

DIVISION 15 - MECHANICAL

SECTION 15000 - GENERAL MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this Section.

1.02 SUMMARY

- A. The Contractor shall furnish all labor, materials, tools and equipment and perform all work and services necessary for a complete and properly operating mechanical work, equipment and systems, as shown in drawings and as specified in accordance with provisions of the Contract Documents and completely coordinated with work of all other trades.
- B. The Contractor shall completely examine the Contract Documents and shall report to the State any error, inconsistency or omission he discovers prior to submitting a bid.
- C. Furnish and install all supplementary or miscellaneous items, details, appurtenances and devices incidental to or necessary for a sound, secure and complete mechanical system where work required is not specifically indicated.
- D. Drawings and specifications shall be taken together. Provide work specified and not indicated or work indicated and not specified as though mentioned in both.
- E. The Contractor shall warrant that all materials and equipment furnished under this Contract will be new and that all work will be good quality, free from faults and defects and in conformance with Contract Documents for a guaranteed period of 1 year.
- F. The Contractor shall maintain at the site one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other modifications in good order and marked to record all changes made during construction. These shall be made available to the Engineer at all times.
- G. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the work, he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials and shall clean all new equipment and accessories.

- H. The Contractor shall give the State timely notice of its readiness for testing any work including the data arranged so that the Engineer may observe such testing. The Contractor shall bear all cost of such tests.

1.03 SUBMITTALS

- A. Submit shop drawings, manufacturers' data and certificates for equipment, materials, finish and pertinent details for each system and have them approved before procurement, fabrication or delivery of the items to the job site. Partial submittals will not be acceptable and will be returned without review. Partial submittal for long lead equipment shall be accepted prior to complete submittal. Submittals shall include the manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable industry and technical society publication references and other information necessary to establish contract compliance of each item the Contractor proposes to furnish.
- B. Shop Drawings: Drawings shall be 24 inches by 36 inches in size, except as specified otherwise. Drawings shall include floor plans, sectional views, installation details of equipment; and equipment spaces identifying and indicating proposed location, layout and arrangement of items of equipment, accessories, piping and other items that must be shown to assure a coordinated installation. Drawings shall indicate adequate clearance for operation, maintenance and replacement of operating equipment devices. If equipment is disapproved, drawings shall be revised to show acceptable equipment and be resubmitted.

The Contractor shall review, stamp with his approval and submit, all Shop Drawings required by the Contract Documents or subsequently by the State as covered by modifications. At the time of submission, the Contractor shall inform the State in writing of any deviation in the Shop Drawings from the requirements of the Contract Documents. By approving and submitting Shop Drawings, the Contractor certifies that he has determined and verified all field measurements and obstructions, field construction criteria, materials, catalog numbers and similar data, that he has checked and coordinated each Shop Drawing with the requirements of the work and of the Contract Documents and that all equipment fits within designated spaces.

- C. Manufacturers' Data: Submittals for each manufactured item shall be manufacturers' descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves and catalog cuts. Submittals shall include equipment certification terms and conditions, applicable self-diagnostic testing and start-up procedures. Equipment submittals shall specifically indicate the specified equipment assembly configurations with all specified standard and optional features, above and beyond general catalog products technical literature.
- D. Standards Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI),

American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA) and Underwriters Laboratories (UL), American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) proof of such conformance shall be submitted to the State for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable test and is approved by the State. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product and the referenced standard and shall simply state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

- E. Certified Test Reports: Before delivery of materials and equipment, certified copies of all test reports specified in the individual section shall be submitted for approval. Furthermore, submit a written certificate, dated and signed by an authorized corporate officer of the Contractor who is either a full-time employee, principal, or a full-time partner delegated with the authority to bind the Contractor in all matters relating to its professional work of the Contractor, evidencing the performance of any portion of the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Corporate credentials shall be furnished concurrently with applicable written certificates. Whenever a regulatory agency performs inspections or tests of any portion of the work, a written certificate shall be furnished by the Contractor to validate the results from the respective inspection test.
- F. Certificates of Conformance or Compliance: Submit all certificates applicable to all specified equipment assemblies and parts for the Engineer's approval prior to equipment delivery and commencement of equipment on-site installation. A certification from the manufacturer attesting that materials and equipment to be furnished for this project complies with the requirements of this specification and of the referenced publications. Preprinted certifications will not be acceptable; certifications shall be in the original. The certification shall not contain statements that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as"; "achieve the same end use and result as materials formulated in accordance with the referenced publication," "equal or exceed the service and performance of the specified material." The certification shall simply state that the product conforms to the requirements specified. Furthermore, submit a written certificate, dated and signed by an authorized corporate officer of the Contractor who is either a full-time employee, principal, or a full-time partner delegated with the authority to bind the Contractor in all matters relating to its professional work of the Contractor, evidencing the performance of any portion of

the work, or any testing; as a condition precedent to the acceptance of any work or the result of any test. Corporate credentials shall be furnished concurrently with applicable written certificates. Whenever a regulatory agency performs inspections or tests of any portion of the work, a written certificate shall be furnished by the Contractor to validate the results from the respective inspection test.

- G. Manufacturers' Certified Full Standard Product Warranty: Submit the manufacturer's certified Full Standard Product Warranty terms and conditions applicable to all specified equipment assemblies and parts for the Engineer's approval prior to equipment delivery and commencement of equipment on-site installation, as approved by the Engineer. All manufacturers' Full Standard Product Warranty certificates are to be provided to the State at the time of equipment delivery and prior to the commencement of equipment on-site installation. The warranty and maintenance service shall extend for a period of 2 years commencing after 30 consecutive days of trouble-free operation after the Project Acceptance Date or as authorized by the Contractor, if earlier than the Project Acceptance Date.

Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of 1 year from project acceptance.

- H. Operation and Maintenance Manuals: Submit manuals on all equipment and the overall system upon successful completion of equipment on-site installation and start-up and prior to final inspection, as approved by the Engineer.
- I. Manufacturers' factory trained and certified service personnel: Prior to the equipment on-site installation, submit to the State documentation as evidence of the respective manufacturers' certification of all personnel responsible for installation, testing, and start-up of the equipment.

1.04 LAWS, REGULATIONS AND CODES

- A. All work shall be in accordance with government laws, ordinances, rules and regulations and orders.
- B. The following shall govern where applicable; the Uniform Plumbing Code, International Building Code, State of Hawaii Department of Health Regulations, Applicable National Fire Protection Association Standards, OSHA, Rules and Regulations and all other codes and standards referenced in these specifications. Where requirements differ in these codes and standards, the more stringent shall apply.

1.05 TRADE NAME

- A. Mentioning of a trade name in the plans and specifications indicates that the manufacturer is acceptable to the State. However, certain specified construction and details may not be regularly included in the manufacturer's catalogued product. The

Mechanical Contractor shall provide the material or equipment complete as specified.

1.06 PERMITS AND INSPECTIONS

- A. Applications for permits will be done by the State. The Mechanical Contractor shall pay for all necessary permits and fees.
- B. The Mechanical Contractor shall apply and pay for all necessary inspections required by any public authority having jurisdiction.

1.07 DISCREPANCIES

- A. The Drawings and Specifications are intended to be cooperative. Any materials, equipment or system related to this section and exhibited on the Electrical or Mechanical Drawings but not mentioned in the Specifications are to be executed to the intent and meaning thereof, as if it were both mentioned in the Specifications and set forth on the Drawings.
- B. In case of differences between the Drawings and Specifications, the Specifications shall govern first, and then the Drawings. Large scale details shall take precedence over small scale Drawings as to the shape and details of construction. Specifications shall govern as to materials.
- C. Drawings and Specifications are intended to be fully cooperative and to agree but should any discrepancy or apparent difference occur between Drawings and Specifications or should error occur in the work of others affecting the work, the Contractors shall notify the Engineer at once. If the Contractor proceeds with the work affected without instructions from the State, he shall make good any resultant damage or defect. All interpretations of Drawings and specifications shall be clarified by the State.

1.08 WORKMANSHIP AND MATERIALS

- A. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. The Contractor shall furnish the services of an experienced superintendent, who will be constantly in charge of the erection of the work, until completed and accepted.
- B. Unless otherwise hereinafter specified, each article of its kind shall be the standard product of a single manufacturer.
- C. Whenever the words "or approved equal" or other words of similar intent or meaning are used, implying that judgment is to be exercised, it is understood that it is the judgment of the Engineer that is referred to.

- D. The Engineer shall have the right to accept or reject material, equipment and/or workmanship and determine when the Contractor has complied with the requirements herein specified.
- E. All manufactured materials shall be delivered and stored in their original containers. Equipment shall be clearly marked or stamped with the manufacturer's name and rating. 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.
- F. Reference to standards are intended to be the latest revision of the standard specified.

1.09 MANUFACTURER'S RECOMMENDATIONS

- A. Equipment installed under this Division of the Specifications shall be installed according to manufacturer's recommendations, unless otherwise shown on the drawings or herein specified. 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 the installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can cause rejection of the material.

1.10 INSPECTION OF SITE

- A. This Contractor shall visit the site and examine the conditions affecting his work before submitting his proposal. The submission of the proposal shall be considered evidence that the Contractor has visited the site and no extra payments will be allowed to the Contractor on account of extra work made necessary by his failure to visit the site. If there are any questions or discrepancies in the design, the Contractor shall bring it to the attention of the Engineer before submitting his proposal.

1.11 CONTINUITY OF SERVICES, PHASING

- A. Examine site and become familiar with existing local conditions affecting work.
- B. Examine all Drawings and Specifications (i.e. work from other trades) and become familiar with the types and systems of construction to be used. Determine how such types and systems will affect the installation of mechanical work.
- C. Investigate, determine and verify locations of any overhead utilities on or near the site. Determine such locations in conjunction with all public and private utility companies and with all authorities having jurisdiction.

1.12 OPENINGS, CUTTING AND REPAIRING

- A. The Mechanical Contractor shall cooperate with the work to be done under other sections in providing information as to openings required in walls and slabs for all piping including sleeves where required.
- B. Any drilling or cutting required for the performance of work under this Section shall be the responsibility of this Contractor and the cost shall be borne by him.
- C. Holes in Concrete: The Mechanical Contractor shall pay all costs for cutting holes. All holes through existing concrete shall be either core drilled or saw cut. All holes required shall have the approval of the Engineer prior to cutting and drilling.
- D. It shall be the responsibility of this Contractor to ascertain that all openings are properly located.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. As specified in all sections of DIVISION 15 -MECHANICAL.
- B. Materials and equipment shall be cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be the manufacturer's latest design that complies with the specifications requirements. Materials and equipment shall be duplicate items that have been in satisfactory commercial or industrial use at least 2 years prior to bid opening. Where two or more items of the same class of equipment are required these items shall be products of a single manufacturer; however, the component parts of the items need not be the products of the same manufacturer. Each item of equipment shall have the manufacturer's name, address, model number and serial number on the nameplate.
- C. The mechanical contractor shall provide all necessary options and/or accessories to comply with the applicable equipment specification requirements. Installation of the options and/or accessories shall be in accordance with the manufacturer's requirements and the complete assembly shall be warranted by the respective equipment manufacturer.
- D. The Mechanical contractor shall provide certified manufacturer's representatives and/or service technicians for any field modification to mechanical equipment. The Contractor shall ensure that any modification to the equipment will not invalidate the manufacturer's warranty

2.02 SUBSTITUTIONS

- A. The materials, products, and equipment described in these specifications establish a standard of required function, quality, dimension, capacity, performance and appearance to be met by any proposed substitution.
- B. Specific product listings in these specifications shall not preclude alternative product selections of equivalent or superior quality. Contractor may make reasonable substitutions, provided that these are submitted to the Engineer for acceptance in accordance with the SPECIAL PROVISIONS and the INTERIM GENERAL CONDITIONS. The Contractor shall be responsible for design changes to accommodate the substituted product, at no additional cost to the State.

PART 3 – EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

- A. Provide competent and qualified manufacturer's factory trained and certified field service personnel on-site to be responsible for execution of all diagnostic testing in accordance with equipment manufacturer's installation and start-up certification requirements and warranty terms and conditions. Perform work using adequate numbers of personnel skilled in the appropriate trades, and provide adequate supervision and management of the work.
- B. All workmanship shall be of the highest standard. The piping systems shall be laid out to insure a neat, systematic and orderly arrangement of all work. Vertical piping lines shall be plumb and lines that are grouped shall be parallel and as direct as possible. Exposed pipe where indicated, shall be run parallel with walls.

3.02 PROTECTION OF MATERIALS AND EQUIPMENT

- A. Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. Upon completion of all work the fixtures, materials and equipment shall be thoroughly cleaned, repainted as required, adjusted and operated.

3.03 CUTTING AND PATCHING

- A. The Contractor shall arrange for all cutting, fitting and patching necessary to accommodate the plumbing work as the job progresses and such cutting and patching shall be done by that trade experienced in the particular type of work required.

3.04 PIPING IDENTIFICATION

- A. Identification of all new pipelines shall be by means of colored, waterproof, all temperature, self-adhering labels and directional arrow.
- B. All exposed pipes, whether insulated or not shall be identified. Labels may be omitted from piping where the use is obvious, due to its connection to equipment and where the appearance would be objectionable in finished rooms, as approved by direction.
- C. Identification labels shall be placed as follows:

Near each valve and branch connection.

Wherever piping merges or disappears from view from the floor of the room in which it is installed.

Labels shall not be more than 50 feet apart.

3.05 EQUIPMENT IDENTIFICATION

- A. Identify all equipment with symbol and service conforming to that indicated on the drawings. Identification shall be on 1-1/4 inch by 3 inch laminated plastic nameplates securely fastened to the equipment. Leave manufacturer's nameplate clean, legible, and unpainted.

3.06 COORDINATION OF WORK AS SPECIFIED IN OTHER SECTIONS

- A. The Mechanical Contractor is responsible for coordination with the General Contractor to assure proper layout, size, and location of mechanical equipment. Mechanical Contractor shall ensure that power and control wiring are provided and installed.

3.07 INSPECTIONS

- A. All work and materials are subject to field observation at any and all times by the Engineer.
- B. Contractor shall notify the Engineer a minimum of two days prior to testing any piping which must be witnessed and approved before they are covered up or enclosed. Should the Contractor fail to notify the Engineer at the times prescribed, it shall then be the Contractor's responsibility to make accessible any concealed lines or demonstrate the acceptability of any part of the system. Any extra cost caused by the removal of such work shall be borne by the Contractor.

- C. If observer finds any material or work not conforming to these Specifications, Contractor within three days of being notified shall remove said materials from the premises and replace with approved material, at no cost to the State.

3.08 OPERATIONAL ACCEPTANCE TESTS

- A. The Mechanical Contractor shall perform all tests of the installed work and shall provide all services, labor, equipment, materials and instruments needed for the tests. During pressure tests all items in the system to be tested, not designed for test pressures, shall be removed or isolated from the system and shall be reconnected or unblocked after tests are completed. Should operating tests require the presence of manufacturers' representatives, the Mechanical Contractor shall cooperate with them and shall place at their disposal all assistance, materials and services required to perform such test. The Mechanical Contractor shall certify in writing that all work has passed all required tests and shall complete the attached Operational Performance Tests form.

3.09 INSTRUCTION TO STATE PERSONNEL

- A. The Contractor shall furnish 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 or system specified. Each instructor 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 and turned over to the State for regular operation. The number of man-days (8 hours) of instruction furnished shall be as specified in other sections. When more than 4 man-days of instruction are specified, approximately half of the time shall be used for classroom instruction. All other time shall be used for instruction with the equipment or system. When significant changes or modifications in the equipment or systems are made under the term of the contract, additional instruction shall be provided to acquaint the operating personnel with the changes or modifications.

3.10 LOCAL TECHNICAL SUPPORT

- A. The mechanical equipment supplier shall have a Hawaii office within 500 miles of the project site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.
- B. The control system supplier shall have a Hawaii office within 500 miles of the project site, staffed with factory trained engineers fully capable of providing instruction, routine maintenance and emergency maintenance service on all system components.

3.11 SAFETY REQUIREMENTS

- A. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts located so that any person can come in close proximity thereto shall be fully enclosed or properly guarded. High temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of a type as specified herein.

Items such as catwalks, ladders and guardrails shall be provided where required for safe operation and maintenance of equipment.

3.12 CLEANUP AND REPAIRS

- A. Debris shall not be allowed to accumulate as a result of this work. Upon completion of this work, remove all debris and excess materials, tools, etc. resulting from this work from the jobsite and leave the location of this work broom-clean in a manner acceptable to the Contracting Officer.
- B. This Contractor shall clean all fixtures and equipment set by him of oil, grease, stains, etc. All plates, trim, etc. shall be polished. Traps and drains shall be clean and unobstructed.
- C. All fixture piping and lines shall be thoroughly cleaned before leaving the work.

3.13 FINAL INSPECTION

- A. Final inspection shall be requested by the Mechanical Contractor only after submittal of all required certificates. No final inspection will be made until all moving parts of equipment are properly guarded, all controls and safety devices tested and operative, all painting required done and the site cleaned up.

3.14 GUARANTEE

- A. The Mechanical Contractor shall guarantee the installation for a period of 1 year after 30 consecutive days of trouble-free operation after the date of acceptance of the project by the State against any defects due to faulty materials, equipment, workmanship or installation. Upon notice of defect, the Mechanical Contractor shall correct; replace defective item at no additional cost to the State.

3.15 TWO-YEAR GUARANTEE AND MAINTENANCE SERVICE CONTRACT

- A. In addition to the Guaranty on materials and workmanship, the Installer shall submit seven (7) copies of the Maintenance Service Contract, countersigned by the Contractor, that will validate the Guaranty.

- B. The Guarantee and maintenance service shall extend for a period of 2 years after 30 consecutive days of trouble-free operation after the Project Acceptance Date, or the Air Conditioning Equipment Acceptance Date if earlier than the Project Acceptance Date, and shall include all labor, materials, equipment and parts necessary to service the complete system, in accordance with the subsection 3.16 E. Maintenance Schedule, so as to assure proper operation and function of the system. All costs for the periodic maintenance, including emergency calls, shall be borne by the State. This maintenance period and the Guaranty period shall run concurrently (same start and end dates).

Trouble-free operation is defined as a non-disabling condition or a non-recurring failure or disruption and the following:

1. The system shall be free of all discrepancies, contamination and debris which require correction in excess to those described for the monthly service which is included in the Schedule of Maintenance.
 2. The system is maintaining operational conditions and other parameter as measured during acceptance tests.
- C. The Installer shall include a listing of the following items along with the Maintenance Service Contract:
1. Names of the servicing contractor.
 2. Air conditioning system acceptance date.
 3. Service contract expiration date.
 4. Monthly inspection schedule for the maintenance period.
 5. Itemized listing of the equipment covered under the service contract, including a description of the equipment identified, its model and serial number(s) and manufacturer's name(s).

Maintenance service contractor shall have a local office, staffed with competent and qualified manufacturer's factory trained and certified field service personnel and stocked with full inventory of replacement repair parts, to perform specified service and maintenance tasks on all equipment in accordance with the One-Year Maintenance Service Contract and terms and conditions of all equipment manufacturer's warranties and recommendations. Field service personnel shall be fully capable of providing technical assistance instruction, routine maintenance and emergency maintenance service on all system equipment components.

- D. The Maintenance Service Contract shall be submitted along with the Operations and Maintenance Manual on/or before the Project Acceptance Date.

Distribution of submittal:

1 copy: DAGS HDO

2 copies: User

2 copies: User's Facility Maintenance Agency

1 copy: DAGS, Technical Services Office

- E. Schedule of Maintenance Service: All service performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance task:

1. AIR HANDLING UNIT/FAN COIL UNIT

a. Monthly Service

- (1) Clean and clear all drip pans and flush all related condensate drain lines with nitrogen. Install pan tablets if necessary to control algae growth. (Note: Contractor may be liable for water damage due to clogged drains.)
- (2) Change all disposable air filters at least once a month; use Farr 30/30 or equal.
- (3) Wash permanent type filters with an approved detergent and spray coat with an approved filter treatment solution. Replace deteriorated permanent type filters which cannot be cleaned.
- (4) Lubricate and oil all fan and motor bearings and connections of dampers and vanes.
- (5) Check all drives for wear; adjust belt tension. Replace belt as required.
- (6) Operate equipment to check for proper operation, unusual noise and vibration; adjust or repair all equipment and controls as required; clean-up all equipment.
- (7) Check time clock for proper operation and time settings.
- (8) Certify performance of monthly services and that all discrepancies are reported and corrected.

b. Annual Service

- (1) Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves.

- (2) Clean cooling coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.
- (3) Check pressure and temperature differential across cooling coils and log readings. Clean strainers, check vents and drains on refrigerant lines.
- (4) Clean supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird screens.
- (5) Clean all fan wheels and interior and exterior of equipment housings.
- (6) Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.
- (7) Check and calibrate all pneumatic and/or electric temperature controls.
- (8) Certify performance of annual service and that all discrepancies are reported and corrected.

2. TEMPERATURE CONTROLS

a. Quarterly Service

- (1) Check control devices for proper operation, sticking stems, and calibration; repair/replace weak or broken springs and all other parts.
- (2) Adjust thermostat to maintain 55F supply air temperature.
- (3) Certify performance of quarterly maintenance service and that all discrepancies are reported and corrected.

3. SPLIT DX AIR-COOLED AIR CONDITIONER

a. Monthly Service

- (1) Perform the tasks of Item a. Air Handling Unit/Fan Coil Unit.
- (2) Check compressor oil level and refrigerant sight glass; add oil as needed and change filter/drier if moisture indicated.
- (3) Check refrigerant system for leaks, unusual noise and vibration and record suction, discharge and oil pressures and maintenance log book and correct and report all deficiencies.

b. Annual Service

- (1) Perform the tasks of item a. Air Handling Unit/Fan Coil Unit.
- (2) Check compressor coupling alignment; lubricate or replace noisy bearings.
- (3) Clean cooling and condenser coils of dirt accumulation using nitrogen, high pressure air/water, steam or chemical coil cleaner solution.
- (4) Test compressor crankcase oil and replace if contaminated or submit oil test results. clean or replace strainer and oil filter (open compressor).
- (5) Test and check system response at various cooling load conditions for proper operation, record settings, adjust as required. Recalibrate all safeties, capacity, and temperature controls to proper settings.
- (6) Check and clean all unit housing (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint.
- (7) Megger (electrical test to measure wire insulation resistance, i.e. condition) compressor motor and submit report and recommendation; check starter, relays, and control contacts and electrical connections for tightness and clean as required.

F. WORK SCHEDULE

All maintenance work shall be performed between the hours of 7:30 a.m. to 4:00 p.m., on normal working days, Monday through Friday, excluding State Holidays.

G. TROUBLE CALLS

Emergency service and repairs required between regular service calls shall be rendered within 24 hours after the Contractor is notified, non-work days excluded.

H. MAINTENANCE REPORT/CHECKLIST:

The Contractor shall prepare and maintain a maintenance service report/checklist which shall include the following:

1. Date maintenance service was performed.
2. The name of the mechanic who performed said maintenance.
3. The type and cost (labor, materials, parts and equipment) of repair work performed on the unit, if any.

4. Documents and other data pertaining to the maintenance performed.

It will be the responsibility of the Contractor to maintain the report/checklist by recording the above noted data after each scheduled maintenance and emergency repairs and have the checklist available for inspection at the building site. The report shall be sufficiently detailed to properly reflect the past maintenance history of the equipment. See attached service maintenance report form.

Reports shall be certified by a representative of the facility being served and shall be submitted at the completion of the service contract.

I. CLEANUP AND WORK PRACTICES

The Contractor shall keep the job site free of debris, litter, discarded parts, etc. and shall clean all oil drippings during the daily progress of work. The Contractor shall remove all tools, parts and equipment from the service areas upon completion of the work. The Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to the ceilings, roofing and other building structure. The Contractor shall restore all damages, caused by his negligence, to its original condition at his own expense.

All costs for periodic maintenance services and for emergency calls shall be included in the lump sum bid price.

- J. The Maintenance Service Contract does not include repairs resulting from vandalism, negligent use or misuse of equipment.

3.16 OPERATION AND MAINTENANCE MANUAL

- A. Submit three (3) hard bound copies of the Operating and Maintenance Manual on all equipment and the system as a whole. The manual shall identify project name and number, Contractor, consultant, date and all equipment provided, It shall include the equipment manufacturer's name, model and serial number, tag no., capacity, quantity of units, their location and area (room) served and shall include the manufacturer's operation and maintenance manuals including control and wiring diagrams and source of service and replacement parts. When standard manufactures' brochures are used, adequately indicate (highlight, arrow, etc.) the project related information and delete (X or cross-out) the non-applicable information.

- B. Distribution of submittal:

1 copy: User

2 copies: User's Facility Maintenance Agency

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

- A. Work under this section will not be measured nor paid for separately but shall be considered incidental to and included in the price bid for the various items of work in this project.

END OF SECTION