SECTION 230100 – BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The Work of this Division affects and is affected by the Work of other Divisions. Review each portion of the Contract Documents including General and Supplementary Conditions, Addenda, Drawings and Division 1 through Division 33 Specification Sections to determine the extent of the Work of this Division and the work of the various Division 23 Sections.

B. All work shall meet Florida Building Code 2007 and Florida Mechanical Code 2007 including the standards listed in the individual sections.

1.2 MECHANICAL CONTRACTOR QUALIFICATIONS

A. The Owner intends to award this contract to a Bidder competent to perform and complete the work described in this Division and the Drawings in a satisfactory and timely manner. All Bidders and any subcontractors to the Bidder must be qualified at the time of bid opening.

B. A Bidder shall be a State licensed Class A or B Mechanical Contractor for commercial work.

C. Mechanical Contractor must have a current Florida Mechanical Contractor's license and been in business for a minimum of 3 years.

D. The Mechanical Contractor shall demonstrate experience on new construction projects, by submitting three projects completed within the last 3 years each having a minimum mechanical construction value of $100,000. Submit forms at the end of this section as part of the bid.

E. The Mechanical Contractor shall have a current minimum bond rating of $200,000.

F. The Mechanical Contractor's permanent home office shall be located within 150 miles of the project site.

G. The Architect/Engineer shall reserve the right to disqualify any Subcontractor who does not, in their sole opinion, meet the above minimum requirements. The Mechanical Contractor shall provide qualified Subcontractors as part of the bid.

1.3 DESCRIPTION OF WORK

A. The work to be performed under this division includes, but is not necessarily limited to, the following:
1. Ventilating and exhaust fans.
2. Ductwork – Non-Metal.
3. Grilles, registers and diffusers.
4. Furnish starters and motor controllers.

B. Work not included in this Division: The following work is specified in other sections of the specifications:
1. Finish painting except as specifically included herein.
2. Electric work except as specifically included herein.

1.4 TECHNICAL DEFINITIONS

A. Specific items of terminology, as used herein, shall have the following meanings:

1. "Work" includes all materials, labor, equipment and operation required for complete and proper installation.
2. Bidders: “Bidders” are individuals, corporations, contractors, sub-contractors, suppliers or others who have an interest in proposing to provide, in behalf of the Owner, a portion of or all of the Work defined by the Contract Documents and who submit bids to the Owner or to others for portions of the Work. Bidders are expected to have reviewed and to have become sufficiently familiar with ALL of the Contract Documents to allow submittal of an accurate bid. For renovations, Bidders are required to visit the project site to determine the extent of the work.
3. Contractor: The “Contractor” is the individual or corporation whose proposal to provide, in behalf of the Owner, the Work defined by the Contract Documents has been accepted by the Prime Contractor or Owner and who has entered into a Contractual Agreement wit the Prime Contractor or Owner to complete the Work. The phrase “Contractor” or “Mechanical Contractor” in this Division and associated Drawings includes individuals, corporations, contractors, sub-contractors, suppliers or others who, through the Bidding process, have agreements with the Contractor, directly or through others, for performance of portions of the Work. The division of responsibilities of the trades performing the Work of this Division is left to the Contractor.
4. Prime Contractor: The “Prime Contractor” is the individual or corporation who has entered into a contractual agreement with the owner to complete all of the work of the contract documents. “Contractor” includes the Mechanical Contractor and any Sub-Contractors under contract to perform the work of this Division. “Prime Contractor” shall mean the General Contractor, Construction Manager or similar firm that holds the direct contract for all work of the Contract Documents with the Owner.
5. "By Other Trades" or “Under Other Divisions” shall mean by persons or parties responsible for work at the project other than the party or parties who have been duly awarded the contract for the work of this Division. In the event that this document is used to acquire work as part of a general construction contract the words "by other trades", etc. shall mean by persons or parties who are not anticipated to be the Mechanical Contractor for work of this Division working together with the Prime Contractor. In this context the words "by other trades", etc. shall not be interpreted to mean not included in the overall contract.

1.5 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS

A. As used in the drawings and specifications, certain non-technical words shall be understood to have specific meanings as follows:

1. "Furnish" shall mean purchase and deliver to the project site complete with every necessary appurtenance and support.
2. "Install" shall mean unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project.
3. "Provide" shall mean "furnish" and "install".

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item,

regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. It shall be understood that the specifications and drawings are complementary and are to be taken together for a complete interpretation of the work. Exceptions are those notes on the drawings, which refer to an individual element of work, take precedence over the specifications where they conflict with same.

D. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or items of equipment are to be omitted.

E. The drawings of necessity utilize symbols and schematic diagrams to indicate various items of work. Neither of these items have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed, in accordance with the diagrammatic intent expressed on the electrical and mechanical drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.

F. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

G. Certain details appear on the drawings that are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the indicated work.

H. Information as to the general construction shall be derived from structural and architectural drawings and specifications only.

I. The use of the word in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

J. In the event that extra work is authorized, and performed by this trade, work shown on drawings depicting such work, and/or described by addendum is subject to the base building specification in all respects.

1.6 DRAWINGS AND SPECIFICATIONS

A. It is the intent of drawings and specifications to obtain a complete and satisfactory installation.

B. Separate divisional drawings and specification shall not relieve the Contractor from full responsibility of compliance with the work indicated on any of the drawings or in any division of the specification.

C. Contractor shall carefully examine the architectural, structural, electrical and mechanical drawings and specifications prior to submitting bid.

D. The Contractor is required to furnish, install and connect with appropriate services all items shown on any of the drawings without additional expense to the Owner.

E. The Architect/Engineer shall be notified of any discrepancies, omissions, conflicts or interferences that occur between drawings or between drawings and specifications. If such notification is received in adequate time additional data or changes will be issued by addendum to all bidders.

F. Architectural and structural drawings take precedence over mechanical drawings with reference to building construction.

G. Mechanical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit.

1.7 APPROVED MATERIALS

A. Materials or products specified herein and/or indicated on drawings by trade name, manufacturer's name and/or catalog number shall be provided as specified. Substitutions will not be permitted except as described herein in Supplementary and General Conditions.

B. For approval of products other than those specified, bidders shall submit to the architect a request in writing at least ten (10) days prior to bid date and hour. Requests received after this time will not be reviewed or considered regardless of cause. Requests shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data list of references or other information necessary to completely describe the item. Approval will be in the form of an addendum to the specifications issued to all prospective prime contract bidders on record. The addendum will indicate the additional products that are approved for this project.

C. A list of all materials and equipment that the Contractor proposes to furnish shall be submitted for approval within ten (10) days after the contract has been let. Data shall be complete in all respects.

D. Where such approved substitution or deviation requires different quantity or arrangement of foundations, supports, ductwork, piping, wiring, conduit, and any other equipment or accessories normal to this equipment, Contractor shall furnish said changes and additions and pay all costs for all changes and additions and pay all costs for the changes to the work and the work of others affected by this substitution or deviation.

E. Deviations mean the use of any listed Approved Manufacturer other than those on which the drawings are based.

1.8 USE OF EQUIPMENT OTHER THAN BASIS OF DESIGN

A. The mechanical drawings indicate equipment in the schedules as basis of design. Other manufacturers are listed in the specification sections. All other manufacturers must be submitted to the Engineer for review prior to bid. Any proposed substitution must follow Division 1 and requirements of other Divisions. All costs for reviewing substituted equipment will be paid by the contractor. Engineering costs related to the substitution will be paid by the contractor at $125.00 per hour.

B. The drawings (electrical, structural, architectural, etc) are based upon the products listed in the mechanical schedules (basis of design). Any product provided other than the basis of design may impact the requirements of other

disciplines. The mechanical contractor is responsible for (and shall include in the base bid price) any and all costs related to the substituted equipment. These costs may include engineering review, construction document modifications (supplemental instructions), construction costs for work of other Divisions (particularly electrical), and other associated costs. Engineering costs will be paid by the contractor at the rate of $125.00 per hour. Coordinate with other Contractors regarding impact of substituted equipment prior to bid.

C. The construction documents contain design intent that may or may not be immediately apparent. All other intended physical and aesthetic requirements (stated or not) of the construction documents shall apply to the equipment intended for use. This includes appearance, clearance, access, and concealment requirements.

1.9 COORDINATION OF MECHANICAL WORK

A. Refer to other Divisions for general coordination requirements. The contract documents are diagrammatic in showing certain physical relationships of the mechanical work and the interface with other work, including utilities and electrical work. Final coordination is the responsibility of the Contractor.
   1. Arrange mechanical work in a neat, well-organized manner. Piping and services shall run parallel to primary lines of the building construction, at a minimum of 7'-0" clearance.
   2. Locate operating and control equipment for ease of access. Arrange mechanical work with required clearances for access for operation and maintenance.
   3. Advise other trades of openings required in their work.
   4. Give right-of-way to piping which requires a slope for drainage.

B. NEC Required Clearances: All mechanical equipment with serviceable electrical components at 120v and greater (including but not limited to starters, disconnects, fuses, relays, etc.) shall be installed with allowable NEC clearances. Refer to NEC for the required clearances (which are often greater than 36”). For cramped mechanical spaced with electrical panels, submit coordination drawings showing mechanical and electrical equipment and their respective service and NEC clearances.

C. Do not locate anything within the NEC required service areas required by existing electrical components.

1.10 QUALITY ASSURANCE, STANDARDS AND SYMBOLS, QUALIFICATIONS

A. Administration: Refer to other Divisions for administrative/procedural requirements to comply with codes and standards. For the mechanical work, standards are specified in individual sections.

B. Installation: For fabrication, installation and testing of work of this Division, use trained, skilled mechanics and experienced workmen familiar with items required and manufacturer's recommended methods of installation. Perform work in the best workmanlike manner. In acceptance of installed work, the Architect/Engineer will make no allowance for lack of skill on the part of the workmen. A competent supervisor shall direct the proper and prompt execution of the work.

C. Code Compliance: Materials or equipment data sheets shall indicate compliance with industry standards, such as the American National Standards Institute

(ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratories (UL), American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the Florida Building Code, latest edition, Florida Administrative Code (FAC). Symbols: Except as otherwise indicated, refer to the "ASHRAE Handbook of Fundamentals" for definitions of symbols used on the drawings to show mechanical work.

1.11 SHOP AND ERECTION DRAWINGS AND SAMPLES

A. Submit required and/or requested shop drawings and erection drawings, and obtain written approval of same before ordering or installing any equipment or material. Equipment or material ordered or installed without written approval may not be accepted.

B. Shop drawings shall consist of manufacturer's scale drawings, cuts or catalogs, including descriptive literature, which shall clearly indicate the construction, material, physical dimensions, and complete operating data clearly marked for each item. Data of general nature will not be accepted.

C. Indication of “Approved” on the shop drawing review does not relieve the contractor of the responsibility to comply with all requirements of this specification.

1.12 SUBMITTAL REQUIREMENTS

A. Submittal data is required for each Section of this Division.

B. Submittals for this section:
1. Firm qualifications for this project at time of bid.
2. Foreman’s resume and experience for this project.
3. Mechanical system identification.

C. All data shall be submitted to the Engineer at one time; partial submittals will not be accepted. Submit in individual vinyl-covered 3-ring binders. The front cover of the binder shall contain the project name and the GRAEF job number from the drawings. Index each section using the format from the Project Specifications.
1. Each section of the submittal shall begin with a "Submittal Identification Sheet" (last page of this specification section) with a complete list of all items in that section. Failure to follow this procedure shall result in rejection of the submittal by the Engineer. This list shall also contain the following information:
a. Model numbers and summary descriptions.
b. The number of pages submitted for each item.
c. Space for Engineer's review stamp for each item.
d. Names of Project, Contractor, Sub-Contractors and Suppliers of Equipment.

The submittal shall be formatted in this manner in order to facilitate timely review by the Engineer. Engineer shall review submittal data no more than two times. Additional submittal review time shall be paid by Contractor under the base bid at a minimum rate of $125.00/hour.

D. Refer to other Divisions for administration of submittals. For mechanical work, the following quantities are required for each category of submittal, unless otherwise indicated.

1. Shop Drawings: 6 sets, including 2 for maintenance manuals.
2. Product Data: 6 sets, including 2 for maintenance manuals.
3. Warranties (Guarantees): 6 copies, including 2 for maintenance manuals.
4. Manuals: 2 final copies, including flow diagrams, maintenance instructions, operating instructions, parts listings, and copies of other submittals indicated for inclusion.

E. Maintenance Manuals: Thirty days prior to Substantial completion, furnish two operation and maintenance manuals with index and thumb-tab marker for each section of information; bind in 3-ring, vinyl-covered binder. Label binder with "OPERATION AND MAINTENANCE MANUAL," the name and location of the project, the name of the Contractor, and the contract number. Include the names, addresses, and telephone numbers of each subcontractor installing the equipment. Include a list of all equipment and the supplier with address and telephone number. Include a table of contents and assemble to conform to the Project Manual (specifications) with the tab sheets before instructions covering the subject. Instructions shall be legible and easily read, fold large sheets of drawings. The manual shall include: wiring and control diagrams, detailed explanation of operation and control of each item of equipment; description of the function of each principal item of equipment; installation instructions; maintenance instructions; lubrication schedule including type, grade, temperature range and frequency; safety precautions, diagrams and illustrations; test procedures; performance data; and parts lists. The manual shall be complete, including all equipment, controls, accessories and associated appurtenances.

1.13 RECORD DRAWINGS

A. Contractor is instructed to refer to section covering General Conditions of this specification.

B. During the course of construction the Contractor shall keep an accurate record of all deviations and changes of the work as indicated on the drawings and its actual installation.

C. Prepare one set of "as-built" reproducible drawings indicating a record of construction revisions and changes from the contract drawings.

D. Upon completion of the work and within 30 days after acceptance by the Architect, the Contractor shall furnish to the Owner a revised and final set of reproducibles and a set of CADD diskette and prints showing all work as installed.

2. PART 2 - PRODUCTS AND MATERIALS

2.1 GENERAL: When a specified or indicated item has been superseded or is no longer available, the manufacturer's latest equivalent type or model of material or equipment as approved by the Engineer shall be furnished and installed at no additional cost to the Owner.

2.2 ELECTRICAL PROVISIONS OF MECHANICAL WORK

A. The electrical provisions of mechanical work, where indicated to be furnished integrally with mechanical work, can be summarized (but not by way of limitation) to include the following: 1) Motors, 2) Motor starters, 3) Electrical work specified

as mechanical work in the HVAC control system, and 4) Drip pans to protect electrical work.

B. Starters, Switches: See schedules for starter and switch requirements.

C. Motors: Motors shall be high efficiency type rated for the intended use and installed environment.

D. Drip Pans: Where possible, do not run mechanical piping directly above electrical (or electronic) equipment which is sensitive to moisture; otherwise provide drip pans under mechanical piping. Locate pan below piping, and extend 6" on each side of piping and lengthwise 18" beyond equipment. Fabricate pans 2" deep, of reinforced sheet metal with rolled edges and soldered or welded seams; 20 gage copper, or 16 gage steel with 2 oz. zinc finish hot dipped after fabrication. Provide 3/4" copper drainage piping, properly discharged. Mechanical piping or duct shall not pass above any electrical panels without providing required structure to adequately separate and provide protection to panels, ductwork, and/or pipes.

3. PART 3 - EXECUTION

3.1 COORDINATION WITH OTHER TRADES

A. Coordinate work of this Division with work of other trades to avoid interferences and delays. Assist in working out space requirements to make a satisfactory installation.

B. If work of this Division is installed before coordinating with other trades, or so as to cause any interference with work of other trades, the necessary changes in the work to correct the condition shall be made promptly and without extra charge.

C. Furnish to other trades, as required, all necessary templates, patterns, settings plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

D. See other Sections for responsibilities of mechanical contractor prior to test and balance.

3.2 PAINTING: Refer to individual sections for painting of mechanical work.

3.3 DISCREPANCIES: In the event of discrepancy, work shall cease and the Architect/Engineer shall be notified immediately.

3.4 CLOSING-IN OF UNINSPECTED WORK: Do not allow or cause any of the work in this Section to be covered up or enclosed until it has been inspected, tested, and approved by the Architect/Engineer and by all authorities having jurisdiction.

3.5 MECHANICAL WORK CLOSEOUT

A. Refer to other Divisions 1 sections for general closeout requirements.

B. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Operate each item of equipment and each system in a test run of appropriate duration (with the Architect/ Engineer and the Owner's operating personnel present) to demonstrate

sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system, and replace excessively worn parts and similar expendable items of the work.

C. Operating Instructions: Conduct a walk-through instruction for the Owner's personnel to be involved in the continued operation and maintenance of mechanical equipment and systems. Explain the identification system, operational diagrams, sequencing requirements, security, safety, efficiency and similar features of the systems. Review the sequence of control of all mechanical equipment with Owner's personnel at time of walk-through.

D. Turn-Over of Operation: At the time of final completion, turn over the prime responsibility for operation of the mechanical equipment and systems to the Owner's operating personnel.

3.6 GUARANTEES AND CERTIFICATIONS

A. All work shall be guaranteed to be free from leaks or defects. Any defective materials or workmanship as well as damage to the work of all trades resulting from same shall be replaced or repaired as directed for the duration of stipulated guarantee periods.

B. The duration of guarantee periods following the date of beneficial use of the system shall be one year. Beneficial use is defined as operation of the system to obtain its intended use.

C. The date of acceptance shall be the date of final payment for the work or the date of a formal notice of acceptance, whichever is earlier.

D. Certification shall be submitted attesting to the fact that specified performance criteria are met by all items of heating and air conditioning equipment.

3.7 ENGINEER’S SUBSTANTIAL COMPLETION OBSERVATION

A. Contractor Preparation:
1. All equipment and controls shall be operational. Systems commissioning and start up forms shall be completed and submitted to Architect/Engineer. Contractor’s initial handwritten test and balance report shall be submitted.
2. The Contractor shall contact the Architect/Engineer to schedule a substantial completion site observation. The Engineer shall perform the observation within 72 hours of the notice of observation. It is the Contractor’s sole responsibility to plan for and schedule this observation.

B. The Contractor shall walk the site with the Architect/Engineer and assist in providing ladders, flashlights, and access to equipment.

C. Documents: The Contractor shall have a red lined set of AS-BUILT information that has been edited as equipment is installed.

D. Record start-up/commissioning information as required in other Sections.

E. At the successful conclusion of the walk-through, the Contractor and Architect/Engineer shall sign the inspection form on the AS-BUILT drawings. It is the Contractor’s sole responsibility to plan for and schedule this observation.

F. As a minimum, the following shall be completed prior to issuance of substantial completion:
   1. All systems and controls operational.
   2. Initial test and balance complete and hand written report issued.

G. Any deficiencies shall be fixed immediately and a re-observation shall be scheduled. Any visits after the first observation shall be paid by the Contractor to the Engineer ($750/visit) prior to the Engineer's revisit.

3.8 FINAL ACCEPTANCE OBSERVATION

A. Contractor shall carefully read all applicable sections of these specifications and prepare and assemble necessary test reports, maintenance manuals, certificates, guarantees, letters of instruction, etc. that are required. See other Sections for pump start-up/commissioning forms.

B. These documents shall be delivered to the Architect's / Engineer's office at least 48 hours before requesting final acceptance observation for work covered under this division of the specifications.

C. Contractor's representatives responsible for work under this division shall be present at time of acceptance inspections and shall furnish required mechanics, tools and ladders to assist in the inspection.

D. A list of items to be corrected as a result of acceptance inspection will be furnished to the contractor. Notify Architect / Engineer in writing of any items appearing on list of correction that are disputed by Contractor. When ready, request in writing a re-inspection of work.

E. Should items appearing on substantial completion list remain uncorrected at time of final acceptance inspection and additional final inspections are required to ascertain completion these additional inspections will be paid by Contractor at rate of $125.00 per hour to Engineer whose time is involved. This amount will be paid by the Contractor or deducted from the Contractor's final payment and paid to the Engineer by the Owner.

END OF SECTION 230100

SUBMITTAL IDENTIFICATION SHEET

PROJECT: _____

CONTRACTOR: _____ SUBCONTRACTOR: _____

SPECIFICATION REFERENCE: _____ SUBSECTION PARAGRAPH: _____

NO. OF PAGES OF SUBMITTAL: _____ ITEM: _____

MANUFACTURER: _____ MODEL #: _____

REQUEST FOR SUBSTITUTION: _____ ITEM AS SPECIFIED: _____

OPTIONS / ACCESSORIES INCLUDED: _____

DEVIATIONS FROM SPECIFICATIONS: _____

ADDITIONAL REMARKS: _____

ENGINEER'S COMMENTS: _____

REVIEW STAMP

SHOP DRAWING REVIEW

ENGINEER'S REVIEW

☐ APPROVED	☐ REJECTED / RESUBMIT	☐ SUBMITTTAL NOT REQUESTED
☐ SUBMITTAL NOY RECEIVED, CONTRACTOR TO SUBMIT		
☐ APPROVED AS NOTED	☐ NO ACTION REQUIRED	☐ REVISE AS NOTED, RESUBMIT

Review or approval is limited to general conformance with the design concept of the Project and general compliance with information stated in the Contract Documents and does not extend to means, methods, techniques, sequences, or construction procedures. Review or approval shall not relieve Contractor from responsibility for errors and omissions in the Shop Drawings or from obligations to comply with the requirements of the Contract Documents. Approval of a specific item shall not indicate approval of an assembly of which the item is a component. Contractor is solely responsible for: dimensions to be verified at the Project site; information pertaining solely to the fabrication process; coordination of the Work of all trades; and performing all Work in a safe and satisfactory manner and in compliance with the requirements of the Contract Documents.

GRAEF

Date: By: