

Assist in initial start-up and testing.

Record dates of the start of the operations of systems and equipment.

Submit to Engineer written notice of the beginning of warranty period for equipment put into service.

COORDINATION OF CONTRACT CLOSEOUT

Substantial Completion:

- a. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion.
- b. Upon determination of Substantial Completion of work or portion thereof, prepare for the Engineer a list of incomplete or unsatisfactory items.
- c. Request Substantial Inspection at the scheduled time. Provide Engineer and Owner five working days notice.

Final Completion:

Upon determination that work is at final completion:

- a. Submit written notice to Engineer that the work is ready for final inspection.
- b. Secure and transmit to Engineer required closeout submittals.

Turn over to Engineer.

- a. Operations and maintenance data.
- b. Spare parts and maintenance materials.
- c. Warranties and other data as required for these specifications.
- d. Owner file copies of all submittals, changes, etc.

After Owner occupancy of premises, coordinate access to site by various sections for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

Assemble and coordinate closeout submittals specified.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

REQUIREMENTS INCLUDED

Contractor shall attend a Pre-Construction meeting administered by the Engineer.

Contractor shall schedule and administer monthly progress meetings and specially called meetings throughout progress of work. Perform the following:

1. Prepare agenda for meetings.
2. Distribute written agenda of each meeting four days in advance of meeting date.
3. Make physical arrangements for meetings.
4. Preside at meetings.
5. Record the minutes; include significant proceedings and decisions.
6. Reproduce and distribute copies of minutes within three days after each meeting.
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meetings.
 - c. Furnish three copies of minutes to Engineer.

Representative of Contractors, Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

Invite Owner and Engineer to all such meetings. Owner and Engineer may attend to ascertain that Work is expedited consistent with Contract Documents and construction schedules.

RELATED REQUIREMENTS

Bidding Conditions.

Contractual Conditions.

Shop drawings, product data and samples.

Section 01010 - Summary of Work

Section 01040 - Coordination.

PRECONSTRUCTION MEETING

Location: A site designated by Owner.

Attendance: forward written notification to the following:

1. Owner's Project Manager.

2. Engineer and his professional consultants.
3. Contractor's Superintendent.
4. Major Subcontractors.
5. Others as Appropriate.

Suggested Agenda:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected Construction Schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination:
 - a. Designation of responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Submittals.
 - d. Change Orders.
 - e. Applications for Payment.
6. Adequacy of distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of Premises:
 - a. Office, work and storage areas.
 - b. Owner's requirements.
9. Construction facilities, controls and construction aids.
10. Temporary Utilities.
11. Safety and first-aid procedures.
12. Security procedures.
13. Housekeeping procedures.

PROGRESS MEETINGS

Contractor shall schedule regular periodic meetings at least monthly or more often if deemed appropriate by the Engineer.

Hold called meetings as required by progress of work.

Location of the meetings: Project jobsite.

Attendance:

1. Owner and Engineer and his professional consultants as needed.
2. Subcontractors as appropriate to the agenda.
3. Suppliers as appropriate to the agenda.
4. Others.

Suggested Agenda:

1. Review, approval of minutes of previous meetings.
2. Review of work progress since previous meetings.
3. Field observations, problems and conflicts.
4. Problems which impeded Construction Schedule.
5. Review of off-site fabrication, delivery schedule.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date.
 - b. Effect on other contracts of the Project.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01340 - SUBMITTALS

PART 1 - GENERAL

REQUIREMENTS INCLUDED

Submit Shop Drawings, Product Data and Samples required by Contract Documents.

Submittals may include, but are not limited to the following:

1. Those required in the individual technical specification sections.

RELATED REQUIREMENTS

Definitions and Additional Responsibilities of Parties: General Conditions of the Contract.

Designate in the Construction Schedule, Application for Payments, or in a separate coordinated schedule, the dates for submission of Shop Drawings, Product Data and Samples.

SHOP DRAWINGS

Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, schedule or room numbers shown on Contract Drawings.

Shall be original drawings, prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate some portion of the work and show fabrication, layout, setting or erection details. Duplication of contract Documents for any submittal shall not be acceptable.

PRODUCT DATA

Preparation:

1. Clearly mark each copy to identify pertinent products or models.
2. Show performance characteristics and capacities.
3. Show dimensions and clearances required.
4. Show wiring or piping diagrams and controls.
5. Note deviations from Contract Documents.

Manufacturer's standard schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the work.
2. Supplement standard information to provide information specifically applicable to the work.
3. Note deviations from Contract Documents.

CONTRACTOR RESPONSIBILITIES

Review Shop Drawings, Product Data and Samples prior to submission. Check and stamp submittal with his approval.

Determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with specifications.
5. Note deviations from Contract Documents.

Coordinate each submittal with requirements of the work and of the Contract Documents.

Notify the Engineer in writing, at time of submission, of his review and approval of submittal and of any deviations in the submittals from requirements of the Contract Documents.

1. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Engineers review of submittals, unless specific deviations are called to the attention of the Engineer in writing and the Engineer gives written acceptance of specific deviations.
2. Contractor's responsibility for errors and omissions in submittals is not relieved by Engineer's review of submittals.

Begin no fabrication or work which requires submittals until return of submittals with Engineer review.

Submittals not reviewed and approved by the Contractor will be rejected.

SUBMISSION REQUIREMENTS

Make submittals promptly in accordance with accepted schedule, and in such sequence as to cause no delay in the work or in the work of any other Contractor.

Number of submittals required:

1. Shop Drawings: Submit sufficient quantity of copies of shop drawing for the Contractor's use and four (4) copies to be retained by the Engineer.
2. Product Data: Submit sufficient quantity of Product Data for the Contractor's use and four (4) copies to be retained by the Engineer.
3. Samples: Submit the number stated in each specification section. Provide two (2) samples if not indicated.

Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The project title and number.

3. Contract identification.
4. The names of Contractor, Supplier and Manufacturer.
5. Identification of the product, with the specification section number.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the work or materials.
8. Identification of revisions on re-submittals.
9. Applicable Standards (such as ASTM or Federal Specification numbers).
10. A 5 inch x 3 inch blank space for contractor and Engineer or provide review status cover page.
11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

RE-SUBMISSION REQUIREMENTS

Make any corrections or changes in the submittals required by the Engineer and resubmit until accepted.

Shop drawings and product data:

1. Revise initial drawings of data, and resubmit as specified for the initial submittal.
2. Cloud any change which has been made.
3. Indicate shop drawing is being resubmitted, use Engineer's shop drawing identification number if provided.

Samples: Submit new samples if requested by Engineer.

DISTRIBUTION

Distribute reproductions of Shop Drawings and copies of Product Data which carry the Engineer stamp of acceptance to:

1. Job site file.
2. Subcontractors.
3. Supplier or Fabricator.
4. Project close-out documents.

ENGINEER DUTIES

Review submittals; allowing Engineer a period of 14 calendar days for review and return of Shop drawings.

Affix stamp and initials or signature and indicate requirements for re-submittal or approval of submittal.

Return submittals to Contractor for distribution of for re-submission.

Forward copy of submittal for Owner's use and information. This shall not relieve contractor's requirements in other sections to provide the Owner with a complete record copy at job close-out.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Shop Drawing Submittals shall be reviewed in accord with the following:

Review by Engineer of Record of submittals is for general conformance with the design concept as presented by the Contract Documents. No detailed check of quantities or dimensions will be made.

The General Contractor/Construction Manager is responsible for assuring that all submittals comply with the latest project plans, specifications, governing codes and regulations and is solely responsible for confirming all quantities, dimensions, fabrication techniques and coordinating work with all trades.

Shop drawings are to be submitted in a timely manner allowing adequate time for processing.

Submit shop drawings for specific components, such as columns, footings, etc., in their entirety. Shop drawings for similar floors shall be submitted in the same package.

All submittals are to be accompanied by a letter of transmittal. Do not combine different submittals on the same transmittal.

All shop drawings must bear evidence of the Contractor's approval prior to submitting to the Engineer of Record.

All changes and additions made on re-submittals must be clearly flagged and noted. The purpose of the re-submittals must be clearly noted on the letter of transmittal. Engineer of Record review is limited to those items causing the resubmission.

Shop drawings not meeting the above criteria or submitted after fabrication will not be reviewed.

The Contract Documents are not to be reproduced for use as shop drawings.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

REQUIREMENTS

Closeout is hereby defined to include general requirement near end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the Work. Time of closeout is directly related to "Substantial Completion" and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

PREREQUISITES TO SUBSTANTIAL COMPLETION

Prior to requesting Engineer's inspection for certification of substantial completion for either entire Work or portions thereof, complete the following and list known exceptions in request:

1. In progress payment request, show either 100% completion for portion of work claimed as "substantially complete" or list incomplete items, value of incompleteness and reasons for being incomplete.
2. Include supporting documentation for completion as indicated in these Contract Documents.
3. Submit statement showing accounting of changes to the Contract sum.
4. Advise Owner of pending insurance change-over requirements.
5. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
6. Obtain and submit releases enabling Owner's full and unrestricted use of the Work and access to services and utilities, including (where required) occupancy permits, operating certificates and similar releases.
7. Deliver tools, spare parts, extra stocks of materials and similar physical items to Owner.
8. Complete start-up testing of systems and instructions of Owner's operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups and similar elements.

Upon receipt of Contractor's request, Engineer will either proceed with inspection or advise contractor of prerequisites not fulfilled. Following initial inspection, Engineer will either prepare certificate of substantial completion or advise contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch-list" for final acceptance.

PREREQUISITES TO FINAL ACCEPTANCE

Prior to requesting Engineer's final inspection for certification of final acceptance and final payment as required by General Conditions, complete the following and list known exceptions (if any) in request:

1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit updated final statement accounting for additional (final) changes to Contract Sum.
3. Submit copy of Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by Engineer.
4. Submit final meter readings for utilities, measured record of stored fuel and similar data as of time of substantial completion or when Owner took possession of and responsibility for corresponding elements of the work.
5. Submit original Consent of Surety.
6. Submit final liquidated damages settlement statement, acceptable to Owner.
7. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey and similar final record information.
8. Complete final cleaning up requirements, including touch-up of marred surfaces.
9. Touch-up and otherwise repair and restore marred exposed finishes.
10. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.
11. Certificates of elevator inspection.
12. Mechanical:
 - a. Air System Test and Balance (prepared by Owner's independent agent)
 - b. Piping pressure tests and certificates
 - c. Project certification
13. Electrical:
 - a. System tests, including fire alarm system.
 - b. Project certification

Upon receipt of Contractor's notice that work has been completed including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, Engineer will re-inspect work. Upon completion of re-inspection, Engineer will either prepare certificate of final acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure will be repeated.

If re-inspections of above referenced items are required by the Engineer due to the failure of any of the Work to comply with the claims made by the Contractor as to the status of their completeness, the Owner will deduct the costs incurred by such re-inspections from the Contract amount.

RECORD DOCUMENT SUBMITTAL

Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in General Conditions. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for Engineer's reference during normal working hours.

At time of final acceptance, submit complete sets of all required record documents to the Engineer for Owner's records.

RECORD DRAWINGS

Maintain a white-print set of contract drawings and shop drawings in clean, undamaged condition with mark-up of actual installations which vary substantially from the work as originally shown. Mark whichever drawings are most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark-up new information which is recognized to be of importance to Owner but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work which would be difficult to measure and record at a later date. Note related change order numbers where applicable.

Upon completion of the Work, this data shall be recorded to scale, by a competent draftsman. A new copy of the contract drawings will be furnished to the Contractor by the Engineer, but cost shall be borne by the Contractor. Where changes are to be recorded, the prints shall be erased in such a way as to properly represent the work as installed. Where the work was installed exactly as shown on the Contract drawings, the prints shall not be disturbed. In showing the changes, the same legend shall be used to identify piping, etc., as was used on the Contract Drawings.

The Contractor shall review the completed record drawings and ascertain that all data furnished on the record drawings are accurate and truly represent the Work as actually installed. Information for reference data can be obtained from the office of the Engineer. Upon completion, the subcontractor involved shall date and sign the drawings, signifying compliance with the requirements set forth herein prior to submission of the sepias and prints required.

The Contractor shall sign all pages to certify completeness of the Record Set of Drawings. Contractor shall submit the drawings and two sets of photocopies to the Engineer for the Owner.

Record Specifications:

Maintain one copy of specifications including addenda, change orders and similar modifications issued in printed form during construction and mark-up variations (of substance) in actual Work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data where applicable.

Record Shop Drawings and Product Data:

Maintain one copy of each product data submittal and mark-up significant variations in actual work in comparison with submitted information. Include both variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up or record drawings and specifications.

Record Sample Submittal:

Immediately prior to date(s) of substantial completion, Engineer (and including Owner's personnel where desired) will meet with Contractor at site and will determine which (if any) of submitted samples maintained by Contractor during progress of the work are to be transmitted to Owner for record purposes. Comply with Engineer's instructions for packaging, identification marking and delivery to Owner's sample storage space.

Miscellaneous Record Submittals:

Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference.

FINAL CLEANING

Special cleaning for specific units of work is specified in sections of Divisions 2 through 16. General cleaning during progress or work is specified in General Conditions and as temporary service in "Temporary Facilities" section of this Division. Provide final cleaning of the work at time indicated, consisting of cleaning each surface or unit of Work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples of cleaning levels required:

1. Remove non-permanent protection and labels which are not required as permanent labels.
2. Clean transparent materials including mirrors and window or glass to a polished condition removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
4. Wipe surfaces of mechanical and electrical equipment clean; remove excess lubrication and other substance.
5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes and similar spaces.
6. Clean concrete floors in non-occupied spaces broom clean.
7. Vacuum and steam clean carpeted surfaces and similar soft surfaces.
8. Clean light fixtures and lamps so as to function with full efficiency.
9. Clean project site (yard and grounds) of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.
10. Vacuum clean all cabinetwork, equipment, etc.

Removal of Protection:

Remove temporary protection devices and facilities which were installed during course of the Work to protect previously completed Work during remainder of construction period.

Compliances:

Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site or bury debris or excess materials on Owner's property or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

CLOSEOUT DOCUMENTS CHECKLIST

All items listed below, with the exception of Item No. 1 and Item No. 2 shall be bound in individual heavy duty 3-ring vinyl covered binders. Mark appropriate identification on front and spine of each binder.

All items shall be submitted in triplicate within fifteen day of Substantial Completion for the project.

1. Application and Certification for Payment (Final). Four copies with original signatures and seals.
2. Final schedule of contract values. Four copies attached to Application and Certification for Payment.
3. Contractor's Affidavit of Payment of Debts (AIA G706).
4. Contractor's Affidavit of Release of Liens from all Contractors, Subcontractors, and Suppliers (AIA G706A).
5. Power of Attorney from Surety to make Final Payment.
6. Consent of Surety to Final Payment (AIA G707).
7. Contractor's Guarantee and Warranties as specified.
8. Special warranties as required by the specifications, in the name of the Owner.
9. Provide a list summarizing the various guarantees and warranties and stating the following with respect to each:
 - a. Character of work affected.
 - b. Name, address and telephone number of each Subcontractor.
 - c. Name, address and telephone number of each local firm designated to provide warranty service for an out-of-town firm. Copy of agreement between the firms.
 - d. Period of guarantee and effective date.
 - e. Statement of guarantee in the following form.

"If within any guarantee period, repairs or changes are required in conjunction with the guarantee work, which in the opinion of the Engineer is rendered necessary as the result of the use of materials, equipment or workmanship, which are defective or inferior, or not in

accordance with the terms of the Contract, the Contractor shall, upon written notice from the Owner, and without expense to the Owner, proceed within twenty four (24) hours to place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein; and make good all damages to the structure or site or equipment or contents thereof disturbed in fulfilling any such guarantee work.

11. Operation and Maintenance Manuals.
12. Notarized Affidavit of all Subcontractor payrolls, bills for materials/equipment and other indebtedness paid and satisfied.
13. As-built drawings. Provide in accordance with other specification sections.
14. Punch lists signed off by Owner's Representatives.

END OF SECTION

SECTION 14220

ELECTRIC TRACTION PASSENGER ELEVATOR RENOVATION WORK

PART I – GENERAL

1.01 SECTION INCLUDES

- A. Elevator and other renovation work, including all labor, materials, tools, supervision, hoists or cranes, project management, coordination, insurance, engineering, fabrication and related costs or responsibilities necessary to complete all of the work required under this contract. The Dover Elevator brand electric traction passenger elevators involved in this renovation project are identified by State of Florida elevator serial numbers 39345 (elevator no. 6) and 39346 (elevator no. 7). All of the requirements, general conditions, sections, special project instructions, notices and other communications listed in Section 14220, as well as all other sections in the Project Manual or Construction Documents, shall apply to this contract. In general, the following work is required under this contract:
1. Provide all of the elevator renovation project work required by Section 14220, as hereinafter described. A basic outline of the work includes materials and labor for the following:
 - a. New gearless driving machines to replace the existing geared type machines and hardware, all as specified hereinafter.
 - b. New elevator control systems complete, to replace the existing controls, with new motor drives, group supervisory controls, floor selector equipment and related gear and hardware, all as specified hereinafter.
 - c. New door operator equipment complete, to replace the existing door operators, including new door operator machines, door operator controls, door safety screen devices, door interlocks, door track and hanger equipment, door hardware items, and related equipment, all as specified hereinafter.
 - d. New over-speed governor equipment, governor rope tail sheaves, governor ropes and related gear, to replace all existing similar components, as specified hereinafter.
 - e. New signal fixtures at all landings and in elevator cabs, to replace all existing fixtures for the elevators, as specified hereinafter. The Elevator Contractor shall be completely responsible for all cutting (including granite, marble, drywall or other surfaces) which surround the elevator hoist way entrances or other locations, where signal fixtures are mounted. Additionally, and concrete cutting in machine room and hoist way areas shall be the responsibility of the Elevator Contractor.
 - f. New equipment, and materials for reuse of the existing elevator cabs, including the following: New swing type front return panels and operating devices, new cab doors, new LED type cab lighting, new signal fixtures, new covering for transoms, new entrance strike columns, new car top exit panels, new car top exit panels switches, and related items, all as specified hereinafter.

- g. New hoist cables, new 2:1 cable sheaves, new sheave mountings and supports, as well as related equipment, as specified hereinafter.
- h. Original equipment manufacturer (or successor company) replacement roller guide wheels for elevator cars and counterweights, to replace all existing roller guide wheels, as specified hereinafter.
- i. Furnish and install emergency telephone equipment, and intercommunication equipment between the elevator cabs and elevator machine room area. The equipment shall be a combination system that provides both functions, as specified hereinafter.
- j. New Whisperflex brand cable type hoist rope compensation for elevators, as required hereinafter.
- k. Remove all existing door guide shoes on hoist way doors, and replace with new guide shoes and door retainer devices, as specified hereinafter.
- l. Furnish and install all new electrical wiring conductors, electrical devices, controls, and other materials, whatsoever, to replace all existing wiring. In addition, the Elevator Contactor shall furnish and install all newly required wiring, whatsoever required, to meet all needs for this project, as specified hereinafter (in all sections of the project requirements), or as required by all applicable codes, operations and provisions that must be met under this project. This includes requirements of the Owner relative to security or restrictive operation controls, etc.
 - 1) Floor restriction devices.
 - 2) Security cameras.
 - 3) Firemen's recall operation.
 - 4) Emergency power signal wiring.
 - 5) Any other devices as required for the project.
- m. Provide suitably designed safety barricades, at least 7'-0", constructed of painted plywood, hinged doors and safety locks. Barriers shall be installed at all openings where work is being performed. Include all suitable warning signs. Barriers shall meet all requirements of the Owner, Engineer and Elevator Consultant.
- n. Provide professionally designed and constructed signage in appropriate locations indicating the elevators are being renovated. Signage must meet Owner and Engineer's approval.
- o. Remove existing pit ladders and replace with new ladders that extend at least 48" above the lowest land threshold. Ladders shall meet all code requirements.
- p. Copy of these specifications shall be provided to the mechanic in charge of this project.

- q. Work on elevators shall be based on working on one (1) elevator at a time, two (2) shifts per day, five (5) days per week, except on holidays, as specified hereinafter.
- r. Other work as specified hereinafter.

1.02 OTHER WORK

A. Other Project Requirements:

- 1. Under this contract, the Elevator Contractor shall be responsible for providing all work required for the entire project, and such work to be included in his or her bid price. This includes any required mechanical, electrical, general construction or other types of work or services necessary to complete the entire project.

1.03 REFERENCES

A. Regulatory Requirements:

- 1. ASME A17.1-2007, including all published addenda.
- 2. Requirements of the State of Florida, Bureau of Elevator Safety, and Florida Building Code for Existing Buildings.
- 3. ASME A17.1 Safety Code for Elevator Electrical Equipment, latest edition.
- 4. NFPA 70 National Electrical Code, latest edition approved by State of Florida.
- 5. Americans with Disabilities Act – Accessibilities Guidelines (ADAAG), latest edition.
- 6. AWS – American Welding, for all welding methods and certifications related to elevator equipment, and equipment installation.
- 7. All other State of Florida and Local Codes, and Fire Department Requirements.

B. Fire Rated Hoist way Entrance Interlock Wiring Materials:

- 1. All new interlock wiring materials and methods shall comply with all requirements of ASME A17.1 and National Electrical Code. Wiring shall be SF-2, as required by NEC.

1.04 SUBMITTALS

A. Submittal Documents:

- 1. The Elevator Contractor shall submit all shop drawings, cut sheets, samples and other forms of submittals in accordance with the requirements herein described, or in accordance with general requirements listed elsewhere in the Project Requirements or Instructions. All submittals shall be delivered to the Project Engineer for distribution and handling. All submittals required for approval shall be submitted in the quantities required, and approved prior to any fabrication on the equipment being provided under the contract. Provide all submittals on the elevator work in one (1) submittal package that includes all such requirements.

B. Product Data and/or Shop Drawings: Provide five (5) copies of each of the following:

1. Car and landing signal fixture and operating device layout drawings.
2. Car door opening restrictor devices that comply with ASME A17.1.
3. Driving machines and motors.
4. Complete general layout drawings of hoist way and machine room area, showing equipment layout, and all ASME Code required information for new equipment being furnished.
5. Over-speed governors and governor rope tail sheave assemblies, including governor mounted encoders.
6. Cut-sheets on electrical controllers, motor controls and related equipment.
7. Roller guide wheels as replacement items. OEM cut sheets for replacement roller guide wheels will be acceptable for submittal.
8. Cab replacement components and equipment, as specified hereinafter.
9. LED type cab lighting replacement system and devices, all types of lighting.
10. Cab emergency lighting system, utilizing a portion of normal lighting fixtures.
11. All 2:1 roping components, sheaves, hardware, etc. for car suspension.
12. Hoist rope information, including size, design, construction and manufacturer proposed.
13. Emergency telephone and communication system.
14. Elevator door safety screen system.
15. Door operator equipment, controls, components, etc.
16. Hoist way door guide shoe assemblies and door retainer devices.
17. Hoist rope compensation devices, including cables, retainers, etc.
18. Hoist rope lubricator devices.
19. Any other elevator components required under this contract.
20. Any product data on coatings, paint, etc. that is to be field applied.

C. Metal Samples:

1. Provide five (5) samples of all metal to be provided for signal fixtures, cab front materials, cab doors, or other locations.
2. Samples shall be at least 4" by 4" in size, all with no. 4 satin finish.

D. Permits, Inspections, Tests and Other Records:

1. Provide five (5) copies of all such records to Engineer when the records are received from the sources.

E. Operation, Adjustment, Maintenance, Testing, and Trouble-shooting Data Requirements:

1. Elevator Contactor shall provide all of the following materials in three (3) copies, as specified hereinafter.
2. Project and serial number specific installation instructions, adjustment instructions, trouble-shooting instructions, maintenance and service data, test instructions, and related data on all elevator equipment or components which are incorporated into this elevator system. This includes the elevator controller system, motor control system, door operator system, signal fixtures, safety switches, interlocks, door safety screen system, elevator drive motors, governors, roller guides, and other elevator components.
3. All wiring diagrams and electrical data (project specific) for elevator controller systems, motor drive systems, hoist way wiring systems, signal fixture systems, job site pull sheets for field wiring, connection diagrams, wiring marker systems, etc. Drawings shall be on 8.5" by 11" size, suitable for inclusion in book format. Also, include one (1) additional set of all drawings on heavy gauge (24 pound, high rag content black on white paper) drawing paper suitable for reproduction, when needed. Provide the large drawings in a heavy paper or plastic tube with screw on cap. Mark tube with contents and job identification.
4. All controller function details and operation features shall be furnished, including but not limited to the following: entry codes, SIM cards, legends, passwords, malfunction codes, operation codes, test codes, connections, and all other information or equipment that will allow a competent elevator contractor to perform all necessary tests, operational diagnosis or adjustments to the controller systems without the need for any outside assistance.
5. Provide complete controller, motor control and door operator software for these elevator systems. If the systems require preprogrammed chips or devices for entry, these devices shall also be provided during closeout of project.
6. Provide project specific parts lists for all parts utilized on the elevator systems.
7. Provide typed instructions for proper cleaning and maintenance on the architectural surfaces furnished under this contract.
8. All materials shall be furnished in heavy duty three (3) ring binders, with oversized covers and positive locking devices to prevent pages from easily falling out.

9. Provide suitable project identification labels on binders, including the edge of the binders.

F. Special Tools and Equipment:

1. Any special tools, terminals, hand held devices of any type, SIM cards and any similar equipment necessary to access the elevator controllers, motor controllers, door operators or any other components or systems for maintenance, adjustments trouble-shooting, resetting of operational parameters, or any type of testing, shall be provided to Engineer during final acceptance and close-out of this project. Failure to do so will result in withholding of final payment until the devices are turned over for examination by Engineer and Elevator Consultant.
2. Any special tools shall be designed to recognize only the controller and component serial numbers for which the equipment is supplied to operate, and cannot be utilized on other elevators at a different location.
3. In the elevator machine room, install the following, to be used for elevator system evaluation, adjusting, trouble-shooting, testing and other purposes:
 - a. Small wooden or metal desk and chair.
 - b. Desktop computer terminal, with serialized system protection capabilities, and fully programmed for these elevators. Secure the computer to the desk to prevent easy removal. Provide plastic covers to protect equipment.
 - c. Ink jet copier, with plastic cover.
 - d. Ethernet cable connected to elevator controllers.
 - e. Software program for evaluating all elevator performance, as well as making adjustments or testing of each elevator controller system. This includes Management Information System, capable of accessing and evaluating all elevator electrical components.
4. Elevator Contractor bidder shall provide a letter of commitment from the Elevator Contractor, signed by an executive of the elevator company, stating that the Elevator Contractor is committed to providing all of the requirements listed in items 1.04, E & F, if awarded the contract for this work. Additionally, this Elevator Contractor shall confirm that the company shall provide, at the standard replacement parts prices, all replacement necessary parts, supplies and equipment to the Owner or Elevator Contractor agent, whom may be maintaining the elevator equipment, after the Warranty and Maintenance period has expired.

1.05 QUALITY ASSURANCE

A. Elevator Equipment Manufacturer and Elevator Contractor Qualifications:

1. In the interest of continuity, the Elevator Equipment Manufacturer and Elevator Contractor shall be owned by the same parent firm, and shall have been regularly engaged in design, manufacturing, installation, maintenance, repair, and modernization of high quality commercial elevator equipment for a period of no less than ten (10) years. The experience of the Elevator Manufacturing and Elevator Contracting firm shall have at least ten (10) years experience in the Leon County, performing work at least equal to the type of work to be performed under this contract.
 2. For purposes of these project requirements, the elevator manufacturing portion of the firm shall be the manufacturer shall be the manufacturer of at least the following components: elevator electrical controller system, the motor controller system, signal fixtures, door operator machine and control system, as well as the driving machine design and assembly.
 3. Only new components are acceptable. No rebuilt or reconditioned parts are permitted to be brought onto the site.
 4. The elevator components are required to be products of the highest elevator industry manufacturing standards.
 5. The major components shall be manufactured in North America, except that a portion of gearless driving machine can be imported if the component has a solid, verifiable track record of high performance and reliability.
- B. The following Elevator Manufacturers – Elevator Contractors are provided with pre-approval, provided the firm fully complies with every aspect and condition of these technical specifications. Any firm named, that does not intend to completely comply with all specified requirements listed herein shall be deemed an unqualified bidder for this project.
1. Otis Elevator Company.
 2. Schindler Elevator Corporation
 3. ThyssenKrupp Elevator Corporation
- C. Bidders shall have a well established local sales and business office in the City of Tallahassee, Florida, equipped with a local branch manager, secretary in the office to handle day to day business matters, local supervision of maintenance and repair staff, local field mechanics to provide the elevator renovation work, local maintenance mechanics which live within 20 miles of the building site, local parts and tools storage facility and an exceptionally good reputation for servicing their clients in the local community. Companies that have a "store-front" operation only for storage of parts do not meet the requirements of these contract provisions.
- D. Any other bidders wishing to submit a bid shall provide all of the necessary evaluation information, including information on the firm, equipment proposed to be used, all design details, and any other materials necessary for consideration, at least 18 calendar days prior to the bid date, for complete evaluation by Owner, Project Engineer and Elevator Consultant. Any firm who do not have an exceptional reputation for performance with this Owner, or whom fails to meet any of the specific requirements listed in "C" above can anticipate not being approved for this project. Additionally, a complete listing of all maintenance contract

accounts in the Tallahassee, Florida area, including location, address, contact persons and phone numbers, is required at least 18 days prior to the bid date so that any and all of the accounts can be contacted.

Further, any Elevator Contractor wishing to bid shall provide a complete list of all similar completed projects within the Tallahassee, Florida market area (extending out 50 miles in each direction, using the Leon County Courthouse, as the center). Provide the names of the projects, size of the projects, locations of the projects, age of the completed work, contact persons and phone numbers.

Any other interested bidders, who obtain approval to bid, shall be approved by addendum.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver elevator materials and equipment in equipment manufacturer's protective packaging. All packing materials shall be disposed of at the sole expense of the Elevator Contractor.
- B. Store all materials in a dry, protected area. Protect and handle the materials in accordance with the manufacturer's recommendations. Storage space on the building site is extremely limited, and delivery of the materials shall be arranged for in advance with the Owner's Representative. The elevator equipment, supplies, tools and materials will require storage off-site, and delivered to the site as the materials are needed for the project. Owner shall not be responsible for any added costs related to storage, cartage and similar costs.
- C. Elevator Contractor shall be responsible for removing, from the building site, all of the materials that are not to be reused or retained on the renovation project. The Elevator Contractor shall take title to the scrap materials upon removal from the elevator systems, and lawfully dispose of the materials as his expense. All materials that are being disposed of shall be removed from the site on a daily basis, except for small items that can be temporarily stored in a location acceptable to the Owner or Property Manager. Items temporarily stored

at any agreed upon location must be removed from the site at least two (2) times per week. Elevator Contractor shall arrange for and pay for the rental of a "trash container" or "dumpster" of adequate size to hold the materials without overflowing beyond the design capacity. No equipment or debris that is removed from the elevator systems, or surrounding areas, shall remain on the site after the renovation work has been completed. Close coordination with Owner's Representatives shall be paramount throughout the course of this contract.

- D. Hoisting of all materials to the elevator machine room shall be at the sole expense and responsibility of the Elevator Contractor, including the use of cranes, hoists, derricks, or similar equipment. Any damage caused by the Elevator Contractor to the existing roofs, roof structures, or to any areas inside or outside the building(s) shall be repaired at the sole expense of the Elevator Contractor. It shall be the responsibility of the Elevator Contractor to suitably coordinate the use of cranes, hoists, derricks or other such equipment during non peak periods to avoid disrupting street traffic or causing a safety hazard to pedestrians. Coordination with Owner's Representatives, and other officials, is a major requirement of this contract.

1.07 PROJECT CONDITIONS

- A. Prohibited Use: The elevator equipment shall not be used to handle passengers, or otherwise be put into public use, during the time of renovation or alteration work being

performed on either elevator. After completion of the renovation work on each elevator, the completed elevator shall be returned to unlimited passenger service.

- B. Each of the two (2) elevators covered under this contract, shall be removed from building service, one (1) at a time, and for the shortest possible time period. The elevator work on this project shall be based on two (2) shifts per day, working five (5) days per week, except for no work on holidays. No more than one (1) elevator shall be out of service at one time, except that the Elevator Contractor shall allow sufficient time for work on overtime to arrange switch-over of the elevator systems at times other than during the regular workdays for the building staff and visitors to the complex. At least 16 hours of overtime work shall be necessary during this process; however, the Elevator Contractor shall provide all necessary overtime needed to accomplish the task, regardless of the hours required.

This is a "time is of the essence" and "high quality performance" contract.

- C. All of the work shall be performed on the basis of shift work, with at least 95% of the work being performed on that basis. Only adjusting, testing and related work is permitted on a single shift basis.
- D. Painting: All of the following elevator equipment shall be field painted during the elevator equipment renovation:
1. Tops of elevator cabs, bottoms and sides of platforms, safety plank assemblies, roller guide assemblies (prior to installation of new rollers), cross-heads and car frames, guide rails and brackets, overhead machine support beams, pit buffers and buffer supports, 2:1 sheaves and sheave support assemblies, counterweight assemblies, and all other metal in the hoist ways. Repaint the new governor rope tension sheaves, weight assemblies and attachment arms.
 2. Hoist way door fascia, backs of hoist way doors, headers, toe guards, and dust covers.
 3. Driving machines motors, mounting frames & bedplates, sheaves, machine hardware and electrical apparatus. All controller equipment that is not powder coated at the factory, shall be repainted in the field. Isolation transformers, electrical dust work, electrical conduit and all other items in the machine room area, shall be repainted in the field.
 4. Coat the machined blades of the guide rails and the polished pistons on the pit buffers with high quality, fast drying type, machinist bluing materials to retard rust and corrosion on the machined surfaces. Use Dykem brand bluing materials.
 5. Paint or install new floor numbers on the rear of all hoist way door panels.
 6. Paint the elevator pits with two coats of high quality, water based, gray colored, gloss finish, floor and deck enamel after all work has been completed.
 7. Paint the machine room floor with two (2) coats of high quality, water based, gray colored, gloss finish, floor and deck enamel after all work has been completed.
 8. Any unnecessary holes in the machine room floor shall be neatly patched prior to painting of the machine room floor area.

1.08 WARRANTY PROVISIONS

- A. Submit Elevator Manufacturer's and Elevator Contractor's written project warranty agreeing provide labor, materials and supplies to repair, replace or otherwise restore materials or workmanship on all elevator components or systems, whether or not furnished new under this contract. The warranty does not extend to existing finishes on hoist way doors or cabs unless replaced under this contract.

Warranty period shall be for a period of twelve (12) months, commencing when renovation work on both elevators have been fully completed and accepted by the Owner, Engineer and Elevator Consultant.

1.09 MAINTENANCE PROVISIONS

- A. Elevator Contractor shall provide complete elevator maintenance for twelve (12) months after the work on the last elevator has been fully completed and accepted as final by the Owner, Engineer and Elevator Consultant.
- B. The Elevator Contractor shall provide complete maintenance on all of the elevator equipment, commencing one (1) month prior to removing the first elevator from service for renovation work, and for one (1) full year after the second elevator has been fully completed and accepted by Owner, Engineer and Elevator Consultant. The total maintenance period is anticipated to be approximately 17-18 months; however, this is only an estimate. During this time period, the Elevator Contractor shall provide all labor, supplies, parts, equipment, repairs, lubricants, cleaning, adjusting, testing, bulbs, supervision, tools, 24-hour call-back service on 24/7 basis, and all other work whatsoever to properly maintain the elevator equipment.
- C. The Elevator Contractor shall provide response to call-backs within 30 minutes from the time a call is received during regular working hours, and within one (1) hour during overtime hours, including holidays, weekends and other times.
- D. The elevators shall be examined at least one (1) per month, during a time period that is convenient to the Owner, for a period of not less than two (2) hours per elevator, on the site, per regular maintenance examination. The total time per month, for both elevators, shall be a minimum of four (4) hours. All work on the elevators shall be provided by a certified mechanic, who holds a Certificate of Competency card issued by State of Florida. Helpers or "Temporary Mechanics" are not permitted to answer call-backs or perform any work on these elevator unless a certified mechanic is on site at the time the work is performed.
- E. Near the time of termination of the maintenance included in this contract, the Elevator Contractor shall provide the following work as a requirement of this contract:
 - 1. Fully clean all of the elevator equipment in the machine room, hoist way, pit area and on the car top.
 - 2. Fully clean the interiors of the elevator electrical controller panels.
 - 3. Verify that all telephone and intercommunication equipment is fully functional. Correct any malfunctions.
 - 4. Verify that the emergency lighting and alarm bell systems are fully functional. Correct any malfunctions.

5. Adjust the door operation to comply with the door times and operating conditions shown in these technical specifications.
6. Verify that all floor leveling is accurate, and in compliance with these specifications.
7. Remove all rattles, squeaks, noises, vibrations, or other conditions that detract from the quality of the elevator installation.
8. Tighten all components of the elevator cab, doors and other such components. Replace all worn door guide shoes.
9. Perform all tests that are to be performed, as a requirement of the State of Florida.
10. Lubricate all equipment that requires such attention on a regular basis.
11. Adjust all roller guides and other items that impact ride comfort.
12. Adjust the tension on all hoist ropes to within five (5) pounds of the adjacent ropes.
13. As necessary, adjust the governor ropes to allow the governor rope tail sheave assembly support bracket to be no lower than in a horizontal position.
14. Provide the Owner with written certification that all required work has been performed in accordance with these requirements.
15. Arrange, at least ten (10) calendar days in advance of the end of the maintenance included in this contract, for the Owner and Elevator Consultant to evaluate the work performed by the Elevator Contractor. Any deficiencies found shall be corrected by the Elevator Contractor before being released from the contract requirements.

PART II – PRODUCTS

2.01 MATERIALS, GENERAL

- A. The materials to be utilized in the renovation of two (2) existing Dover Elevator Company brand passenger elevators located in Leon County Courthouse, are to be as contained in this section of the elevator technical specifications.
- B. The new materials to be incorporated into the elevator system are clearly defined in this specifications section.
- C. The existing materials to be removed and replaced with new materials are clearly defined in this specification section.
- D. The materials that are to be removed from the elevator are clearly identified.

2.02 SCHEDULE OF EQUIPMENT

- A. Two (2) existing electric traction passenger elevators.

- B. Machine type: New gearless type, permanent magnet motor, alternating current design; roped 2:1.
- C. Machine location: Overhead, in machine room, above hoist way, on existing machine support beams.
- D. Capacity : 4,500 pounds
- E. Speed: 350 feet per minute
- F. Travel Distance: Existing. Elevator Contractor shall verify the travel distance.
- G. Stops: Seven (7). Elevator Contractor shall verify the stops.
- H. Openings: Seven (7). Elevator Contractor shall verify the opening locations.
- I. Operation: Two-car group automatic system, with programmable, microprocessor based control system.
- J. Control: Variable frequency, variable voltage, alternating current, with regenerative power saver feature and other power savings features.
- K. Doors: Car and hoist way doors are motorized, two-speed type, side sliding, passenger elevator type doors, 4'-0" wide by 7'-0" high. Elevator Contractor shall verify opening sizes.
- L. Cab design: Passenger type, with alterations as specified hereinafter.
- M. Power supply: 480 volts, 3 phase, 60 cycles.
- N. Warranty and maintenance: Twelve (12) months after completion of second elevator.

2.03 HOIST WAY MATERIALS

- A. The following materials located in the hoist way area shall be either retained and reused, or completely replaced with new materials as specifically indicated hereinafter.
 - 1. Guide Rails and Rail Support Brackets: All such materials, including all of the heavy steel mountings for the guide rails for car and counterweight assembly, shall be retained and reused under this contract. These materials shall all be cleaned and painted as required under Painting. Check the mountings for the guide rails and guide rail brackets, and correct any defects found. Bluing material is required on the machined surfaces of these guide rails, as required by Painting.
 - 2. Counterweight Assembly: The entire assembly shall be retained and reused under this contract. The existing roller guide wheels shall be removed and replaced with original equipment manufacturer (successor company) replacement roller guide wheels, under this contract. Adjust roller guides for proper rail contact.

The amount of weight in the counterweight assembly shall be increased or decreased, depending upon the weight required to compensate for changes in cab weight, counterweight ratio and other appurtenances or changes associated with the renovation of the elevator car, door operator, cab and counterweight assembly. The Elevator

Contractor shall pay for any additional weights, and labor to install same, as may be required to properly adjust the weight of the complete counterweight assembly.

3. Elevator Car Frame, Platform, Safety Device Under the Car, Platform Brace Rods and Related Materials: These items of materials shall be retained and reused under this contract. All of the fasteners shall be checked, and replaced as may be necessary. All of the car equipment shall be cleaned and painted in accordance with the General Requirements section of the elevator specifications. Safety switch for the under car safety device shall be retained, and checked for proper operation. In the event the safety switch does not operate correctly, replace or repair the switch at the expense of the Elevator Contractor.

The toe guard or safety apron on the elevator car platform shall be altered, replaced or extended to comply with the ASME A17.1-2007 Safety Code for Elevators.

Car safety device and safety switch shall be tested at full load on the car.

4. Car Guide Assemblies: The existing car roller guide assemblies shall be completely cleaned and painted, and all roller wheels shall be replaced with new original manufacturer equipment (successor company) roller guide wheels. The tires for the roller guides shall be high quality neoprene type, designed for long life and comfortable ride characteristics. Adjust the roller guides to function according to the manufacturer's installation and adjustment instructions.
5. Hoist Ropes, Rope Shackles & Hardware: The hoist ropes and rope shackles shall be removed and replaced under this contract. Furnish and install proper number, size and construction for the new elevator drive sheave assembly recommended by the elevator equipment manufacturer. Rope shackles shall be wedge type design. Condition the rope shackles against rusting and corrosion. Install a new hoist rope tag indicating manufacturer, type of rope construction and date of installation. Hoist ropes shall be equipped with a hoist rope lubricator device, which is to be adjusted to dispense only a small amount of cable lubricant onto the ropes. Lubrication device shall be grounded to the elevator driving machine.
6. Hoist Rope Compounding & Deflector Sheaves in Hoist way: The new hoisting rope compounding and deflector sheaves located in the hoist way area shall all be new equipment, to replace any existing sheaves. Any metallic sheaves shall be thoroughly cleaned and field painted according to Painting requirements.

Hoist rope compound sheaves shall be added to top of counterweight assembly and top of elevator car, to modify the existing roping arrangement from 1:1 to 2:1 roping. All necessary hardware, sheaves, guards, reinforcements, and other changes shall be included in this contract. All materials shall be factory and field painted as required by the Painting requirements.

7. Compensating Cables, Brackets and Other Such Hardware: The Elevator Contractor shall furnish and install new hoist rope compensation equipment on these elevators, equal to the quality and performance to Draka Elevator Products, Whisperflex cable design, with suitable sway elimination equipment, devices and hardware mounted in the pit area. Install and adjust the equipment to provide noiseless operation and long service life. Take all necessary precautions to prevent the cables from rubbing on elevator cars or cabs. All hardware shall be painted as required by Painting specifications.

8. Pit Buffers: The existing oil-type pit buffers, located under the elevator car and counterweight, shall all be retained and reused under this contract. Add additional, or modify the existing buffers, as required, to accommodate the required hoist rope compensation equipment. The buffers and buffer supports shall all be cleaned and repainted, as required by the Painting specifications.

Pit buffers shall be drained, flushed and refilled with new approved buffer oil of the proper characteristics as approved by the original buffer manufacturer. Install a metal tag on each buffer indicating the type and manufacturer of oil that is installed in the buffers. Clean and polish the plungers, and coat each plunger with fast drying machinist bluing material to retard rust and corrosion. Paint the exterior of each buffer when work has been completed. Additionally, each buffer must be tested when the elevator work has been completed.

9. Machinery Support Beams at Top of Hoist way: The existing beams shall remain in place and be reused during the elevator renovation. Add any additional beams as may be required for the new hoisting equipment and 2:1 roping arrangement. Any additional costs incurred by the Elevator Contractor shall be included in the contract for elevator renovation. All of the beams shall be cleaned and painted, as required by the Painting specifications.
10. Governor Rope Tension Sheave, Weight Assembly and Attachment Arm: The existing governor rope tension sheave, weight and attachment arm assembly shall be removed and replaced with all new equipment. The attachment arm shall be installed in a manner that it remains near the horizontal position after rope stretch. Factory paint and field paint all of this equipment, as specified by Painting specifications.
11. Hoist way Doors and Frames: The hoist way door frames shall be retained and reused during the elevator renovation. The existing doors shall all be retained under this contract. Install new rubber type door bumpers on the door frames at all floors. Install new guide shoes on each door panel, using renewable door gibs of the proper width and quality to fit the existing threshold grooves.

Furnish and install new machined solid metal type hoist way door tracks, door hangers and rollers, relating cables and accessory hardware. Furnish and install new door bumpers on the hoist way door frames to cushion the doors as they close. Furnish and install devices at the bottom of the doors to restrict the doors from coming loose from thresholds during a fire emergency.

New door tracks and hangers shall have a coating that retards rust and corrosion.

12. Hoist way Door Frame Marking Plates: Remove and replace all existing hoist way door frame marking plates, and replace the plates all frame locations with new cast bronze (provide cast stainless steel plates on floors without bronze entrance frames) colored plates equal in quality to Entrada Braille, Minneapolis, MN. Plates shall be model VP1, VP2, VP3 or VP4, as selected by the Owner. Submit samples for approval.

Plates shall have high quality adhesive backing to properly secure the plates to the frames. Additionally, secure each plate with two (2) countersunk screws that are painted with chip resistant matching color black paint after installation.

13. Hoist way Entrance Thresholds: All of the existing hoist way entrance thresholds shall be cleaned and polished to improve the appearance. Except for existing major damage

to the metal surface, the thresholds shall appear to be new when the work is completed by the Elevator Contractor. The thresholds shall be cleaned inside the hoist way, as well.

14. Fascia, Headers, Toe Guards and Dust Covers: Retain and reuse all of these materials under this contract, provided they are suitable for continued use. In the event any such materials are damaged, or are missing, furnish and install new components under the contract requirements. All materials in this category shall be cleaned and painted as specified under the Painting specifications.
15. Hoist way Interlock Assemblies: All existing hoist way interlocks, at all openings shall be removed and replaced with new interlock assemblies, complete. All equipment shall be painted as specified under Painting specifications.
16. Hoist way Interlock Release Mechanisms: All existing door interlock release roller/crank mechanisms, hooks, lift rods, roller assemblies and related hardware shall be completely replaced under this elevator renovation contract. All such devices shall be adjusted to function properly to provide safe and reliable operation. All devices shall be protected against rust and corrosion, as required under Painting specifications.
17. Car and Hoist way Door Operator and Door Safety Equipment: All of the existing car and hoist way door operator equipment shall be removed and replaced with new heavy duty type, door operator equipment, including complete new door operator machine, heavy duty operator motor, door operator controls, car door switches, solid steel machined car door tracks, car door hangers, car door opening restrictor, car door clutches, car door electronic type safety edge equipment and miscellaneous door operator hardware. New door operator shall have the following features:
 - a. Heavy duty type drive motor, at least ½ horsepower, alternating current design.
 - b. Door operator shall be of heavy duty gearless type, with highly effective harmonic motion door drive system. Door system shall be designed to easily handle the weight and size of the door panels in the door equipment.
 - c. Door operator controls shall be microprocessor based, software oriented design, completely “closed loop” type design, manufactured exclusively for high quality elevator door controls.
 - d. Operator controls shall be easily adjustable, with adjustable parameters that can be set under field conditions, from the top of the elevator cab. Provide a hand-held programming device or complete on-board diagnostics for programming purposes.
 - e. A precise encoder shall be furnished on door drive operator motor shaft.
 - f. Provide door position recognition.
 - g. Provide door velocity recognition.
 - h. Provide door motor current monitoring and regulation.
 - i. Provide door closing pressure recognition. Set door closing pressure at 18-20 pounds of pressure. If pre- set door closing pressure occurs during a closing operation, the doors shall immediately stop closing and automatically reopen to full open position.

- j. Include high quality retractable type car door clutch on each car door assembly.
 - k. Include door obstruction warning: If the doors are obstructed from closing for a period of approximately 15-20 seconds (provide an adjustable timer with a range of 10 to 30 seconds), an audible warning shall occur and continue to sound until the doorway is cleared of obstructions; however, the doors shall not attempt to close during this time period. When the doorway has been cleared of obstructions, the doors shall close at the normal rate of speed, continuing to be accompanied by sounding of the audible device that warned of obstructions in the door way. The audible sound shall continue until the door is fully closed, when it has been obstructed. The electronic door safety monitoring device shall remain activated during the door closing cycle.
 - l. Door close watchdog: If the doors are closing, but do not fully close after a programmable time period, the doors shall be capable of recycling to open position for up to 10 times to attempt to clear the fault in the door system or obstruction in the door threshold, before the elevator is automatically removed from continued service. The recycling program shall be adjustable for up to 20 times, which can be pre-set by elevator technician.
 - m. Door close assist: When the doors have failed to completely close due to high air differential in the hoist way area, or obstructions in the thresholds, the door operator drive motor shall have an increased torque applied to possibly overcome the mechanical obstruction or a differential air pressure problem, and allow the door to close completely. Door close assist torque shall never exceed 30 pounds of pressure during any closing operation.
 - n. Door open time saver: If the car is stopping in response to a car call assignment, the current door open time is changed to a shorter field programmable time when the electronic door safety detection system is activated by a passenger moving through the doorway.
 - o. Door time variable: When the car stops to respond to hall call only, the door time shall be reduced after the electronic door safety system is activated and the car-call button is pushed
 - p. Door operator designs without all of these features are not acceptable under this contract.
 - q. Door opening time period required, measured from door fully closed position, shall be 2.1 seconds.
 - r. Door closing time period required, measured from door fully open position, shall be 4.5 seconds.
18. Hoist way and Car Door Up-thrusts or Eccentrics: All door up-thrusts or eccentrics shall be set at .0005" running clearance, in all locations.
19. Electronic Car Door Safety Screen: The existing door protection device shall be removed and replaced with completely new door protection device on the cab doors. The new devices shall be equal in design, operation and performance to that manufactured by Janus Elevator Products, Inc. The new safety screen shall have 3-D feature and Panachrome lighting system incorporated into the safety screen. The Panachrome

system shall feature green lighting, mounted vertically along the electronic edge, indicating it is safe to enter the doorway, and orange/red lighting in the same area indicating that the doors are ready to close or are closing, and passengers should not enter the doorway during this time. All electrical connections should be located on the car top out of reach of unauthorized persons. Provide a defeat switch on the car top for removal of the 3-D function, if so elected by the Owner.

20. Electrical Switches, Cams & Brackets: The Elevator Contractor shall furnish and install all new hoist way switches, cams and brackets for all suitable switches in the hoist way, including limit switches, terminal switches, hoist way access switches and similar devices. All cams, brackets, and hardware shall be painted after installation, as required by Painting specifications.
21. Pit Ladder: Elevator Contractor shall furnish and install a high quality, steel ladder in the pit that extends from the pit floor to at least 48" above the lowest landing of the elevator. Ladder shall meet all applicable code requirements. Paint ladder according to Paint specifications.
22. Safety Railing on Car Top: The car top shall be equipped with a safety railing system to meet the current code requirements. Railing shall be mounted securely, and braced to retard deflection as much as possible. Mount auxiliary car top lighting on the safety railing. Paint railing according to Painting specifications.

2.04 MACHINE ROOM EQUIPMENT

A. Driving Machine: The existing Dover Elevator brand geared traction driving machine shall be removed and replaced with a new permanent magnet type, alternating current drive, gearless machine, mounted directly over the hoist way. The new gearless machine shall include the following:

1. Drive Motor: Shall be permanent magnet type rotor design, with totally enclosed motor frame assembly. Motor shall have at least "F" type insulation. New motor shall be quiet in operation, and function without vibration or other undesirable conditions.
2. Brake Assembly: The dual brake assembly shall be capable of stopping and holding a fully loaded car, including all of the requirements of preventing unintended motion of the elevator car. This braking system shall be designed to meet all such requirements of ASME A17.1-2007 Safety Code for Elevators and Escalators.

Brake assembly shall be adjusted and tested as required by ASME A17.1-2007 Safety Code for Elevators and Escalators, using a full load of test weights on the elevator car. Operation shall be smooth, quiet and reliable.

Electrical switch on the brake assembly shall be adjusted to prevent the machine from operating unless the brake shoes or pads have been lifted off the brake drum or rotor.

3. Drive Sheave Assembly: This driving machine shall have a replaceable drive sheave assembly, designed to handle the number of ropes required for the application. The drive sheave shall be metal of the correct degree of hardness for the rope tensile strength. Provide rope guards to prevent the rope from leaving the drive sheave during an emergency stop condition.
4. Bearings and Seals: Machine shall be constructed with replaceable roller or ball bearings that are designed for extra long life service and friction free operation.

5. Isolation Pads For Driving Machine: Rubber insulated pads shall be incorporated into the machine mounting frame assembly, to alleviate vibrations from being transmitted to the building structure. These pads shall be replaceable, as may be necessary during the life of the driving machine.
 6. Design the elevator driving system to function per elevator code without need for addition of a secondary braking system to prevent unintended upward movement of the elevator car.
 7. Field paint the driving machinery and support equipment according to the Painting specifications.
- B. Over-speed Governor: The existing over-speed governor shall be removed and replaced with a new over-speed assembly, which includes an electrical encoder device and over-speed cut-off switch. The over-speed governor shall be factory adjusted and tested to trip at the correct tripping speed, and the entire assembly shall be tested in the field after installation. The governor shall be repainted in the field after installation, and tested in accordance with all requirements of ASME A17.1 Safety Code.

The over-speed governor shall be operated by a new rope assembly of the proper size and construction, as required for operation of the governor.

Paint all equipment as required by Painting specifications.

- C. Motor Control Assembly: The existing elevator motor controls shall be removed and replaced with new controls to operate the new alternating current, permanent magnet type, gearless, hoisting machine motor. The new motor controls shall be microprocessor type, software oriented, vector controlled pulse width modulated alternating current drive systems. The variable voltage, variable frequency drive shall convert the alternating current power supply using a two-part process to a variable voltage, variable frequency power supply to the hoist machine drive motor. Speed control shall be by means of vector control providing independent excitation and torque current. Furnish a digital encoder on the driving machine motor, providing feedback to the motor controller on the speed of the motor and the position in the hoist way. Motor control shall provide for exceptionally smooth, efficient, expedient and quiet operation of the elevator. Provide all necessary electrical line isolation filters, isolation transformer, and other devices as may be necessary to minimize the total harmonic line distortion and noise generated by the elevator equipment. Also, include car position and velocity feed-back control feed-back on the over-speed governor or other suitable means. Elevator motor controller equipment shall be equal to that manufactured by ThyssenKrupp Elevator, model 10K Drive, Otis Elevator, Model 411 VVVF- PMAC Drive, or Magnetek Model 900HVP-PMAC.

Motor Control System shall include **Regenerative Power Recovery Feature**. The use of resistors to absorb regenerative power from hoist motor is not acceptable under this contract.

A power supply isolation transformer designed for 480 volts primary and 460 volts secondary power shall be installed in the power feed to the elevator motor controller system. This special transformer shall be isolated from the main power controller, so that it only controls power to the motor control drive assembly. When the elevator sits idle for as much as ten

(10) minutes (provide a field adjustable time that can be adjusted from 5-20 minutes), the isolation transformer and motor drive shall be temporarily disconnected in order to conserve electrical energy. The Elevator Contractor shall furnish a heavy duty type, quiet operating, highly reliable type, three-phase electrical switch arrangement that will connect (and

disconnect) the transformer/motor drive to the electrical feeder system. The design of the electrical contractor equipment shall be of the type that will permit the feed-back of electrical power generated by the elevator drive motor. Elimination of the isolation transformers from the elevator power systems is not acceptable.

Power supply to the elevator electrical controller system shall not be interrupted when the power to the transformer and drive assembly is disconnected with the elevator is sitting idle for the predetermined time period. When a landing call is registered, the electrical controller shall immediately reconnect the isolation transformer and motor drive system.

Isolation transformer shall be repainted in the field to match the elevator controller panel finish.

- D. Elevator Controller System: The existing electro-mechanical elevator controller system shall be completely removed and replaced with a completely new microprocessor type, software oriented controller system, using up-to-date design architecture. The system shall operate in real time, continuously analyzing the position and condition of the elevator. Control of the elevator shall be by means of push-buttons located at each elevator landing, with "up-down" buttons at all intermediate floors and single call buttons at each terminal landing. The operation shall be a two-car microprocessor group supervisory type system using the latest state-of-the-art technology especially designed for elevator control systems to maximize the level of efficiency in serving the varying traffic needs in the building, while minimizing the passenger waiting times and travel times. The system shall electronically calculate and continuously evaluate the service demand, and shall automatically change directions as required. The elevator control system shall be capable of providing serial communications with car and landing signal fixtures.

Elevator control systems shall be equal in design to Otis Elevator, model no. 411 or ThyssenKrupp Elevator, model no. TAC 50-04.

There shall be two (2) risers of pushbuttons for the elevators, installed at each floor opening. The elevators are installed on opposite sides of the elevator lobby, making it necessary to have two (2) risers of landing stations.

The elevator control system shall be fully capable of resetting automatically in the event of a power failure that does not damage the elevator control equipment or trip an electrical overload on the motor control system.

Additionally, the following features shall be included in the elevator electrical controller system:

1. Meet all requirements of ASME A17.1-2007 Safety Code for Elevators and Escalators, and all published addenda.
2. Main floor coverage when elevators in group remain idle for five (5) minutes.
3. Independent service operation, from key switch in service cabinet in car.
4. Emergency power operation, including operational delays for power transfer, for emergency power use by Owner. Provide selector switch in main landing operating station. Switch shall be marked according to the existing marking for three (3) elevators that are controller by the same switch. Numbering of elevators may be different, if desired by Owner. Verify marking prior to developing the shop drawings.

5. Digital position indicator operation at all floors, with direction arrows indicating direction of car travel.
6. Digital car position indicators, in each car. Include direction arrows in each indicator.
7. Dual car riding lanterns in each car, with single chime for up direction and double chime for down direction.
8. Door operation control interface, for car top mounted, high quality, "closed loop" door operator control systems.
9. Floor passing chime in both car operating panels.
10. Load weighing system complete, equal to K-TEC model 5200. Fully adjustable, microprocessor type. Also, use for anti-nuisance, motor pre-torque, overload conditions, load by-pass. Special chime shall sound if elevator becomes overloaded. If car becomes overloaded, the elevator doors shall not close until the load is reduced to the acceptable capacity.
11. Door closing interference warning system. (See door operator equipment and operation)
12. Controller shall have baked enamel (or power coat) finish and swing doors. Lift-off type doors are not acceptable.
13. Controller equipment shall have cooling fans that shut off after a predetermined period of idle time.
14. Controller shall be designed for floor mounting or wall mounting.
15. Hoist way access controls, top and bottom terminals, with key operated switch in car maintenance cabinet.
16. Timer system to control electrical power contactor to turn off power to isolation transformer and motor controller system after elevator remains idle for ten (10) minutes (adjustable timer from 5-20 minutes), and doors are closed. Elevator Contractor shall reconnect the isolation transformer and motor controller when a landing call is registered.
17. Control for cab lighting system, to shut down the lighting and exhaust blower after ten (10) minutes (adjustable timer, from 5-30 minutes), provided the car is idle and doors are closed. Arrange wiring and controls so that cab emergency lighting system shall not be activated during this shut-down operation. Contract Electronic Controls, Inc. for design information. Call Walter Barnes @ 888.633.9788.
18. Also, provide a fault out-put if the emergency lighting battery is low or defective. Contract Electronic Controls, Inc. at 888.633.9788, for details on operation of this system.
19. On-board diagnostics of elevator system, with ability to make adjustments on the controls. Also, provide the ability to make adjustments from multiple locations through Enhanced Management Information System features in the control system, including those which allow remote monitoring, system adjustments, etc.

20. Car top safety operation, for operating car from control station on top of car. Also, provide a key switch in the car operating panel maintenance cabinet.
21. Any other additional features that will enhance operation or benefit Owner.

2.05 SIGNAL FIXTURES

- A. Car Top Station: A new operating station shall be mounted on the car top to control operation during maintenance work, inspections and tests on the equipment. The station shall meet all elevator code requirements, and include a duplex 115 volts, GFCI protected electrical outlet. Mount station near the doorway to permit access without stepping onto car top. Include a light on the operating station, controlled by a switch that is within easy reach of the landing.

Additionally, mount an industrial grade fluorescent fixture on the car top, consisting of two (2) 40 watt fluorescent tubes, with protective lens, to prevent contact with the lamps. Mount the lighting fixture horizontally on the safety railing, in a manner that allows it to illuminate the entire car top. Connect the wiring for the fixture to the switch that illuminates the lamp on the car top operating station.

- B. Car Operating Panel: The existing car operating panel shall be removed, and replaced with new car operating panel, mounted in no. 4 satin finished bronze swing panel. The new operating panel shall include the following features:
 1. Complete car operating panels in each cab, mounted in full swing, full height type, front return panels, with high quality, heavy duty hinges and locking devices. Bronze or Muntz metal (with lacquer finish) materials are required. All locking devices shall be adjustable, to permit proper alignment and to alleviate rattles. Remove and discard the existing car operating panels and entrance columns.
 2. Cab operating panel shall contain all of the necessary components to function as required for the building, meet the needs of the Owner, and to meet the required code provisions. Design the panels in a very neat, well arranged fashion.
 3. Button design shall be as selected from full spectrum of buttons shown in the MAD brand signal fixture component brochure. Final selections shall be made by Owner, Engineer and Elevator Consultant during the drawing approval process. Call registered lights shall illuminate blue in color.
 4. Mount the floor selection buttons in a straight line, if possible. Provide the necessary key switches as required to restrict traffic flow to certain locations, mounted in the locations approved by Owner. Provide all markings for handicapped persons, using type and design as approved by Owner, Project Engineer and Elevator Consultant during approval process.
 5. Provide door control buttons mounted below the floor selection buttons. Buttons shall be selected from MAD brand button brochure.
 6. Provide keyed stop switch in each panel, grouped with alarm bell button. Provide an alarm bell button which shall illuminate with a red light or jewel when depressed.
 7. Provide digital position indicators in the upper portion of the car operating panels, along with direction arrows which alert the direction of car travel. Digital position indicators shall be approximately 1.5 inches in height.

8. Firemen's operation panel shall contain all of the features required by elevator code. Include a tight fitting bronze door to match the finish on the front return panels. Engrave firemen's operation nomenclature on the panel door. Provide the proper keyed lock for the door. Install operating instructions on the rear of the swing door.
9. Service cabinet, mounted below the emergency telephone device, shall contain the following keyed switches, and have a tight fitting, key locked, bronze swing door. Cabinet shall contain the following features:
 - a. Independent service switch.
 - b. Three (3) position exhaust blower switch (off-low-high).
 - c. Car lights switch.
 - d. Car emergency lighting test switch.
 - e. Hoist way access switch.
 - f. Car top inspection switch.
 - g. Any other special requirements, including certificate holder and certificate cover, as part of the hinged door.
10. Engrave no smoking signs and symbols in swing returns, above the position indicator.
11. Engrave capacity in pounds and number of people, located where space is available.
12. Overload jewel and audible chime.
13. Engrave the appropriate elevator numbers at the top of each swing panel. Include the building elevator numbers and State of Florida serial numbers.
14. Firemen's cap jewel that flashes when smoke or fire is in machine room or in hoist way area.
15. Floor passing chimes. Chimes shall have adjustable volume controls.
16. Flush mounted certificate frame, sized for State of Florida inspection certificate, in the swing door of the service cabinet. Include a flush mounted Lexan brand, scratch resistant cover, approximately 5/16" thickness, for the certificate frame. Size the cabinet door, and certificate holder, to accept a standard sized Florida operating certificate.
17. Emergency telephone device, with all required features to meet code and comply with the requirements of the Owner. Include punched grillwork for speaker and microphone.
18. Provide punched grillwork for speaker and microphone associated with elevator intercommunication system.
19. Provide a black or bronze colored, modern design duplex type GFCI protected electrical outlet in the lower part of the swing panel, flush mounted in horizontal position, approximately 6" above the floor line. Power supply shall be 115 volts, alternating

current, fused for 15 amps. Mount from the rear of the panel without any exposed fasteners.

20. Provide any additional features required by Contract, Owner required security system, elevator code or other applicable codes.
 21. All lamps shall be high quality LED type.
- C. Car Riding Lanterns: Remove the existing car riding lanterns and install two (2) complete new lanterns, per car, designed for installation without faceplates. Include the following:
1. All lamps shall be highest quality, high output, LED type.
 2. The lantern lenses shall be through a series of punched holes in a vandal resistant arrow design.
 3. Up arrows shall illuminate brilliant white.
 4. Down arrows shall illuminate brilliant red.
 5. No exposed fasteners shall be permitted.
 6. Chime shall ring one (1) time for up traveling car, and two (2) times for down traveling car. Chime volume shall be adjustable.
 7. Lanterns shall be designed for service and maintenance from the rear of the fixtures.
- D. Landing Stations at Each Hoist way Opening: Remove the existing landing control stations and replace them with completely new operating stations that contain the following features:
1. Cover plates constructed of 1/8" thickness bronze or Muntz metal, approximately 8" wide, with final design width as selected by the Owner, Engineer and Elevator Consultant. Plates shall be flush mounted. Attach the covers with a suitable number of matching countersunk fasteners to prevent the covers from warping.
 2. On floors that do not have bronze hoist way doors and frames, install no. 4 satin finish stainless steel cover plates on the landing stations. Cover plates shall be the same design layout, except for the materials from which they are constructed.
 3. Finish on cover plates shall be as selected by Owner, Engineer and Elevator Consultant.
 4. Button design shall be round type, stainless steel materials, LED lamps, highly durable design, as selected from MAD signal fixture design brochure. All call registered lights shall be blue in color.
 5. Braille and raised direction arrows are to be mounted to left of each button.
 6. Warning signage along with red pictograph, to use stairs during fire emergency. Follow ASME A17.1 Code requirements. Pictograph shall be designed for easy replacement if it becomes damaged from abuse.

7. Hoist way access switches at top and bottom floors, in the call stations for the appropriate elevators.
8. Emergency power selector switch in main landing station. Mark switch with "Auto-6-7-8." Final selection of the elevator numbering shall be made at time of approval of drawings.
9. All cutting and patching for station installation shall be by Elevator Contractor. This cutting shall include granite, marble, drywall, concrete or other materials that exist in the location where the stations are to be mounted. Elevator Contractor is expected to hire a professional stone cutter firm to perform such work where needed.
10. Install 2" high position indicators, with car direction arrows, in each landing station at all floors. The elevators are located on opposite walls, requiring the position indicators to reflect the position of the elevator car adjacent to the landing station on each floor. Only one (1) position indicator is to be installed in each landing station.
11. There are two (2) landing stations per floor.
12. All lamps shall be high quality LED type.

2.06 ELEVATOR CAR ENCLOSURE

- A. The Elevator Contractor shall retain the existing cab equipment, except for the following cab related items that shall be replaced or renovated:
 1. The new cab equipment to be installed shall be of the highest quality design and materials, meeting all of the requirements hereinafter described.
 2. New full width, full height, swing return panel; new cab doors; and new stationary entrance column, shall be constructed of no. 4 satin finished bronze or Muntz metal, which shall be used to provide replacement equipment for the cab. The transom panels shall also be clad with new materials to create a matching surface for the other new materials on the front of the cab. The metal thickness for the front return and entrance column shall be 14 gauge, with adequate reinforcement to prevent warping or oil-canning conditions. Metal for cladding the transom shall also be 14 gauge thickness.
 3. The car doors shall be sandwich type construction, using furniture steel materials on front and back, then faced with bronze or Muntz metal as indicated in no. 2 above. Bronze metal for doors shall be at least 16 gauge, securely applied over 16 gauge backing on the door panels.
 4. The cab tops shall be repaired where the materials are damaged by water intrusion into the hoist ways. New car top exit panels, with safety switches shall be installed. Paint the cab exit panels, and replacement top panels, with baked enamel on both sides of the material.
 5. Cab suspended ceiling shall be retained and reused. Outfit the ceiling with new lighting as shown in no. 6 below. Clean the ceiling after the work has been completed.
 6. Existing cab lighting shall be replaced, by using eight (8) high quality LED down lights, with bronze colored or black fixtures, equal in quality to "Cablite" system manufactured by Electronic Controls, Inc., Cape Canaveral, Florida 32990, Phone 800.633.9788, Contact Walter Barnes. The cab lighting system shall include one (1) lighting power controller, and an emergency lighting system which will illuminate four (4) of the lighting fixtures

positioned across the front of the elevator cab. Additionally, the lighting system (and exhaust blower) shall be arranged to automatically turn off ten (10) minutes after the last call is served by the elevator and the doors are closed. The emergency lighting portion of the cab lighting system shall not be impacted by the automatic shut-down of the lighting system. The lighting level shall be approximately 3000 Kelvin.

The cab lighting and exhaust blower shall be restored automatically when a hall call button is depressed, after the lighting and blower have been shut down due to idle elevators.

7. Furnish and install additional lighting, using LED lighting strips, which project lighting downward between the cab walls and the suspended ceiling. Lighting shall be provided on all four sides of the ceiling. Lighting level shall be sufficient to supplement the new LED type lighting system for the cab, and shall be adjustable in lighting output. The lighting shall be warm white level, equal to approximately 3000 Kelvin. This additional lighting shall also be turned off, when the other lighting is automatically switched off, due to the elevator being idle for 10 minutes, or more.
8. Furnish a high quality exhaust blower system, equal in quality to Morrison brand, on the car top. The output of the exhaust blower shall be at least 750 CFM, with quiet operating motor designed for two (2) speed operation. Propeller type fans are not acceptable. The blower control system shall be designed to automatically shut down after ten (10) minutes of car idle time and the doors are closed. Provide a grill work on the underside of the ceiling to protect against accidental contact with the exhaust blower system.
9. Threshold for the cab shall be completely polished to remove scratches and burrs, and to make the threshold appear to be new.
10. Provide "punch-outs" for car riding lanterns, without the use of faceplates. Provide holes positioned in an arrow design to allow illumination to pass.
11. All cab work shall be professional in appearance and construction. All work is subject to approval by Owner, Engineer and Elevator Consultant.
12. Design the swing type front return panels to work with the existing car flooring materials, so that it can be properly opened for maintenance purposes.
13. Each cab shall be thoroughly cleaned before final acceptance examination.

2.07 ELEVATOR FLOOR LEVELING EQUIPMENT AND ACCURACY

- A. The elevator floor leveling equipment shall all be replaced with completely new equipment, designed to provide extremely reliable and quiet operation.
- B. The floor leveling and re-leveling shall stop the elevator platform within 3/16" of the floor level, consistently, with or without a load on the car. Additionally, the direction of travel shall not impact the leveling accuracy.

2.08 EMERGENCY TELEPHONE AND INTERCOMMUNICATION SYSTEM

- A. The system shall be a combination system, including telephone and intercommunication phases, in one (1) electronic type package.

- B. A master operating station shall be mounted in the elevator machine room, which shall include battery back-up equipment that will function for up to four (4) hours after a power failure.
- C. Elevator cabs shall have both emergency telephone equipment and hands-free intercommunication devices, both functions working through punched grillwork in the front return panels.
- D. Telephone equipment shall work with the Owner's telephone system in the building.
- E. The system shall be equal in quality and function to that manufactured by Halma - Janus, EMS5 Call Director, suitable for multiple tasks from multiple locations. The system shall be capable of being expanded in the future, when required to include additional elevators in the complex.

2.09 SPARE EMERGENCY PARTS

- A. The Elevator Contractor shall provide the following emergency replacement parts to the Owner, which shall be available for immediate replacement purposes only. These parts are not to be consumed by the Elevator Contractor in the normal course of maintaining these elevators. Any of the parts utilized shall be replaced in the Owner's inventory as soon as they can be obtained from the appropriate sources. Provide the following:
 - 1. Two (2) sets of all car station panel and landing operating buttons and operating devices, including button caps, and control modules.
 - 2. Two (2) sets of all different types of car panel and landing station panel key switches, complete with keys.
 - 3. Two (2) sets of all lenses utilized on all operating devices such as position indicators, etc.
 - 4. One (1) intermediate landing call station cover plate, in both stainless steel and bronze finish.
 - 5. Two (2) sets of all jewels used in car and landing stations.
 - 6. Two (2) complete sets of all markings for handicapped persons on all operating stations.
 - 7. Two (2) replacement lenses for operating certificates.
 - 8. Four (4) LED down light fixtures for cab ceiling.
 - 9. One (1) LED lighting system control module for each type of LED lighting.

10. Twelve (12) bronze material vandal resistant screws for landing cover plates.

11. Six (6) sets of all LED lamps used in the signal fixtures, both car and landing.

2.10 ELEVATOR ELECTRICAL WORK

- A. All elevator electrical wiring, including traveling cables, shall be replaced with new materials suitable for the purpose intended. No existing wiring conductors shall be retained and reused during the elevator renovation contract.

Provide all needed wiring, conductors, conduit, junction boxes, electrical duct work and other electrical devices, as may be needed, to complete the work associated with operation of the elevator equipment.

- B. The existing metal electrical ductwork is permitted to be retained and reused during this elevator renovation contract provided it meets the following criteria:
1. The electrical duct work is not damaged.
 2. The electrical duct work is located in the proper position for future use. In the event the duct work must be relocated or altered, it shall be completely replaced with new materials.
 3. The capacity of the electrical duct work is sufficient to meet the needs of the renovation contract requirements.
 4. The electrical duct work meets all requirements of ASME A17.1-2007 Safety Code for Elevators and Escalators, and the NEC.
 5. All electrical duct work shall be cleaned and painted.
- C. Furnish and install the electrical wiring, conduits and associated work from all of the elevator power supply disconnect switches in the machine room area, to the elevator controller panels. All work shall comply with NEC and ASME A7.1 Safety Code requirements. Support all wiring conductors, duct work, wire ways, conduit, as necessary, to meet all code requirements.
- D. Remove all existing wiring connected to landing fixtures associated with elevator systems. The fixtures and boxes shall be removed.
- E. Furnish and install new elevator emergency communication system, with emergency phones in cars. Also, provide emergency intercommunication systems in each car, with master station mounted in the elevator machine room area. These intercommunication systems shall be combined with the emergency phone systems, equal in design and quality to Halma - Janus, EMS5 Call Director combined systems. Provide battery backup systems for the master station in the machine room. Design the system to allow additional locations to be added in the future.
- F. All elevator traveling cables shall run be run from the elevator car junction box to the terminals inside the elevator controller panel, without an intermediate junction box.

- G. Provide traveling cables with at least the following additional conductors, for each elevator, as well as those necessary to provide proper car control circuits, security systems and other functions, as required by Owner:
 - 1. Two (2) coax cables of latest design, or conductors as required by Owner for use of video, audio and other types of communications.
 - 2. Four (4) cat. 6 cables of latest design.
 - 3. Twenty-five percent spares of all control wiring required for elevator operation.
 - 4. One-hundred percent spares for car lighting and alarm power supply.
 - 5. Any additional conductors for special elevator control features.
- H. Work closely with Owner's security department personnel, during the design, installation and set-up of the security system to control the access and operation of the elevator equipment. This includes access to elevator and access to specific floors.

PART III – EXECUTION

3.01 EXAMINATION

- A. Before developing any drawings, fabricating and materials or performing any work at the site, the Elevator Contractor shall thoroughly inspect, review, measure and evaluate all site conditions. Verify all dimensions and examine all conditions prior to performing work.

3.02 INSTALLATION

- A. Install all of the elevator components and incorporate the equipment in a completely professional and satisfactory manner, while complying with the contract and specification requirements. Unilateral decisions or changes, without prior written approval, are not acceptable.
- B. Perform the work with competent, highly skilled elevator workman, other skilled trades, under the direct control and supervision of the Elevator Contractor's superintendent. All mechanics shall show evidence of being fully trained and qualified in the elevator trade, and shall possess a current "Certificate of Competency" issued by the State of Florida.
- C. Coordination: Coordinate the elevator work with any other trades on the site, under the control of the Elevator Contractor, to avoid any delays in the completion of the work.
- D. Lubricate any points, where required, on the elevator equipment provided under this contract.
- E. Painting shall all be as required under the paragraph covering painting in this specification section.

3.03 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon completion of each elevator up-grade, and before acceptance of the work by the Owner, Engineer and Elevator Consultant, the elevator equipment shall be inspected and tests witnessed by an authorized Certified Elevator Inspector, who possesses a current CEI license in the State of Florida, issued by the Department of Professional

Regulation, Bureau of Elevators. All work shall be approved by the Bureau of Elevators prior to the elevator equipment being returned to public usage.

- B. The CEI licensed elevator inspector shall not be an employee of the Elevator Contractor, and Inspector shall not have any mutual financial relationship, whatsoever, with the Elevator Contractor.
- C. Documentation of the safety and acceptance tests shall be provided as part of the turn-over documentation.

3.04 ADJUSTING WORK

- A. The door operator equipment, elevator motion controller, elevator supervisory controller, over-speed governor, floor leveling accuracy, hoist ropes, governor rope, and all other features of the elevator equipment, to comply with the requirements of ASME A17.1 Safety Code for Elevators and Escalators, and all of the requirements of these technical elevator specifications. All of the elevator equipment shall operate in first-class condition, and as though it is all completely new.

3.05 CLEANING WORK

- A. Before Final Acceptance of each elevator, the elevator equipment and surrounding areas, shall be fully cleaned of all dirt and debris created by the Elevator Contractor, or by others whom may be under the control of the Elevator Contractor. Remove all trash from the site.
- B. Clean and polish all architectural surfaces, thresholds, door safety screens, signal fixtures and related equipment. Remove all protective coverings for examination of the work.

3.06 DEMONSTRATION AND TRAINING

- A. Provide at least eight (8) hours of training to representatives of the Owner or Property Management Personnel, on the proper maintenance of the new elevator surfaces and operating fixtures that need to be regularly maintained on a daily basis. Also, communicate information on the proper recognition of and usage of the operating devices, key switches, and other components that are new to the building personnel. Advise the Owner and/or Property Manager of the emergency procedures that should be observed and operated.
- B. Personnel providing the training shall be fully qualified and versed in the requirements of these elevators, as well as the system operation with respect to this project.

3.07 TURNOVER OF KEYS AND REQUIRED DOCUMENTS

- A. The Elevator Contractor shall turn over the specified copies of all documents listed in another area of these elevator specifications, plus a total of twelve (12) sets of all typical keys for the new elevator equipment. Provide at least twenty (20) sets of keys for floor lockout purposes.
- B. Only six (6) emergency door release keys are to be provided.
- C. The required documents, keys, tools, manuals and spare parts shall be provided to Engineer prior to Final Acceptance and final payment for this contract.

3.08 COMPLETION DATE

- A. The elevator renovation work is not considered complete until the elevator work has been finalized, including all adjustments, tests, delivery of spare parts and all punch-list items have been completed. All required documentation and keys must also be turned over to the Project Engineer prior to establishing an agreed upon final completion date.

END OF SECTION

SECTION 15010 - MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

GENERAL CONDITIONS

The work described hereunder shall be installed subject to the Contractual Conditions for the entire Specifications.

CORRELATION

This Section of the Specifications and its accompanying Drawings are made separate for the convenience of the General Contractor in preparing his bid and in no way relieves the General Contractor of his responsibility to correlate the work under this Section with that of all other trades as regards the items to be furnished by various Subcontractors, the exact location of all equipment and materials and the necessity of planning the work of all trades to avoid interference.

PLANS AND SPECIFICATIONS

Drawings and Specifications are intended to clearly set forth all work, and the detailed description is added to assist in establishing the scope and the location of the several parts of the work. Collectively, they shall govern and control the scope, character, and design of the Work, and any item called for in any one of the documents shall be as though mentioned in all.

Failure to make reference in the Specifications to any items of the work shown on the Drawings, but necessary to the completion of the Work shall not relieve the Contractor of the full responsibility to furnish the materials and perform the work of such items, in a manner comparable to other items of similar nature for which detailed Specifications are included.

PROJECT FAMILIARIZATION

The bidder is expected to visit the site and familiarize himself with conditions at the site before submitting his bid. He shall familiarize himself with the work required throughout the entire project and shall make allowances for contingencies which may occur in the interconnection of the various systems.

ALTERNATES AND ADDENDA

The Contractor shall investigate all Alternates, Addenda and Allowances as they relate to the Work of this Section.

Note: There are no mechanical alternates listed.

TESTING

The Work shall include complete testing of all equipment and piping at the completion of the Work and making any connection changes or adjustments necessary for the proper functioning of the system and equipment.

WORK INCLUDED

Work covered under this Section consists of furnishing all labor, materials, tools, equipment, transportation, scaffolding, services, supervision, and performing of all operations required to properly complete all mechanical work in accordance with this Division of the Specifications and as indicated on the applicable Drawings, subject to terms and conditions of the Contract.

SUPERVISION OF WORK

The Mechanical Contractor shall have a qualified and experienced superintendent on the job when any related work is in progress.

RELATED WORK SPECIFIED ELSEWHERE

The Contractor is cautioned to note carefully other Sections of the project Specifications with their cross references to other specific standard specifications, standard detail, etc., describing work to be furnished under these Specifications as well as any mechanical work that may be shown on electrical, structural, architectural, or other drawings, in order that he may fully understand the requirements and work to be provided under this Section of the Specifications.

ORDINANCES AND REGULATIONS

All work shall conform with all local and State ordinances or regulations governing the installation of such equipment. If work as laid out, indicated or specified is recognized to be contrary to or conflicting with local ordinances or regulations, the Subcontractor shall report same to the Architect/Engineer before submitting a bid. The Architect/Engineer will then issue instructions as to procedure.

CODES AND STANDARDS

The standards of the following organizations, and individual standards named, shall be followed the same as if they were fully written herein and constitute a part of the Specification requirements except where otherwise specified: For the specific editions that are applicable see Section B, INSTRUCTIONS TO BIDDERS, Exhibit 'A'.

National Fire Protection Associations (NFPA) Standards:

NFPA 70, National Electric Code

NFPA 90-A, Installation of Air Conditioning and Ventilating Systems

NFPA 101, Life Safety Code

NFPA 241, Standard for Safeguarding Building Construction and Demolition Operations

Florida Building Code and Related:

FL Building Code

FL Mechanical Code

FL Plumbing Code

FL Fuel Gas Code

Florida Energy Efficiency Code for Building Construction

National Board of Fire Underwriters

SMACNA Standards

ANSI/ASME B31.9 – Building Services Piping

SMACNA Standards

The foregoing rules, standards, regulations, specifications, recommendations and requirements shall be followed by the Contractor as minimum requirements. They shall not relieve the Contractor from furnishing

and installing higher grades of materials and workmanship which are specified herein or indicated on the Drawings.

Any material, equipment or workmanship specified by reference to the number, symbol or title of Specification or detail, or other standard rules, codes, regulations, etc., shall comply with the latest edition amendments and revisions thereto in effect on the date of these Specifications.

The Contractor shall submit proof, if requested by the Engineer or his representative, that the materials, appliances, equipment or devices that he furnishes and installs under this Contract meet the requirements of the Underwriters' Laboratories, Inc., or Factory Mutual, as regards fire and casualty hazards.

PERMITS, INSPECTIONS AND UTILITY FEES

The Contractor shall obtain necessary permits and inspections required for work and pay all charges incidental thereto. Contractor shall coordinate all utility taps and shall pay all associated fees, impact charges, etc. Upon completion of the work the Contractor shall deliver to the Engineer a certificate of inspection and approval from the local inspection department, if required.

MINOR DEVIATIONS

The Contractor shall note that the Mechanical Drawings are intended to indicate only the extent diagrammatically, general character and location of the work included. Work intended, but having minor details obviously omitted or not shown, shall be furnished and installed complete to perform the functions intended.

Arrangements of piping, ductwork, and equipment that differ materially from the obvious intent of the Drawings will not be permitted except where necessary to avoid interferences, and only where specifically approved by the Architect/Engineer. Drawings shall be furnished showing all changes. Any change resulting in a saving in labor and materials shall be made in accordance with a Contract change order.

BASIC MATERIALS AND METHODS

The materials and methods specified in this article are to be used for work specified throughout this Section of the Specifications.

All materials and workmanship shall be of the highest quality.

Any materials on the job rejected by the Architect/Engineer shall be removed from the premises.

The installation shall be made in a workmanlike manner in accordance with acceptable industry standards except where specific procedures are called for in these Specifications, in which case they shall be followed.

All materials shall be new, free of defects and of the manufacturers latest standard design.

Reference to a particular material or specific equipment by name, make or catalog number is to describe equipment which will meet the requirements of the project and is not intended to restrict bidding.

It is the intent that all of the equipment of a similar type shall be the products of the same (one) manufacturer when practicable, providing unit responsibility for each group.

REVIEW OF MATERIALS

Submittals shall be made in compliance with the General Conditions of the Contract for Construction and the following:

Submittals shall be identified by items numbers as listed in the pertinent section of the specifications and shall be accompanied by a letter of transmittal.

Certificates shall be in triplicate and where required in conjunction with other submittals shall accompany such submittals.

Materials and other items subject to approval shall not be purchased or incorporated in the work before receipt of written approval.

Submittals shall be rendered all at one time for the entire project. Partial submittals will not be accepted or acknowledged. Exception: If a few items have long shop drawing preparation time, then these items will be accepted later to avoid delaying the shop drawing procedure.

CONSTRUCTION SCHEDULE

The contractor shall submit a construction schedule as outlined in the GENERAL CONDITIONS.

SHOP DRAWINGS

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor and which illustrates some portion of the Work.

All shop drawings submitted shall bear the stamps of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to contractor for proper resubmission. If the shop drawings show variances from the other requirements of the contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment. Otherwise, the Contractor will not be relieved of the responsibility for executing the work even though such shop drawings have been approved.

Submit six (4) copies of the shop drawings to be retained and additional copies as required by the Contractor, all items required under appropriate sections of the Specifications.

All materials are to be submitted in a hard cover, three ring binder. All materials are to be labeled with the pertinent Specification Section and are to be separated with dividers for each section of the Mechanical Specifications.

All materials submitted late or re-submitted shall be 3-ring punched and marked with the appropriate Specification Section Numbers.

PROJECT CLOSEOUT

The Contractor shall remove all temporary work and temporary facilities prior to final pay request.

The Contractor shall clean spaces that were occupied by temporary work and temporary facilities. Remove debris, rubbish and excess materials from the sites. Burning or burying is not permitted on the sites.

Repair damages caused by installation or use of temporary facilities. Restore to original condition.

Restore grass, landscaping, hardscaping to original condition.

GUARANTEES, BONDS AND AFFIDAVITS

Warranties:

The Contractor shall submit to the Owner all manufacturer's warranties on equipment furnished and installed under this Contract.

In addition, to the guarantee of equipment by the manufacturer of each piece specified herein, the Contractor shall also guarantee such equipment and shall be held for a period of one year from final acceptance test to make good any defects of the materials or workmanship occurring during this period, without expense to the Owner.

Affidavits:

The Contractor shall provide affidavits as required in the non-technical portion of these Specifications.

OPERATION AND MAINTENANCE DATA

Manuals and Instructions:

The Contractor shall deliver to the Engineer, upon substantial completion of the Work, two copies of descriptive literature related to the equipment installed under this Contract, including parts lists, wiring diagrams, maintenance and operation manuals and warranties customarily supplied by manufacturers for equipment incorporated in this work. The literature shall be neatly bound in a 3-ring binder and delivered to the Engineer prior to final acceptances. Each manual shall include a copy of the Control Diagrams and a complete description of the operation of the control systems.

The Contractor shall give physical demonstration and verbal instructions for proper operation and maintenance of equipment to the Owner or his designated representative. Schedule these demonstrations and instructions at the Owner's convenience.

Provide four (2) hours of tour and demonstration of all equipment installed under this project.

AS-BUILT DRAWINGS

As-Built Drawings are required. Maintain a current and legible record set on the job. Final record prints will be drafted by the Engineer and signed off by the contractor. The Contractor is solely responsible for providing accurate asbuilts.

QUALITY ASSURANCE

Products Criteria:

Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least two (2) years prior to bid opening. Provide list of users upon request.

Equipment having less than a two-year use record, which in the opinion of the Engineer, provided significant benefits to the Owner such as improved energy efficiency, will be acceptable if it is a product of a manufacturer who has been regularly engaged in the manufacture of that specific type of product which has been used in similar applications for a period of two years. The Engineer reserves the right to require the Contractor to submit evidence to this effect for his approval.

Equipment Service: Products shall be supported by a service organization which maintains an adequate inventory of repair parts and is located, in the opinion of the Engineer, reasonably close to the site.

Manufacturer's Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

Manufacturer's Recommendations: Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Engineer prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

FIRESTOPPING

Provide for firestopping of all mechanical systems. UL listed methods conforming to the situations present shall be utilized. Submit shop drawings of intended methods, including installation instructions and proof of UL Listing.

WALL, FLOOR AND CEILING PLATES

Material and Type: Chrome plated brass or chrome plated steel. Use plates that fit tight around pipes, cover openings around pipes, and cover the entire pipe sleeve projection.

Thickness: Not less than 3/32 inch for floor plates. For wall and ceiling plates, not less than 0.025 for up to 3 inch pipe, 0.035 for larger pipe.

Locations: Use where pipe penetrates floors, walls and ceilings in exposed locations, except mechanical rooms or chases. Use also where insulation ends on exposed water supply pipe drop from overhead. Provide a watertight joint in spaces where brass or steel pipe sleeves are specified.

INSTALLATION

Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Follow manufacturer's published recommendations for installation methods not otherwise specified.

Protection and Cleaning:

Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer. Damaged or defective items, in the opinion of the Engineer, shall be replaced.

Protect all finished parts of equipment, such as shafts and bearings, where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water, chemical or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.

Concrete and Grout: Use concrete and shrink-compensating grout, 3000 psi minimum.

Install gauges, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gauges to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.

WORK IN EXISTING BUILDINGS

Cut required openings through existing masonry and reinforced concrete using diamond core drills. Use of pneumatic hammer type drills, impact type electric drills, and hand or manual hammer type drills, will be permitted only with approval of the Engineer. Locate openings that will least effect structural slabs, columns, ribs or beams. Refer to the Engineer for determination of proper design for openings through structural sections and opening layouts approval, prior to cutting or drilling into structure. After Engineer's approval, carefully cut opening through construction no larger than absolutely necessary for the required installation.

PAINTING

Paint all bare steel pipe, supports, hangers, fabricated parts, etc. with two coats of enamel paint. Prepare surfaces in accordance with the manufacturer's recommendations. Coordinate colors with existing like components or per the Owner.

Paint all cut or heat affected galvanized steel components with two coats of cold galvanizing spraypaint, ZRC Cold Galvanizing compound or equal. Prepare surfaces per the manufacturer's recommendations.

PIPE AND EQUIPMENT SUPPORTS

Generally, support in accordance with industry standards and as described in Section 15150.

Use of chain, wire or strap hangers, wood for blocking, stays and bracing, nor hangers suspended from piping above will not be permitted.

Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 1/2 inch clearance between pipe or pipe covering and adjacent work.

Horizontal Pipe Support Spacing:

Cast Iron: Five feet on centers maximum spacing. At least one hanger on each full length of pipe close to hub where possible and at least one within 24 inches of each fitting, and wherever else required to prevent tendency toward deflection due to load. Provide a hanger at upper angle at each drop. Locate hangers adjacent to hubs on multiple fittings not more than four feet on centers.

Plastic pipe: Support in accordance with manufacturers recommendations.

For support spacing of all other horizontal piping refer to MSS-SP-69 and provide additional supports at valves, strainers, in line pumps and other heavy components. Provide a support within one foot of each elbow.

Vertical Pipe Supports:

Bases of cast iron stacks: If not buried in earth support on concrete, brick in cement mortar, or metal brackets permanently attached to building structure.

Vertical runs less than 15 feet long may be supported by the hangers on the connecting horizontal runs.

Up to 6 inch 60 feet long or not over 12 inch pipe up to 30 feet long, Riser clamps bolted to pipe below couplings, or welded to pipe and resting securely on the building structure.

Vertical pipe larger than the foregoing, support on base elbows or tress, or substantial pipe legs extending to the building structure.

LUBRICATION

Field check and lubricate equipment requiring lubrication prior to initial operation.

STARTUP

Perform startup in accordance with the manufacturer's recommendations and requirements. Provide written report for each startup to included functional performance testing results, correction actions, ambient conditions, system conditions, performance, etc.

END OF SECTION

SECTION 15250 - MECHANICAL INSULATION

PART 1 - GENERAL

GENERAL CONDITIONS

The work described hereunder shall be installed in accordance with the "Mechanical General Provisions," Section 15010.

DESCRIPTION OF WORK:

Extent of the mechanical insulation required by this section is indicated on the Drawings and schedules, and by the requirements of this section.

Types of mechanical insulation specified in this section include the following:

Ductwork Systems Insulation:

- Fiberglass duct wrap
- Closed-cell elastomeric
- Semi-rigid faced fiberglass board Insulation
- Rigid faced cellular board Insulation

Piping System Insulation:

- Fiberglass
- Cellular glass
- Close-cell elastomeric

QUALITY ASSURANCE:

Manufacturer's Qualifications: Firms regularly engaged in the manufacture of mechanical insulation products, of types required, whose products have been in satisfactory use in similar service for not less than 3 years.

Installer's Qualifications: Installer shall be an insulation specialty sub-contractor. A professional insulator with adequate experience and ability shall install all insulation. Firm with at least 5 years successful installation experience on projects with mechanical insulations similar to that required for this project.

Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) having flame spread index of 25 or less, and smoke developed index of 50 or less, as tested by ASTM E 84 (NFPA 255) methods.

SUBMITTALS

Submit to the Architect/Engineer for approval six (6) copies of brochures, technical data and/or shop drawings of the following, and as many additional copies as required for Contractor use:

1. Each type of insulation material
2. Insulation mastics
3. Cladding/jacketing materials
4. Mechanical/Impaling Pins

DELIVERY, STORAGE, AND HANDLING:

Deliver insulation, coverings, cements, adhesives and coatings to the site in containers with manufacturer's stamp or label, affixed and showing fire hazard indexes of products.

Protect insulation against dirt, water, and chemical and mechanical damage. Do not install damaged or wet insulation; remove from project site.

PART 2 - PRODUCTS

ELECTRIC HEAT TRACE CABLE:

Self limiting electric heat trace system for freeze protection of insulated hydronic piping and devices. Cable shall consist of 16 AWG nickel-plated copper bus wire, semi-conductive self-limiting matrix and cross-linked polyolefin insulating jacket. System shall be designed to produce 5 watts / ft with 120 Volts. System shall employ a pipe wall sensing thermostatic control. System shall be FLX by Thermon or an approved equivalent.

DUCTWORK INSULATION MATERIALS:

Fiberglass Duct Wrap: Federal Specification HH-1-558B, 1 pcf density, $k=0.24$, rated to 450 degrees F operating temperature. FSK reinforced foil vapor retarder. Owens / Corning Type 100 or an approved equivalent.

Rigid Faced Cellular Board Insulation: Glass-fiber reinforced polyisocyanurate foam core faced with nominal 16.5 mil embossed white acrylic-coated aluminum sheet laminated on one side and 1 mil aluminum on the other, 25 psi compressive strength, 55 psi flexural strength, 250 degrees F max use temperature, 1.25" thick (minimum) to provide a minimum R-8.0, Thermax Heavy Duty Plus Insulation by Dow Chemical Company.

Semi-rigid Fiberglass Board Insulation (for external duct insulation within bldg.): Federal Specification HH-1-558B, 3 pcf density, $k=0.23$, 4.5 minimum R-value or as required by the FBC for the service/location, rated to 450 degrees F operating temperature. FSK reinforced foil vapor retarder. Owens / Corning Quiet R, Manville Type 814 or an approved equivalent.

Closed Cell Elastomeric Duct Wrap: ASTM C 534, $k=0.27$, rated to 200 degrees F operating temperature, maximum permeability = 0.17 perm-in. Armaflex II or an approved equivalent.

DUCTWORK PROTECTIVE BARRIER:

Fiber reinforced metal cladding: Thirteen-ply, aluminum exterior, zero permeability vapor barrier with self adhesive, 15.5 mils thick, 100 oz/in adhesive peel strength, 160 psi product tensile strength, 80# puncture resistance, VentureClad Plus 1579CW or approved equal.

PIPING PROTECTIVE BARRIER:

Aluminum Jacketing: Smooth mill finish aluminum, 0.016" thick, with factory fittings and stainless steel bands.

Aluminum Cladding: Thirteen-ly laminate (six aluminum foil, four polyester film on scrim reinforced core), with special CW coild weather acrylic adhesive system allowing performance to 10 deg F. Natural aluminum finish or emossed. aluminum cladding with self adhesive backing.

Leon County Facilities

Mechanical Insulation

15250-2

Leon County Judicial Complex

Upgrade Elevators No. 6 & 7

MFE 012 3/9/11

PIPING INSULATION MATERIALS:

Cellular Glass Piping Insulation: ASTM C 552, 8 pcf density, k=0.38, rated to 900 degrees F operating temperature. Pittsburgh Corning Foamglass or an approved equivalent.

Cellular glass bedding mastic: Benjamin Foster 30-45

Indoor Insulation Jacket: All service kraft reinforced foil jacket with an elastomeric polymer barrier reinforced with glass fabric. Vapor permeance less than 0.02 grains/hr.sf.in.Hg. Owens/Corning ASJ/SSL-II, Lamtec 30J or equal.

Indoor Insulation Fittings: Finish with glass fabric and vapor barrier mastic. Childers CP-30 or Pittcote 300.

Exterior & Mechanical Room: Aluminum jacketing 0.016" thickness roll formed for straight runs and preformed fittings for elbows with stainless steel bands. Childers Products or equal.

Fiberglass Pipe Insulation: ASTM C 547, 3 pcf density, k=0.26, rated to 650 degrees F operating temperature. Owens/Corning, Fiberglass

Fiberglass insulation jacket: All service kraft reinforced foil jacket. Owens/Corning, ASJ/SSL-II or an approved equivalent.

Closed Cell Elastomeric Plastic Pipe Insulation: ASTM C 534, k=0.27, rated to 200 degrees F operating temperature, maximum permeability = 0.20 perm-in. Armaflex AP or an approved equivalent.

PART 3 - EXECUTION

HEAT TRACE SYSTEM:

Apply the heater linearly on the pipe after the piping has been successfully pressure tested. Secure the heater to the piping with the cable tie or type PF-1 polyester tape.

Apply "electric traced" signs to the outside of the thermal insulation.

After installation and before and after installation of installation, test heater using a 1000 VDC megger.

Entire installation shall be in strict accordance with the manufacturer's recommendations.

INSULATION SYSTEMS:

General Duct Systems Above Ceilings: Insulate supply, return, outside air, and transfer air ductwork with 1-1/2" thick fiberglass duct wrap unless otherwise specified.

General Duct Systems in Mechanical Rooms: Insulate supply, return ductwork with 1-1/2" thickness of rigid fiberglass board insulation.

Exposed/Exterior Duct Systems: Externally insulate with 1-1/4" thick rigid faced cellular board insulation and wrap with fiber reinforced metal cladding. Metal cladding shall extend through building wall and 4" minimum beyond inside face.

Equipment, valves, etc. Insulated with 3/4" closed cell elastomeric insulation. Provide 1" thickness where chilled water equipment is subject to ambient conditions.

Domestic Hot Water: Insulate with 1" thick fiberglass with all service jacket unless specified otherwise.

Domestic Cold Water: Where indicated on the drawings, insulate cold-water piping exposed to outdoor air with 3/4" closed cell elastomeric insulation.

Miscellaneous Cold Drain Piping: Insulate with 3/4" closed cell elastomeric insulation. Seal all seams joints, etc. Use aluminum jacketing to protect insulation exposed to the elements.

Refrigerant Piping: Insulate with 3/4" preformed closed cell elastomeric or closed cell polyurethane insulation. Seal all seams, joints, etc. air tight. Provide aluminum jacket or cladding in building exterior/exposed installations.

GENERAL INSTALLATION REQUIREMENTS:

Examine areas and conditions under which mechanical insulation is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

Surfaces shall be clean and dry before attempting to apply insulation. A professional insulator with adequate experience and ability shall install insulation.

Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.

Rated floors and partitions shall be penetrated only with insulation materials and techniques UL listed to maintain rated assembly. Any questions shall be referred to the Engineer.

Exposed piping in mechanical rooms (within 8 feet of the floor) shall be finished with an aluminum jacket.

Where mechanical/impale type pins/fasteners are used, use type with perforated bases that are set in duct mastic. Self-adhesive type is prohibited.

INSTALLATION OF DUCT WRAP

Duct Insulation (Bldg Interior Applications Only): Ensure all duct surfaces are dry and duct has been leak tested and sealed with mastic before commencing insulation work.

Application: The insulation shall be applied over 4" wide brushed strips of Foster's 85-20 adhesive spaced 12" on center. The insulation shall be overlapped approximately 2" and stapled in place. All ducts 24" or larger in width shall have the insulation additionally secured with mechanical fasteners spaced approximately 18" on center.

Insulation shall be cut and applied to the ductwork with not less than 2" overlap of backing on each edge and on the linear seams. Insulation shall be removed from all overlapping tabs. Exterior insulation shall overlap internal duct liner 12" where duct liner is stopped and exterior insulation is continued.

On rectangular ducts install so insulation is not excessively compressed at corners.

Seams shall be stapled approximately 6" on center with outward clinching staples.

Seal all seams, tears, punctures, penetrations for hanger straps, or any other breaches of duct wrap facing with tape or mastic to provide a vapor tight system.

Transition to rigid fiberglass board insulation 6" from walls, floors and similar ductwork penetrations, except where otherwise indicated.

INSTALLATION OF BOARD INSULATIONS

Duct Insulation (Bldg. Exterior Applications): Ensure all duct surfaces are dry and duct has been leak tested and sealed with mastic before commencing insulation work. Secure rigid faced board insulation to duct exterior with mastic that is approved by the manufacturer. Apply fiberglass mesh tape and insulation mastic to seal all joints, edges, seams, etc. to provide 100% vapor barrier assembly. Seal perimeter of joints at connection to air conditioner or air handler with glass fabric and mastic. Apply final layer of fiber reinforced metal cladding over insulation assembly and seal with mastic the connection to the unit and any penetrations to the barrier to ensure entire assembly is water and air tight. Install cladding per the manufacturer's recommendations, and ensure seams are oriented for proper drainage. Cladding on top surfaces of horizontal ducts shall be built up internally with insulation or cladding strips along centerline of duct to provide 1/8" per foot of slope towards the sides to eliminate water ponding on the exterior.

Duct Insulation (Inside Building): Secure duct board to duct with impale pins as recommended by the manufacturer. Use mechanical fasteners on ducts over 24" wide, spaced 18" on center. Seal all seams, joints, punctures with approved scrim tape. Flex duct wrap shall butt or overlap board insulation at external insulation transitions.

Extend board-type insulation thru mechanical room walls and 6" beyond before transitioning to duct wrap.

INSTALLATION OF PIPING INSULATION:

Insulation is not to be installed until the piping systems have been checked and found free of all leaks.

Provide hanger or pipe support shields of 18 gauge galvanized steel over or embedded in the insulation. Shield shall extend halfway up the pipe insulation cover and at least 6" on each side of the hanger. Securely fasten shield with straps at each end. Insulate anchors adequately to prevent moisture condensation problems.

Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with single cut piece to complete run. Do not use pieces or scraps abutting each other.

Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.

Maintain integrity of vapor-barrier jackets, and protect to prevent puncture or other damage. Gaps and openings in chilled water insulation vapor barrier shall be sealed.

Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe. Installer's option: install factory molded, precut or job fabricated units.

Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.

INSTALLATION OF CELLULAR GLASS PIPE INSULATION:

Apply bedding mastic to the entire pipe surface, inside of insulation and all joints of insulation. Stagger joints and butt insulation firmly together.

Insulation sections shall be secured in place with 16 gauge copper wires or plastic ties or fiberglass-reinforced tape spaced approximately 4' on center.

Apply vapor barrier jacket in accordance with the manufacturer's instructions. Insure integrity of the vapor barrier with properly apply butt strips. Repair all punctures, penetrations, and holes with tape approved by the manufacturer.

INSTALLATION OF CELLULAR GLASS PIPE INSULATION FITTINGS:

Apply a heavy coat of vapor barrier finish to the exterior surface of the insulation. Embed a layer of fabric membrane in the vapor barrier finish, overlapping seams at least 2".

Apply a final coat of vapor barrier finish at least 1/8" thick and finish smooth.

Vapor barrier shall be maintained complete and continuous.

INSTALLATION OF JACKETING

Ensure insulation is complete and all joints, seams, etc. are sealed air tight. Install aluminum jacketing over insulation with lap at bottom. Use aluminum end caps where insulation stops along piping. Use aluminum or stainless steel bands to secure sections to piping and screws to attach miscellaneous fittings and joints. Seal all joints, seams, with clear or silver colored silicone caulk.

Install aluminum cladding where specified over clean, dry insulation. Start at the lowest level and work upwards to ensure proper water shedding. Install cladding with laps on the bottom or out of sight. Install product per the manufacturer's requirements.

PROTECTION AND REPLACEMENT:

Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture-saturated units.

Protection: Insulation installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

FLASHING:

Coordinate with the architectural sheets when flashing is necessary where ducts penetrate exterior walls or roofs. A roofing contractor shall provide primary flashing. The mechanical and/or insulating contractor shall install secondary flashing/cladding that attaches to ducts.

END OF SECTION

SECTION 15891 - METAL AND FLEXIBLE DUCTWORK

PART 1 - GENERAL

GENERAL CONDITIONS

The work described hereunder shall be installed in accordance with the "Mechanical General Provisions," Section 15010.

DESCRIPTION OF WORK:

Extent of metal ductwork is indicated on drawings and in schedules, and by requirements of this section. In general, the work consists of, but is not limited to, the following:

A system of heating and air-conditioning supply and return ductwork.

Smoke dampers, diffusers and miscellaneous accessories.

Miscellaneous dampers

Conventional exhaust ductwork.

RELATED WORK

Insulation is specified under section 15250.

QUALITY ASSURANCE:

Manufacturer's Qualifications: Firms regularly engaged in manufacture of metal ductwork products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

Installer's qualifications: Firm with at least three (3) years of successful installation experience on projects with metal ductwork systems similar to that required for project.

Codes and Standards:

SMACNA Standards: Comply with SMACNA's "HVAC Duct Construction Standards, Metal and Flexible" for fabrication and installation of metal ductwork.

NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilation Systems".

NFPA Compliance: Comply with NFPA 96 "Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment".

SUBMITTALS:

Submit to the Architect/Engineer for approval six (6) copies of brochures, technical data and/or shop drawings of the following, and as many additional copies as required for Contractor use:

Ductwork materials

Grilles & accessories

Smoke dampers, miscellaneous dampers and installation instructions

Duct Sealants/Mastics

DELIVERY, STORAGE AND HANDLING:

Handle ductwork and equipment carefully to prevent damage. Do not install damaged sections or components; replace with new.

Store ductwork and equipment in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

DUCTWORK MATERIALS:

Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with G 90 zinc coating in accordance with ASTM A 525.

Sheet metal spiral seam single-wall round duct. Snap-lock duct is prohibited.

Sheet metal single-wall round duct fittings shall be 5-gore welded or smooth. Adjustable gored fittings are prohibited.

Prefabricated Double-Wall Duct: Preinsulated round duct with mechanical fastening, spiral flat seams, complying with ASTM A527, with G-90 zinc coating (paintable) in accordance with ASTM A 525, with perforated inner wall, one-inch thick fiberglass insulation with acrylic coating on exposed surface, equal to McGill Airflow LLC ACOUSTI-k27. All fittings, assembly hardwares, seals, etc. shall be by the manufacturer of the duct.

MISCELLANEOUS MATERIALS:

General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connections of ductwork and equipment.

Duct Sealant: Non-hardening, low VOC, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation detail, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.

Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

Flexible Ducts: Insulated spiral-wound spring steel with flame proof vinyl sheathing complying with UL 181, Class I air duct (duct connectors will not be accepted).

Smoke Dampers: Dampers shall meet the requirements listed in NFPA 90A, 92A and 92B and shall be classified as leakage rated dampers for use in smoke control systems in accordance with the UL555S. Provide factory installed electric actuators qualified under UL555S. For each damper provide an access door 4" smaller than sheet metal size in width (up to 18") and 18" in length.

Smoke Damper Actuators: Actuators to be normally closed (powered open), spring return (selectable), 120 VAC with end position indication (two built in auxiliary switches), overload protection with disconnect switch. It will meet UL555 and UL555S requirements and be factory mounted to the smoke damper.

Grilles & Registers: Provide as scheduled on the drawings or an approved equivalent.

FABRICATION:

Duct sizes are internal free area unless otherwise noted.

Shop fabricate ductwork of gages and reinforcement complying with SMACNA "HVAC Duct Construction Standards".

Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers.

PART 3 - EXECUTION

INSTALLATION OF METAL DUCTWORK

Examine areas and conditions under which metal ductwork is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

Install metal ductwork in accordance with SMACNA HVAC "Duct Construction Standards". Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight and noiseless systems, capable of performing each indicated service. Install each run with minimum number of joints. Support ducts rigidly with suitable ties, braces, hanger straps and anchors of type which will hold ducts true-to-shape and to prevent buckling. Fabric and/or non-metallic hangers are prohibited.

Routing: Field verify duct route prior to any fabrication. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge duct. Overlap opening on 4 sides or round duct by at least 1-1/2". Fasten to duct and substrata. Where ducts pass through fire-rated floors, smoke walls, or partitions, provide in accordance with details and accepted industry practice.

INSTALLATION OF SMOKE DAMPERS:

General: Install smoke dampers in accordance with the manufacturers' installation instructions in order to maintain the UL listing.

INSTALLATION OF FLEXIBLE DUCTS:

Maximum Length: For any duct run using flexible ductwork, do not exceed 10 feet extended length. Install shortest possible length. For longer runs, use hard round duct.

Installation: Install in accordance with Section III of SMACNA "HVAC Duct Construction Standards, Metal and Flexible". No bends shall be made with center line radius of less than one duct diameter.

Supports for flexible and round runouts shall consist of wire (size per SMACNA) supported from structure with 4" wide sheet metal saddles that extend up 2/3 up the sides of the duct (minimum). Hem all edges of saddles. Fabric and/or non-metallic hangers/supports are prohibited.

END OF SECTION

SECTION 16010 ELECTRICAL - GENERAL PROVISIONS

PART 1 - GENERAL

APPLICATION

The work described hereunder shall be installed subject to the Contractual Conditions for the entire Specifications.

These provisions apply to all sections of Division 16 of this project except as specified otherwise in each individual section.

CORRELATION

This Section of the Specifications and its accompanying Drawings are made separate for the convenience of the General Contractor / Construction Manager in preparing his bid and in no way relieves the General Contractor / Construction Manager of his responsibility to correlate the work under this Section with that of all other trades as regards the items to be furnished by various Subcontractors, the exact location of all equipment and materials and the necessity of planning the work of all trades to avoid interference.

DESCRIPTION OF WORK

Furnish all labor, materials, equipment and incidentals required to complete all electrical work as specified in this Division and as shown on the Contract Drawings. Division 16 work shall include the installation of a complete and properly operating electrical system. This system required consists basically of, and is not limited to, the following:

Extend the distribution system for lighting and power including the necessary feeders, branch circuits, installation of and connection to lighting fixtures, devices, panelboards, transformers, switches, and all other equipment shown or specified, and the connection to motors, and other power loads furnished under separate divisions.

Extend the building ground system and provide special grounds as indicated.

Connect all control devices as indicated, including all line voltage connections to equipment provided under other sections of the Specification or by other trades.

Furnish and install all necessary access panels for work performed under this section.

Furnish and install the additional supervised fire alarm and detection system devices. Test, put into operation and certify these devices.

Refer to other Divisions of this specification for electrical requirements of factory installed motors, controllers, power supplies, etc. Electrical connections to equipment furnished as specified in other sections of these Specifications or shown on other than the Electrical Drawings shall be governed by this Division of the Specifications.

The bidder shall inspect the present jobsite conditions before preparing his bid. The submission of a bid will be considered evidence that such a visit and inspection was performed by the bidder and that he takes full responsibility for all factors governing his work.

The electrical work shall be complete, fully operational, and suitable in every way for the service required. Drawings are generally diagrammatic in nature and do not show all details, devices and incidental materials necessary to accomplish their intent. Therefore, it shall be understood that such devices and incidental materials required shall be furnished at no cost to the Owner.

RELATED WORK

Drawings and general provisions of Contract, including General Conditions, Supplementary General Conditions, and Special Conditions sections apply to work specified in Division 16.

The Contractor shall be aware that other divisions of these Specifications may apply to related work required to perform Division 16 requirements. All related work shall be performed in accordance with those divisions.

CONFORMANCE

If the Contractor takes no exceptions to these Specifications in the Submitted Bid, the Contractor will be held totally responsible for failure to comply.

Any exception to the Specification shall reference the affected paragraph(s), subject(s), and list benefit to the Owner.

The Owner reserves the right to have the Contractor replace installed material or equipment which does not comply with these Specifications at the Contractor's expense.

SUBMITTALS

Obtain approval before procurement, fabrication, or delivery of items to the job site. Submit manufacturers' data on the equipment listed below and as directed in other Sections of Division 16. Data shall be in the form of manufacturer's descriptive data sheets and engineering drawings and will be reviewed by the Engineer before materials and equipment are delivered to the work site. Review of the submittal by the Engineer is to check for general conformance to the design intent and will not relieve the Contractor of the responsibility for the correctness of all dimensions, conformance and the proper fitting of all parts of the work.

- Circuit Breakers
- Disconnect Switches
- Plugs Receptacles and Devices
- Lighting Fixtures
- Lamps and Ballasts
- Fire Alarm System and Devices and Installation Drawings*

* prepared by Manufacturer or System Supplier

Submit manufacturers' names and catalog numbers for the following materials:

- Conduit, Fittings, and Couplings
- Boxes and Fittings
- 600 Volt Wire and Cables
- Grounding Equipment

The Contractor shall thoroughly check the submittal for accuracy and compliance with the contract requirements. Shop drawings and data sheets shall bear the date checked and shall be accompanied by

the Contractor's statement that they have been checked for conformity to the Specifications and Drawings. Submittals not so checked and noted will be returned without review.

Deliver the entire electrical submittal to the Engineer complete and in one package. An incomplete submittal will be returned to the Contractor without review.

EQUIPMENT SUBSTITUTIONS

Substitutions that do not increase installation value will not be accepted.

Contractor proposed substitutions may result in necessary changes to the construction documents. Coordination effort due to Contractor proposed substitutions shall be the complete responsibility of the Contractor. All potential conflicts are to be addressed. The Contractor shall also be responsible for any work of any other trades made necessary by the substitution. All potential conflicts with other trades are to be addressed.

The Engineer's review of the proposed substitutions and coordination documents is for the benefit of the Owner and not the Contractor and does not relieve the Contractor of responsibility for making any corrections necessary to insure the Owner receives full benefit of the original design intent.

Detailed coordination documents shall be provided for any equipment that, in the opinion of the Engineer, materially differs from the design documents. This difference includes but is not limited to any equipment having:

- access requirements that differ from the design / specification
- operating characteristics that differ from the design / specification
- footprints or elevations that differ from the design / specification
- connection requirements or locations that differ from the design / specification
- venting or combustion air requirements that differ from the design / specification
- electrical characteristics that differ from the design / specification
- control requirements that differ from the design / specification
- hydronic characteristics that differ from the design / specification
- plumbing requirements that differ from the design / specification

Documentation shall include a detailed listing of all differences from the design / specification. Also included will be a detailed explanation as to why these differences should be considered equal or an improvement.

Any physical differences shall be coordinated with drawings. All Coordination Drawings shall be produced by a competent drafts person and shall be equivalent in quality, detail, and scope to the Construction Drawings.

Acceptance of the substitution as an equal will be the sole discretion of the Engineer. Items of necessary coordination or review omitted from the documentation shall be grounds for rejection of the substitution.

CODES, INSPECTION AND FEES

Comply with the indicated edition of the following codes and ordinances. Where specific edition is not indicated, comply with the latest published edition.

- NFPA 70 - 2008; The National Electrical Code
- NFPA 72 – 2006;The National Fire Alarm Code
- NFPA 90A – 2002; Standard for the Installation of Air Conditioning and Ventilating Systems
- NFPA 101 – 2006; The Life Safety Code
- NFPA 110 -2002; Standard for Emergency and Standby Power Systems

NFPA 111 – 2001; Standard on Stored Electrical Energy Emergency and Standby Power Systems
UL Standard 467; Electrical Grounding and Bonding Equipment
UL Standard 506; Enclosures
UL Standard 869; Electrical Service Equipment
ANSI C2 – 1994 - The National Electrical Safety Code
ANSI/NEMA MG 1 - Motors and Generators
ANSI/NEMA MG 2 - "Safety and Use of Electrical Motors and Generators"
IEEE Standard 446 - "IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications".
NEMA ICS 1 and 2, and IEEE 472
FBC 2007; The Florida Building Code (with 2009 Supplement)
FBC 2007; The Florida Fire Prevention Code
FBC 2007; The Florida Mechanical Code
FBC 2007; The Florida Plumbing Code
State and Municipal Codes and Requirements

Obtain all permits required. Contractor shall pay all fees for permits and inspections.

COMPLIANCE AND REVIEW

Within two weeks of the awarding of the contract, and before any work is commenced, the Contractor shall meet with all legal authorities having jurisdiction, review all materials and details of this project, and agree on any required revisions. A letter shall be forwarded to the Engineer listing the names, dates and place of such review and the revisions required. A copy of the letter shall also be sent to the reviewing authority.

TEMPORARY LIGHTING AND POWER

Provide temporary lighting and power during construction. The Contractor may utilize existing building distribution power for temporary and construction power. Temporary power shall be 120/240 volt, single phase.

Temporary wiring shall be done in a safe and neat manner. See Article 527 of the NEC.

Provide a minimum of one (1) 100 watt incandescent lamp for every 300 square feet of interior space being constructed.

Provide 30 amp, 120/240 volt single phase power points throughout the construction area such that a power point will be within fifty feet of where any saws, drills, or other electrical tool is being used. Each power point shall have a disconnecting safety switch.

Provide 20 amp receptacles with ground fault interrupting circuitry. Outdoor or otherwise exposed receptacles shall have weatherproof covers. Provide any necessary special outlets required.

Size temporary power conductors so that voltage drop is kept below 5% at maximum designed load at the delivery point.

RECORD DOCUMENTS

Prepare record documents. Record documents shall be complete and accurate and clearly show deviations to the Contract Drawings. Additionally, indicate major raceway sizes and routings, locations of all control devices, all equipment and locations to scale, and fuse and circuit breaker ratings and arrangements.

Prepare bound sets of equipment Operation and Maintenance Instructions. These instructions shall include the name and location of the system, the name and telephone number of the Contractor, and all subcontractors installing the system or equipment, and the name and telephone number of each local manufacturer's representative for the system or equipment.

Furnish bound copies of all test results required in other sections of this division.

GUARANTEES

Equipment (excluding lamps): one (1) year from final acceptance by the Owner. Materials and labor: one (1) year from final acceptance by the Owner.

All equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced and the unit(s) restored to service at no expense to the Owner.

In addition to the guarantee of equipment by the manufacturer the Contractor shall also guarantee such equipment for a period of one (1) year from final acceptance by the Owner. The Contractor's one (1) year guarantee shall be for equipment, materials, and labor.

The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision will be allowed.

Additional guarantee requirements specific to certain parts or assemblies or installations may be in the General and Special Conditions, or other Sections of these Specifications.

PART 2 - PRODUCTS

EQUIPMENT AND MATERIALS

Furnish materials or equipment specified by manufacturers named.

Materials furnished shall be new, undamaged and packed in the original manufacturer's packing.

All equipment and apparatus shall bear the seal of approval of the Underwriter's Laboratory where testing and listing performance criteria has been established for like items.

Protect equipment and materials from mechanical and water damage during construction. Suitable storage facilities shall be provided. Equipment shall not be stored out-of-doors.

All items to be installed shall be free of rust and dirt. Damaged materials and equipment shall be replaced by the Contractor at no cost to the Owner.

All electrical panels, enclosures, raceways, conduit, and boxes shall be fabricated of metal unless indicated otherwise.

EQUIPMENT AND MATERIALS STANDARDS

Design and fabrication of electrical equipment and materials:

The American National Standards Institute (ANSI)
The American Society of Mechanical Engineers (ASME)

The American Society for Testing and Materials (ASTM)
The Institute of Electrical and Electronic Engineers (IEEE)
The National Electrical Manufacturers Association (NEMA)
The Occupational Safety and Health Administration (OSHA)
The Underwriters Laboratories (UL)
The National Fire Protection Association (NFPA)

Comply with the latest edition and revisions of these codes and standards.

EQUIPMENT RATINGS

Horsepower and wattages of equipment shown on the Drawings are estimated and comply with a certain basis of design. It is the Contractor's responsibility to coordinate with, and furnish proper connections to equipment substituted and accepted as equivalent to the basis of design.

Conduit, wire, disconnects, fuses, and circuit breakers shall be sized to suit the horsepower and wattage of equipment actually furnished. However, conduit, boxes, wire or disconnects shall not be sized smaller than shown on the Drawings.

PART 3 - EXECUTION

QUALITY ASSURANCE

Installer's Qualifications: At least five years of successful installation experience on projects with electrical work similar to that required for this project.

Manufacturer's Qualifications: Manufacturers regularly engaged in the manufacture of electrical components and equipment of the types and sizes required, whose products have been in satisfactory use in similar service for not less than five years.

Electrical work shall be performed by experienced persons skilled in the trade.

Work shall be supervised by a licensed journeyman or master electrician who shall be on the job site at all times while work is in progress.

Work shall be done neatly and in keeping with good practice and conventions of the trade. The electrical installation shall be of high quality, and of the performance level associated with top level commercial electrical installations as determined by the Engineer and the National Electrical Code.

IDENTIFICATION

Provide laminated plastic nameplates for each panelboard, automatic transfer switch, safety disconnect, equipment enclosure and all other major pieces of equipment installed or modified as part of this contract.

Furnish all starters, disconnect switches and control panels with engraved name plates identifying the equipment served. Attach nameplates to equipment, aligned with structural features of equipment, with two pressure pins or #4 stainless steel screws, nuts, and lockwashers.

Identification of flush mounted panelboards and other cabinets shall be on the inside of the cabinet only.

Panelboards shall have typewritten directories with all loads thoroughly described for each circuit. Update existing panelboards and their directories to reflect new work.

CLEANING AND PAINTING

Clean all equipment and boxes thoroughly inside and outside at the completion of installation. Do not leave dirt and debris inside panelboard and equipment cabinets, device and junction boxes, etc.

Paint all exposed conduit and wiremold installed on painted surfaces to match surrounding surface. Paint exposed threads on conduits and touch up all scratches in galvanized pipe and fittings with a high quality cold galvanizing compound.

Touchup scratched or marred surfaces of lighting fixtures, panelboards, motor control centers, switchboards, etc. with paint furnished by the equipment manufacturer specifically for the purpose.

TESTS

Contractor shall test all wiring for shorts and all equipment for proper grounding before energizing. Equipment shall be thoroughly checked and adjusted for proper operation. Check motors for proper rotation before energizing and adjust if necessary.

END OF SECTION

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SECTION 16100 BASIC MATERIALS AND METHODS

PART 1 - GENERAL

SCOPE OF WORK

Furnish all labor, materials and equipment and incidentals required to construct and install the complete electrical systems as indicated on the Drawings and as specified in this Section.

STANDARD OF MATERIALS

All materials, equipment and apparatus covered by this specification shall be new, of current manufacture and shall bear the seal of approval of the Underwriters' Laboratories.

All equipment and materials shall have ratings established by a recognized independent agency or laboratory. The Contractor shall apply the items used on this project within the ratings and subject to any stipulations or exceptions established by the independent agency or laboratory.

All conduits and raceways, wire, devices, panelboards, switches, etc. of a given type shall be the product of one manufacturer.

SUBMITTALS

Manufacturer's data and shop drawings for all components, fixtures, assemblies and accessories indicated in this Division.

PART 2 - PRODUCTS

RIGID CONDUIT, TUBING AND FITTINGS

Rigid steel conduit: zinc coated, threaded type conforming to the requirements of Federal Specification WW-C-581, UL 6 and ANSI C80.1 standards. Zinc coating shall be applied to both inner and outer surfaces.

Intermediate metal conduit: hot-dipped galvanized, threaded type conforming to the requirements of Federal Specification WW-C-581, UL 1242 and ANSI C80.6 standards.

A fitted thread protector shall protect threaded ends from damage during shipment and handling.

Fittings for rigid steel and IMC conduit: zinc coated, threaded type, conforming to Federal Specification W-F-408.

Electrical Metallic Tubing (EMT): Federal Specification WW-C-563, UL 797 and ANSI C80.3 standards.

Fittings for electrical metallic tubing: Federal Specification W-F-408. Steel compression type, galvanized or cadmium plated, and suitable for location of installation. Conduit bushings shall be metallic with insulated throats. Insulating grounding type bushings shall be provided where required under "Grounding". EMT connectors shall be similar to T&B "Insuline" with completely insulated throats. Field applied insulated throats are not acceptable.

Rigid aluminum conduit: Federal Specification WW-C-540c, UL 6 and ANSI C80.5 standards.

Couplings, fittings, pipe straps and spacers used with aluminum conduit shall be fabricated of aluminum.

Acceptable Metal Conduit and Tubing Manufacturers:

EMT: Allied Tube & Conduit Co.
Republic Steel Corp.
Triangle PWC, Inc.

Fittings: Steel City
Thomas & Betts (T&B)
Raco Inc.

FLEXIBLE METAL CONDUIT, COUPLINGS AND FITTINGS

Flexible metal conduit for dry interior applications: Federal Specification WW-C-566 and UL 1, continuous, spiral wound galvanized steel type.

Fittings (connectors) for flexible metal conduit: UL E 23018. Squeeze Type, malleable iron zinc plated.

Flexible metal conduit for damp or exterior applications: liquid tight, UL listed, spiral wound galvanized steel with PVC outer jacket.

Fittings for liquid tight conduit: Federal Specification W-F-406. Provide cadmium plated, malleable iron fittings with compression type steel ferrule and gasket sealing rings and insulated throats.

Acceptable Metal Conduit and Fittings Manufacturers:

FMC: Alflex Corp.
American Flexible Conduit Co.
Anaconda Metal Hose, ANAMET Inc.

FMC Fittings: Steel City
Thomas & Betts (T&B)
Raco Inc.

Wall and Floor Seals: O-Z/Gedney Co.
Spring City Electrical Mfg. Co.
Chase Technology Corp.

CONDUIT MOUNTING EQUIPMENT

Hangers, rods, backplates, beam clamps etc. shall be hot-dipped galvanized iron or steel. They shall be as manufactured by the Appleton Electric Co., Thomas and Betts Co., Unistrut Corp., or approved equal.

JUNCTION BOXES

Sheet Steel Outlet Boxes: conform to UL 514A, "Metallic Outlet Boxes, Electrical", UL 514B, "Fittings for Conduit and Outlet Boxes, Covers, and Box Supports", and NEMA OS1, "Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports".

Sheet Steel: Flat-rolled, code gauge galvanized steel.

Acceptable Manufacturers: Sheet-steel boxes shall be manufactured by RACO, Steel City or equal.

All junction boxes and pull boxes shall be sized per NEC requirements and be of the proper NEMA classification for the locations where they are installed. Where boxes occur above other than lift-out ceilings, access panels must be provided.

Wet location covers shall meet NEC wet location requirements (shall comply with NEC 2005 Article 406.8 (B)(1)). Covers shall mount vertically or horizontally and be of gasketed heavy-duty polycarbonate construction with clear cover with lockable hasp for 1/8" shank lock

OUTLET BOXES

Switch, receptacle and wall or ceiling mounted junction boxes shall be the 4" X 2 1/8" square type. Tile, dry wall, or flat cover plates for one or two devices shall be furnished for each box as required.

LIGHTING FIXTURE BOXES

Lighting fixture boxes shall be the 4" X 1 1/2" octagonal type.

OUTDOOR BOXES

Cast Aluminum Boxes: exposed, exterior locations; copper free aluminum, threaded raceway entries, and features and accessories suitable for each location including mounting ears, threaded screw holes for devices, and closure plugs.

Boxes shall have a rear opening in addition to necessary top and bottom openings. Boxes shall be provided complete with a minimum of two closure plugs and self-threading ground screw. Boxes shall have a thermoset, baked enamel silver gray finish. Weatherproof cover plates for one or two devices shall be furnished for each box as required.

Covers shall be of heavy duty die-cast construction. Mounting screws shall be stainless steel. Covers shall have a thermoset, baked enamel silver gray finish and be equipped with a sealing gasket. Covers shall be equipped with a hasp-type locking tab.

Nonmetallic boxes shall be thermoplastic or polyester fiberglass types as manufactured by Carlon or Pass & Seymour.

LOCATION OF OUTLETS

The approximate locations of outlets, etc. are shown on the drawings. The exact locations shall be determined at the building.

CONDUIT BODIES

Conduit bodies shall be constructed of galvanized or cadmium plated malleable iron or copper-free aluminum. Galvanized steel or aluminum covers and gaskets shall be supplied.

LB's 3" and greater shall be mogul type with domed covers.

CONDUCTORS

Compliance: Provide wires, cables and connectors that comply with the following standards as applicable:

UL Standard 83	Thermoplastic Insulated Wires and Cables
UL Standard 486A	Wire Connectors and Soldering Lugs for Use with Copper Conductors

UL Standard 854	Service Entrance Cable
NEMA/ICEA WC-5	Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
NEMA/ICEA WC-8	Ethylene Propylene Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
IEEE Standard 82	Test procedures for Impulse Voltage Tests on Insulated Conductors

Wire and cable manufactured more than twelve months before delivery to the jobsite shall not be used.

All conductors shall be soft-drawn copper of not less than ninety-eight percent (98%) conductivity, with NEC Type THW, THHN, or THWN for No. 4 and smaller, and Type RHW, THW, or THWN for No. 2 and larger, 600 volt insulation.

Jackets: Factory applied nylon or PVC external jacketed wires and cables for installation in raceways and where indicated.

Color coding of all ungrounded service, feeder, and branch circuits conductors shall be required according to the following convention:

- 120/208 Volt, 3 phase: black, red, and blue
- 277/480 Volt, 3 phase: yellow, brown and orange

Ground wires shall be green and neutrals shall be white. Green and white shall be used for these purposes only.

Conductors No. 12 AWG through No. 10 AWG may be solid or stranded, and No. 8 AWG and larger shall be stranded. No conductors smaller than No. 12 AWG shall be used except as otherwise noted.

Control conductors shall be No. 14 AWG Type TW, stranded unless indicated otherwise.

Multi-conductor control cable shall be stranded copper, 600 volt polyvinyl chloride insulated and jacketed Type PNR.

Acceptable manufacturers: Anaconda Wire and Cable Co., General Electric Co., Okonite Co., Southwire Co., or Rome Cable Co.

CABLE AND WIRE SPLICES

General: the materials shall be compatible with the conductors, insulations and protective jackets of the respective cables and wires. Use connectors with ampacity and temperature ratings equal to or greater than those of the wires upon which used.

In locations where moisture might be present, the splice shall be watertight and submersible.

Connectors: UL 486A. Aluminum and aluminum alloy fittings will not be accepted. Connectors shall be plated with tin or tin alloy.

Conductor Sizes No. 6 AWG and Larger: Splices in conductors shall be made with indenter, crimp connectors and compression tools or with bolted clamp type connectors to insure a satisfactory mechanical and electrical joint.

WIRE AND CABLE MARKERS

Wire and cable markers shall be "Omni-Grip" as manufactured by W.H. Brady Co., or equal.

RECEPTACLES

Receptacles shall be furnished and installed where shown on the drawings and shall conform to the following requirements:

Grounding type duplex receptacle: rated 20 amperes, 125 volt, 2 wire, 3 pole with grounded shunt (yoke permanently grounded to third clip), NEMA Configuration No. 5-20R, and conforming to Federal Specification W-C-596F (submit proof of compliance).

All receptacles listed on the drawings shall be specification grade receptacles.

All exterior devices shall be designed for the application and shall be installed in a waterproof enclosure with proper cover.

Acceptable manufacturer: Eagle, GE, Hubbell, Leviton or Pass and Seymour.

SWITCHES

Flush, enclosed type, specification grade, rated at 20 amperes, 120/277 volts, alternating current only, quiet operation, and shall comply with Federal Specification W-S-896F (submit proof of compliance). Switch housing shall be color coded for current rating.

Acceptable manufacturer: Eagle, GE, Hubbell, Leviton or Pass and Seymour.

Motor switches with inherent thermal overload protection shall be Square D, Type F for flush or surface mounting as required by the location of the unit. Units shall be furnished with pilot lights as indicated.

DEVICE PLATES

All plates for switch, receptacles and telephone outlets located on finished walls shall be UL listed stainless steel with the number of gangs required for the application. All plates for outlets located on unfinished walls or on conduit type fittings shall be zinc coated sheet metal with rounded or beveled edges.

Weatherproof plates shall be of stainless steel, gasketed, sized with twin covers for duplex receptacles, and weatherproof switch for switch plates.

Device plates shall be factory engraved where indicated on the drawings. Letters shall be black filled.

RELAYS

Relays shall be electrically held and operated. Relays shall be mounted in a NEMA 1 enclosure. The contactors shall be capable of switching inductive and resistive loads.

CIRCUIT BREAKERS INSTALLED IN EXISTING PANELS

Circuit breakers installed in existing panels shall have an A.I.C. rating equal to that of the panel in which they are installed.

SAFETY DISCONNECT SWITCHES

Compliance: NFPA 70 National Electrical Code, UL 98, "Enclosed and Dead Front Switches", NEMA Publication KS1, "Enclosed Switches", and NEMA KS 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)".

Safety switches shall be provided for all motors and equipment indicated or required by the National Electrical Code.

Safety switches shall be Type "HD" (heavy duty) unless noted otherwise, fused or non-fusible as indicated with number of poles as shown or required. Safety switches for equipment may be non-fused only if equipment is UL tested with circuit breaker protection.

Fuses: general use, dual element time-delay, current limiting. Manufactured by Bussman, Littlefuse, Edison, or equivalent.

Safety switches for indoor general purpose application shall be NEMA 1 and for exterior application shall be NEMA 3R.

Acceptable manufacturer: provide safety switches manufactured by Cutler-Hammer, Square D, or Siemens.

Construction: Gray baked enamel finish. NEMA 3R enclosures shall be manufactured from galvanized steel.

Ratings: Fusible disconnects shall be 240 or 600 volt rated depending on the service voltage.

Fusible disconnects shall be furnished with Class R fuses of the indicated ampere rating (up to 600 amps) and be equipped with rejection clips.

Fusible disconnects shall be UL listed for 200,000 RMS symmetrical ampere short circuit current when equipped with Class R or Class L fuses.

Lugs shall be front removable and be UL listed for aluminum or copper conductors at 60 degrees C or 75 degrees C.

Disconnect switches shall be horsepower rated.

GROUNDING AND BONDING

Conductors: type THW, THHN/THWN, or RHW to match power supply wiring.

Bonding Jumper Braid: copper braided tape, constructed of 30 gage bare copper wires and properly sized for application.

Flexible Jumper Strap: flexible flat conductor, 48,250 circular mils, with copper bolt hole ends sized for 3/8" diameter bolts.

NAMEPLATES

Nameplates: 0.125 inch thick laminated plastic; white and black finish; rectangular shaped; minimum of 1.0 X 2.5 inches with 0.25 inch high block style engraved lettering

PART 3 - EXECUTION

RACEWAY INSTALLATION

All interior and above grade exterior wiring shall be installed in a metal conduit and all embedded in concrete or below grade wiring shall be in PVC conduit unless indicated otherwise on the drawings.

Exterior low voltage (less than 50 volts) wiring may be installed in liquid tight, non-metallic flexible conduit ("Sealtite") where installation is above grade and not subject to damage.

No conduit smaller than 1/2 inch electrical trade size shall be used, nor shall any have more than three 90 degree bends in any one run. Pull boxes shall be provided as required or directed.

No wire shall be pulled until the conduit system is complete in all details.

The ends of all conduits shall be tightly plugged to exclude dust and moisture during construction.

Conduit support shall be spaced at intervals of 8 ft. or less, as required to obtain rigid construction.

Single conduits shall be supported by means of two-hole pipe clamps. Multiple runs of conduits shall be supported on trapeze type hangers with steel horizontal members and threaded hanger rods. The rods shall be not less than 3/8 inch diameter. The channel shall be not less than 1 1/2" nominal size.

Conduit hangers shall be attached to structural steel by means of beam or channel clamps.

All conduits on exposed work shall be run at right angles to and parallel with the surrounding walls and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduit shall be run straight and true.

Conduit terminating in sheet steel boxes shall have double locknuts and insulated bushings.

Flexible metal conduit shall be used for all motor terminations and other equipment where vibration is present. Flexible conduit length shall not exceed 1'-6" in length for this application.

Provide expansion coupling every 100 feet for long runs of conduit and at concrete expansion joints. Provide ground bonding jumpers around expansion couplings, used on metallic conduit, sized according to Table 250-122 of the NEC.

Transitions from below grade to above grade shall be with rigid galvanized steel long sweep nineties with a bituminous coating where in contact with earth or concrete. Area of transition shall not be subject to standing puddles of water.

Seal all wall penetrations to watertight condition. Finish as applicable to location.

Approval by the Engineer shall be required to install conduit in structural members.

In general, the conduit installation shall follow the layout shown on the plans. This layout is, however, diagrammatic only, and where changes are necessary due to structural conditions, other apparatus or other causes, such changes shall be made without additional cost to the Owner. It is recognized that branch circuit routing shown on the drawings may not always be the most economical or the most feasible method. Routing may be changed by the Contractor subject to the following provisions:

Conduits shown routed overhead may not be installed in or below slabs or in walls.

Not more than three circuits may be installed in any one conduit. Care must be taken to provide the appropriate number of neutrals where two or three circuits are on the same phase.

All conduit shall be concealed unless otherwise noted on the drawings.

Exposed conduit will be permitted only as shown on the drawings. Exposed conduit shall be run parallel with or at right angles to the building walls.

All empty conduits shall be provided with a plastic pull wire.

Conduit stub-ups at panels shall be secured in place by use of Unistrut and clamps.

Conduit and tubing shall be kept at least twelve (12) inches from parallel runs of flues, steam pipes or hot water lines.

Telephone and data raceways shall be 3/4" minimum.

Where exposed connections to motors and equipment from overhead conduits are made without benefit of a wall for conduit mounting, the connection shall consist of vertical conduit (minimum size 1") from Type "LL", "LR" or "TT" Unilet to floor flange. Connection to equipment shall be with flexible liquid-tight from Type FDT boxes located in the vertical conduit.

Flexible conduit in all areas subject to moisture shall be liquid-tight flexible conduit.

All electrical connections to vibration isolated equipment shall be made with flexible conduit.

Connections to indoor dry type transformers shall be made with weatherproof flexible conduit.

All conduit entering the building shall be suitably sealed to prevent the entrance of moisture.

All conduit passing through a structural expansion joint shall be provided with a UL approved expansion joint fitting and bonded as required by the National Electrical Code.

RACEWAY INSTALLATION - CONDITIONS

Conduit raceways shall be installed as indicated herein. Where more than one type of raceway is listed under one condition, the Contractor may exercise his option of the raceway used. Conditions of raceway installation are as follows:

Exposed Raceway Below 8'-0" from Finish Floor and in Areas Subject to Moisture: Rigid galvanized steel conduit.

Raceway Concealed Overhead, or in Walls: Rigid galvanized steel conduit, intermediate metallic conduit or electrical metallic tubing (EMT).

Raceway Concealed in Ground Outside Building: Schedule 40 PVC or rigid steel. Rigid steel conduits installed below slab-on-grade or in the earth shall have a factory-applied PVC coating, two coats of a coal-tar system, or shall be field-wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50-percent overlay.

Final Raceway Connection to Recessed Fixtures in Accessible Locations: Flexible steel conduit maximum of 6'-0" long.

Final Raceway Connection to Pumps, Motors, Transformers, Etc.: Liquid-tight flexible steel conduit maximum of 1'-6" long.

Raceway That Extend Through the Slab or Above Finish Grade: 90° elbows, nipples and couplings of rigid galvanized steel or IMC shall be used where any raceway extends through the slab or above finished grade. In general PVC conduit shall not be allowed above finished slab inside the building or within 1 1/2' of finished grade outside the building.

WIRING

All conductors shall be carefully handled to avoid kinks or damage to insulation.

All wires, cables and each conductor of multi-conductor cables shall be uniquely identified at each end by color or with wire and cable markers. Lighting and receptacle wiring shall be distinctly differentiated and junction boxes marked.

Lubrications shall be used, if required, to facilitate wire pulling. Lubricants shall be UL approved for use with the insulation specified.

Neutral wires shall be pigtailed to receptacles so that a receptacle can be removed for replacement without the neutral connection to other receptacles on the circuit being disconnected.

Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

When stranded wire is used for receptacle and lighting circuit, connections to the devices shall be made using vinyl insulated "Sta-Kon" connector terminals.

All 600 Volt wire insulation shall be tested with a "megger" after installation. Tests shall be made at not less than 500 Volts.

OUTLET BOXES

Outlet boxes for flush mounted lighting fixtures shall be accessible. If lighting fixture is in a non-accessible ceiling the box shall be accessible when the fixture is removed.

Set boxes plumb and such that their device mounting plane is within 1/8" of the finished wall.

Surface mounted boxes and wiremold boxes, both new or existing, shall be painted to match surrounding surfaces.

Above ceiling sub-system boxes shall be labeled and color coded. Junction box covers shall be color coded. The following conventions shall be used:

Fire alarm	RED
HVAC Controls	BLUE
Telephone	GREEN

The location of boxes on the electrical plans is approximate. Review drawings for specific location or if not shown center and align within architectural detail. The Engineer shall reserve the right to move boxes during rough in.

DEVICES

Unless indicated otherwise on the drawings all light switches shall be mounted with the centerline of the device 48" above the finished floor. Pits are the exception to this requirement.

Unless indicated otherwise on the drawings or in the specifications all receptacles shall be mounted with the centerline of the device 18" above the finished floor. Pits are the exception to this requirement.

Receptacles shall be installed with the grounding contact at the top. Where receptacles are required to be mounted horizontally they shall be installed with the neutral contact at the top.

Mount all devices so that the cover plate edges are in contact with the wall and are parallel to building features.

DISCONNECTS

Motor circuit disconnects shall be mounted within fifty feet and in sight of the load being served.

Disconnects shall be labeled in accordance with Section 16010.

Safety disconnects for fire alarm service shall be factory painted red, with engraved plastic nameplate identifying the circuit.

GROUNDING

Ground all non-current carrying metal parts of the electrical system to provide a low impedance path for ground fault current. Route ground connections and conductors to ground and protective devices in shortest and straightest paths as possible.

Insulated grounding bushings shall be required for all raceways, service entrance panels, distribution panels, all raceways one inch and larger and any raceway entering a concentric knock-out.

In general a ground wire shall be installed in every conduit. The conduit installation itself shall serve as an additional grounding means.

Where there are parallel feeders installed in more than one raceway, each raceway shall have a ground conductor.

Where conduits terminate without mechanical connection (i.e., locknuts and bushings) to panelboards, and for all terminations of conduit sizes one inch and larger; and for all sizes of metallic conduit (rigid or flexible) terminating in concentric knockouts, the following procedure shall be followed: Each conduit shall be provided with an insulated grounding bushing and each bushing connected with a bare copper conductor to the ground bus in the electrical equipment. The ground conductor shall be in accordance with Article 250 of the NEC.

Grounding conductors shall be attached to equipment with a bolt or sheet metal screw used for no other purpose. Use crimp-on spade lugs for stranded conductors.

IDENTIFICATION

Equipment identification shall be made using engraved laminated plastic plates (indented tape labels will not be permitted). Characters shall be white on a black background and 1/4" high minimum. Plates shall be secured to the panels by means of screws or metal pressure pins. Cement, by itself, will not be acceptable. All nameplates shall be mounted on the outside surface of the piece of equipment.

Individually enclosed safety switches, circuit breakers, and motor starters, pull boxes, control cabinets and other such items shall be identified indicating load, electrical characteristics, and source. For example, a disconnect switch for a 7-1/2 horsepower, 208 volt, 3 phase air handling unit, Number 8 feed from Panel "MDP", Circuit Number 2 shall be labeled as follows:

AHU-8
7-1/2 HP, 208V, 3Ø
Cir: MDP-2

Distribution panels, panelboards, and transformers shall be identified indicating panel designation from the drawings, electrical characteristics and source. For example, a 277/480 volt 3 phase panel "LPA" feed from "MDP" Circuit No. 3 shall be labeled as follows:

LP-A
277/480V, 3Ø
(Feeder: MDP-3)

All enclosures containing energized components shall be marked with mylar labels identifying hazards. Such warning messages as "WARNING-HAZARDOUS VOLTAGE", 480 VOLTS", "240 VOLTS", etc. are acceptable. Labels shall be EZ-Code by Thomas & Betts or similar product.

Junction Box Identification: Each junction box cover shall be labeled with a permanent "magic" marker or other means to identify the circuits within. For example, a junction box containing lighting circuits 21, 23, 25 from Panel L2A would be labeled "L2A-21,23,25". Telephone junction boxes shall be labeled "T". Fire alarm system junction boxes shall be labeled "FA". Public address and other system junction boxes shall be labeled accordingly.

All raceways leaving the service entrance panel and distribution panels shall be clearly marked as to their circuit number. For example, a conduit containing conductors for Panel MDP, Circuit No. 5 would be marked MDP-5. Empty conduits shall be marked "empty".

FIREPROOFING

All conduit and boxes passing through or installed within fire walls and smoke walls shall be installed so as to maintain the integrity and rating of the wall through which it passes. Boxes shall be installed within 1/8" of wall surface. Conduits penetrating rated floors shall be installed to maintain the fire rating of the floor using UL approved sealing materials.

END OF SECTION

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SECTION 16500 LIGHTING

PART 1 - GENERAL

SCOPE OF WORK

Lighting fixtures shall be furnished and installed as shown on the plans and as specified here.

SUBMITTALS

Submit product data for each type of lighting fixture and emergency lighting unit specified. Assemble and bind with separate sheet for each fixture type with all specifications of the proposed fixture, including all accessories clearly indicated on each sheet. As a minimum include the following data and requirements for approval:

1. Complete photometric data.
2. A description of construction details of the proposed fixture.
3. A comparison picture (for evaluating appearance) of the proposed fixture.

Submit product data for each type of lighting fixture even if furnished exactly as specified.

The Engineer will not consider any substitute fixtures unless the submittal is complete in every detail as stated above.

In addition to the above stated requirements the Engineer may require the delivery of a production fixture sample to the Engineer's office for inspection.

Substitute fixtures shall be equal to or superior to specified fixtures in every detail in order to be approved.

PART 2 - PRODUCTS

LIGHTING FIXTURES

Compliance: NFPA 70, NFPA 101, NEMA LE1 and LE2, and UL 486A. Comply with applicable local codes and regulations for emergency lighting and exit signage.

Lighting fixture types shall be as shown on the Drawings. The catalog numbers listed are given as a guide to the design and quality of fixture desired. Equivalent designs and equal quality fixtures of other manufacturers shall be considered by the Architect for approval (see **SUBMITTALS** section above).

LAMPS

Fluorescent lamps: medium bi-pin, energy saving cool white type unless indicated otherwise on the Drawings. Color temperature - 4100 degree K. Color rendering index (CRI) - 85 or greater.

Compact fluorescent lamps: 4100 degree K cool white type unless indicated otherwise. Color rendering index (CRI) - 85 or greater.

Incandescent lamps: soft white, inside frosted. Lamps shall be rated 130 volts for long life.

All lamps of a given type shall be by one manufacturer.

Acceptable manufacturer: Osram Sylvania Inc., General Electric Company, North American Phillips, Inc. or Westinghouse.

BALLASTS

Fluorescent ballasts: totally discrete electronic, high frequency, energy saving Class P, sound rated A, rapid or programmed start, high power factor type, and listed by Underwriters Laboratories, Inc., for operation on 120/277 volts or as indicated on the Drawings. Electronic ballasts shall be physically interchangeable with standard core and coil electromagnetic ballasts.

Regulatory Requirements: applicable ANSI and IEEE standards including ANSI C82.11 and ANSI/IEEE C62.41 Category A; UL listed Class P and CSA Certified; ballast shall comply with all applicable state and federal efficiency standards. Provide fluorescent lamp ballasts which comply with Certified Ballast Manufacturers Association standards and carry the CBM label.

<u>Performance Requirements:</u>	frequency	20kHz or greater
	THD	10% or less
	power factor	0.98 or greater
	crest factor	1.5 or less
	noise rating	Class "A"
	operating voltage	95 to 140VAC
	temp. rise	25 degrees C (over 40 degree C ambient)

Ballasts shall be compatible with occupancy sensors.

PCB's: the ballasts used on the project shall not contain polychlorinated bi-phenyls (PCB's).

Warranty: five (5) years.

Acceptable manufacturers: Advance, Sylvania Electric Products, Inc., Motorola, Universal, or General Electric Company.

PART 3 - EXECUTION

INSTALLATION

Each fixture shall be a completely finished unit with all components, mounting and hanging devices necessary, for the proper installation of the particular fixture in its designated location and shall be completely wired ready for connection to the branch circuit wires at the outlet.

When fixtures are noted to be installed flush, they shall be complete with the proper accessories for installing in the particular ceiling involved. All flush mounted fixtures shall be supported from the structure and shall not be dependent on the hung ceilings or ceiling grids for their support.

Support recessed troffer fixtures from each corner using steel suspension wires to the structure.

Install flush mounted fixtures to eliminate light leakage between fixture frame and finished surface.

Install emergency units plumb and level with ceilings and walls and in accordance with NFPA 101 Life Safety Code. Install units to provide sufficient and complete coverage of the required area. Adjust aiming and secure position with mechanisms provided.

INSTALLATION QUALITY ASSURANCE

All fixtures shall be left in a clean condition, free of dirt and defects, before acceptance by the Architect.

All fixtures shall operate properly, with no noticeable noise, flicker or other difficulty, and all lamps shall operate properly and with no color shift before acceptance by the Engineer. Fluorescent lamps which exhibit any darkening shall be replaced.

END OF SECTION