

# MECHANICAL OUTLINE SPECIFICATIONS

## I. Section 15010 - Basic Mechanical Requirements

- A. The work of each of the mechanical sections includes furnishing and installing the material, equipment, and systems complete as specified and/or indicated on the drawings. The mechanical installations, when finished, shall be complete and coordinated, ready for satisfactory service of the building.
- B. All work under this contract shall be done in strict accordance with all applicable municipal, state, NFPA, BOCA codes and County Public Work, that govern each particular trade.
- C. The contractor shall make applications and pay all changes for all necessary permits, licenses and inspections as required under the above codes. Upon completion of the work, the customary certifications of approval shall be furnished.
- D. No materials or equipment shall be used in the work until approved. Before submission of the shop drawings, and not more than fifteen (15) days after award of the contract, the contractor shall submit for approval a complete list of materials and equipment which he intends to furnish, giving manufacturer and catalog numbers.
- E. The contractor shall examine all drawings and specifications and shall. Failure to comply with this requirement will not relieve the contractor of responsibility for complying with the intent of the contract documents.
- F. The drawings indicate the general arrangement of the mechanical installations. Details of proposed and other changes due to actual field conditions or other causes shall be submitted for approval prior to installation. Reworking of completed items due to improper field coordination shall be at the contractor's expense.
- G. Provide sufficient access and clearance for all items of equipment requiring servicing and maintenance, such as valves, drains, vents, etc.
- H. The contractor shall prepare three (3) copies of a record and information booklet. The booklet shall be bound in a three-ring loose-leaf binder. Provide the following data in the booklet:
  - 1) Catalog data on each piece of equipment furnished.
  - 2) Approved shop drawings on each piece of equipment furnished.
  - 3) Maintenance, operation and lubrication instruction on each piece of equipment furnished.
  - 4) Simplified temperature control diagram.
  - 5) Manufacturer's and contractor's guarantees.
  - 6) Air balancing reports.
  - 7) Commissioning reports.
  - 8) Schedule/description of all service work/maintenance inspections required by paragraphs P, Q and R of this section.
- I. The entire new plumbing system shall be tested hydrostatically before insulation covering is applied and proved tight under the following gauge pressures:
 

Sanitary and vent piping	As specified below
Domestic water	100 psig
Fire protection	Per NFPA
- J. All sanitary and vent piping shall be tested by the contractor. The entire new drainage system and venting system shall have all necessary openings plugged and filled with water to the level of ten (10) feet above the main or branch being tested. The system shall hold this water for thirty (30) minutes without showing a drop greater than four (4) inches.
 

Note: If any code or public utility requires testing which is different than the test listed above, the more stringent test shall be performed.
- K. All parts of the heating, ventilating, air conditioning and exhaust systems shall be adjusted, checked, balanced and tested by an independent A.A.B.C. certified testing & balancing contractor approved by the owner. The contractor shall put all systems and equipment into full operation and shall test and balance all devices to within ten (10) percent of capacities indicated on the drawings. Submit copies of the balancing reports as required by the contract. Permanently mark the position of each balancing damper and valve.
- L. Upon completion of the mechanical installations, the contractor shall provide a complete set of prints of the mechanical contract drawings which shall be legibly marked in red pencil to show all changes and departures of the installation as compared with the original design. They shall be suitable for use in preparation of record drawings.
- M. All piping systems shall be identified with labels. Materials shall be as manufactured by seton name plate corporation.
- N. All mechanical installations, including all materials and labor shall be guaranteed for a period of one (1) year from date of owner acceptance. The above shall not in any way void or derogate equipment manufacturer's guarantee or warranty. Certificates of guarantee shall be delivered to the owner.
- O. After roughing in the entire water main with future stubs the entire potable water systems shall be disinfected prior to use. The method to be followed shall be that prescribed by the local health authority/code requirements.
- P. Contractor shall also provide one (1) year free service to keep the equipment in operating condition. This service shall be provided per the following schedule and rendered upon request when notified of any equipment malfunction.
- Q. In addition to the first year warranty period, the contractor shall provide, at no additional cost to the owner, a minimum of four (4) service calls and maintenance inspections. A complete outline of the required maintenance and the proposed schedule shall be included in the "record and information booklet" detailed in section 15010-basic mechanical requirements, paragraph I, for review and acceptance by the owner/representative and engineer. The inspections are to be performed at three (3) month intervals for a total of four (4) service calls and inspections during the first year warranty period (three (3) times during the year plus the original system start-up commissioning).

- Upon completion of each scheduled inspection, the contractor shall deliver to the building owner/owner's representative within forty-eight (48) hours of completion, two (2) copies of the completed inspection report for record purposes.
- R. The mechanical or service contractor shall, at the ninth month, advise the owner of the termination date of the above service. This contractor shall also provide the owner with a detailed proposal, reflecting annual escalation, for the continuation of the service and inspections described above.
- ## 2. Section 15050 - Basic Mechanical Piping Material & Methods
- A. Provide all labor and materials necessary to furnish and install all piping systems on this project, including sanitary, sanitary vent, domestic water, refrigerant piping and condensate drain.
  - B. Piping and valves shall be as follows:
    - 1) Sanitary drains below grade.

Pipe	Standard weight cast iron uncoated bell and spigot soil pipe.
Fittings	Standard weight cast iron bell and spigot uncoated soil pipe fittings.
Joints	Neoprene push-lock fittings.
    - 2) Sanitary wastes & vents piping above floor inside building.

Pipe	Cast iron no-hub soil pipe
Fittings	Cast iron no-hub soil pipe fittings
Joints	No-hub stainless steel gasketed fittings
    - 3) Domestic hot and cold water and hot drain piping.

Pipe	All water lines - hard copper type L
Fittings	Solder type wrought copper - lead free solder.
Ball valves	Two piece body, 150 lb. chrome plated full port bronze body and stem, reinforced the seat rings, Nibco S-585-70.
Unions	125 lb. wrought copper, ground joint solder ends.
    - 4) Atmospheric condensate drains.

Pipe	Type DNV seamless copper tubing
Fittings	Wrought copper solder drainage fittings
    - 5) Fire protection piping and fittings as required by NFPA regulations and as hereinafter specified.
  - C. Copper pipe shall be revere, anaconda, or chase types "I" hard drawn, with approved solder fittings.
  - D. Cast iron piping shall be service weight drainage piping and shall conform to the requirements of the C.I.S.P.I. Each length of pipe and each fitting shall be clearly marked with the manufacturer's initials and pipe classifications.
  - E. Steel piping shall be similar and equal to national tube company, republic, or Bethlehem black or zinc-coated (galvanized) steel as hereinafter specified. Pipe shall be free from all defects which may affect the durability of the intended use. Each length of pipe shall be stamped with the manufacturer's name.
  - F. All hangers for copper piping shall be copper clad, split ring swivel type, having rods with machine threads and threaded copper clad ceiling flange. Cast iron and steel piping supports shall be similar without copper clad and prime paint finish.
  - G. Provide dielectric couplings where non-ferrous metal piping is joined to ferrous metal piping. The gasket material shall be capable of withstanding the temperatures and pressures within the piping system in which installed. Submit dielectric coupling and gasket material for approval.
- ## 3. Section 15250 - Mechanical Insulation
- A. All supply/return (existing/new) ductwork and domestic water piping systems shall be insulated with fiberglass insulation. Insulate refrigerant piping with 1/2" Armaflex as needed.
  - B. Pipe insulation shall be 1" premoiled fiberglass insulation with an all service jacket, Owens Corning Fiberglas 551-11. Fittings shall be insulated and covered with pvc covers.
  - C. Ductwork insulation damaged during construction shall be properly fixed with 1-1/2" flexible duct wrap, Owens Corning Fiberglas type T5 with foil faced vapor barrier.
  - D. Interior duct lining shall be as specified under section 15800.
- ## 4. Section 15300 - Fire Protection
- A. All work, materials, equipment, and accessories shall comply with the standards of the national fire protection association and all state and local regulations.
  - B. The sprinkler contractor shall extend the wet pipe sprinkler system to properly cover/protect new room layout along with the oxygen room. Final density flow per square foot shall be determined by fire marshal.
  - C. The installation shall include, but are not limited to valves, flow switches, sprinkler heads and escutcheons, piping, fittings, hangers and signs and other identification markings, as required.
  - D. The sprinkler contractor shall carefully examine all documents during the bidding period. He shall familiarize himself with project conditions such as building construction and pipe and ductwork locations and elevations.
  - E. Sprinkler heads shall be installed to properly cover and protect the clean storage and soiled holding areas. Any sprinkler heads installed in finished ceilings shall be brushed chrome semi recessed type.
  - F. The contractor shall arrange for approval of the sprinkler systems, and conduct tests in accordance with NFPA 13.

- G. The sprinkler contractor shall provide a detailed shop drawing showing piping layout, head locations, elevations and coordination with all building structure, electrical and plumbing trades. The contractor shall submit detailed sprinkler shop drawings with actual heads for architect approval prior to any fabrication.
  - H. The sprinkler contractor must submit one set of sprinkler shop drawings and hydraulic calculations to county fire department/marshal prior to any fabrication or construction.
- ## 4. SECTION 15400 - PLUMBING
- A. The work covered by this section of the specifications consists of furnishing all labor, equipment and materials in connection with the rough-in, final setting and connections to all plumbing fixtures. The contractor shall carefully review the conditions at the site and all of the contract drawings to determine the extent of the plumbing work required.
  - B. All plumbing fixtures shall be complete in every detail with all trimmings and connections. All fixtures shall be designed to prevent the backflow of polluted water or waste into the water supply system. Fixtures shall be American Standard or approved equal as follows:
    - P-1 Water closet (handicapped). #2108.40B Cadet, IT-1/2" high elongated toilet, water saver 1.6 gallon flush with vitreous china construction, siphon jet flush action, close-coupled tank, bolt caps, flush open front white seat with cover, rigid supply with angle stop valve.
    - P-1A Bedpan Cleaning Assembly. #1680.091 assembly which includes vacuum breaker, nozzle with hook, pedal valve and loose key supply
    - P-2 Wall Hung Sink (handicapped). #0355.012 Lucerne, vitreous china construction, front overflow, faucet ledge. Lavatory to be fitted with Elkay #LK-4417-L, single lever center-set faucet, complete with grid drain, tailpiece, cast brass "P" trap, tubing to wall escutcheon, key operated supply valves with rigid supplies and chair carrier. All exposed waste piping and hot and cold water piping shall be insulated with tuobro hand lav-guard model 102 insulation kit with white finish.
    - P-2A Procedure Sink. #LR-1722 by Elkay, 18 gauge-type 302-ssf rim bowl with Sloan Optima ETP-T10 electronic gooseneck hand faucet with infrared sensor with trim plate for center-set sink, sink to be complete with grid drain, tailpiece, cast brass "P" trap, tubing to wall escutcheon, key operated supply valves with rigid supplies.
    - P-2B Nurse/Treatment/Soiled Work Sink. #LR-1722 by Elkay, 18 gauge-type 302-ssf rim bowl. Faucet shall be #5114 by Delta, 11" high gooseneck spout with 4" wrist blade handles. Sink to be complete with grid drain, tailpiece, cast brass "P" trap, tubing to wall escutcheon, key operated supply valves with rigid supplies. Provide a faucet mounted eye wash with Watersaver #EN101 with duct covers and chain (eye wash for the nurse work area sink only refer to note 24 on sheet 152 for water temperature control).
    - P-2C Lounge Sink. #CR-9322 by Elkay, 20 gauge-type 302-ssf rim bowl double bowl sink with 11" x 22" each overall 8 3/4" x 22" 4-hole, faucet #LK2318H5 by Elkay with 5" handles, swinging hi-spout and retractable hose and spray. Sink to be complete with grid drain, tailpiece, cast brass "P" trap, tubing to wall escutcheon, key operated supply valves with rigid supplies.
    - P-2D Scrub Sink. #5564 by FHC (Future Health Concept), stainless wash sink with push button faucet, splash control, backplash and gooseneck faucets. Optional lid buckets to be furnished, model ZR-1224-T5 (include longer supporting bolts and standoffs).
    - P-3 Janitor's sink. #H5B-2424 by Flat, 24" X 24" X 10" deep molded-stone top service basin color white. The factory installed drain body shall be stainless steel and designed to provide for a lead caulk or GDC-3 joint to a 3" drain pipe. Service faucet #B344.111 with top brace, slops, 10-1/2" spout, 3/4" hose thread on spout, integral vacuum breaker, adjustable union couplings, stop shanks and 30" flexible hose.
    - P-4 Refrigeration Ice Maker. Contractor shall provide wall mounted recessed box with shut off valve for connection to refrigeration ice maker by others. Extend 1/4" water line to unit with in-line cartridge filter. Verify exact line size. Box shall be IPS corporation model 4000.
    - P-5 Counter-top Coffee Machine. Contractor shall provide wall mounted recessed box with shut off valve for connection to by others. Extend 1/4" water line to unit. Verify exact line size. Box shall be IPS corporation model 4000.
  - C. The water heater shall be state, or an approved equal. Heater shall be rated at volts and phase as indicated on drawings and be listed by underwriters' laboratories. Tank shall be factory fired with glass lining with 150 psi working pressure and equipped with extended high density magnesium anode at 1 & P relief valve. Electric heating element shall be series I - medium watt density with zinc plated copper sheath. The controls shall include a thermostat with each element and a high temperature cutoff. The jacket shall provide full size control compartments for performance of service and maintenance thru front panel openings and enclose the tank with insulation. The drain valve shall be located in the front for ease of servicing. Outer jacket shall be baked enamel finish. Heater shall have a three (3) year limited warranty for commercial installation, as outlined in the written warranty. Fully illustrated instruction manual shall be included. Insulation must meet asrae standard 900-1980 for energy efficiencies. Refer to drawings for size, capacity and voltage.
  - D. Potable water systems shall be disinfected prior to use. The method to be followed shall be that prescribed by the health authority and code requirements.
- ## 6. Section 15500 - Heating, Ventilating & Air Conditioning (HVAC)
- A. The work to be performed shall include all labor, materials and equipment necessary to furnish and install complete, all hvac mechanical equipment as shown on drawings and/or hereinafter specified. It is the intent that the systems be installed complete with all items necessary to provide satisfactory service.
  - B. All heating, ventilating and air conditioning equipment which contains compressors shall be provided with extended warranties (minimum four (4) years) for the compressors.
  - C. Procedure Room HVAC Unit:
    - (1) The indoor air handler shall be mounted above ceiling, supplemental DX-Air Handling Evaporator. The air handling section shall house, as a minimum, the evaporator coil, expansion valve, evaporator blower/motor and associated electrical and refrigeration components. The evaporator section shall be located at some distance from its corresponding outdoor remote air cooled condensing unit. The system's compressor shall be located with the Remote Condensing system.

- (2) The remote outdoor shall be a remote air cooled condensing unit with direct-driven, propeller fan. The system compressor shall be located with the remote condensing unit section. The condensing unit cabinet shall also house the condenser coil, blower and blower motor and Nema 3R condensing unit motor control/energizing box.
  - The condensing unit shall be sized to provide the total heat of rejection of the system at a 45°F DB ambient temperature for the corresponding model AHU Air Handling Unit. Split system units shall be manufactured by ATS.
  - D. Wall mounted electric heater.
    - (1) Furnish and install Amark, Berko or approved equal.
    - (2) Equipment shall be constructed with the following:
      - A) Tamper resistant construction
      - B) Integral thermostat
      - C) Heavy duty 1/6 gauge bar grille
- ## 6. SECTION 15800 - Air distribution
- A. Furnish all labor and materials necessary to complete the sheet metal work associated with the heating, ventilating, air conditioning and exhaust systems, and other miscellaneous items shown and required.
  - B. All ductwork shall be constructed and installed in accordance with the sheet metal and air conditioning contractors national association (smacna) standards, asrae standards and boca standards.
  - C. Flexible ductwork shall be Hart & Cooley type F214 or approved equal. Flexible duct shall comply with nipa bulletin 90a and shall be U.L. listed as class 1 air duct and connector, standard 181.
  - D. Support horizontal ducts with hangers spaced not more than six (6) feet apart. Use strap hangers for ducts up to thirty (30) inches wide, angle hangers or rods for ducts over thirty (30) inches wide. Strap hangers to be one (1) inch wide, 20 gauge minimum; fasten to sides and bottom of duct with sheet metal screws.
  - E. Ducts shall be straight and smooth on the inside, with joints neatly finished. Ducts shall be suspended from the construction and shall be free from vibration. Curved elbows shall have a center radius equal to one and one-half (1-1/2) times the width of the duct. All square turns shall be vanned. Vanes consisting of curved metal blades shall permit the air to make abrupt turns without turbulence.
  - F. All joints in the heating, ventilating, air conditioning and exhaust system ductwork shall be sealed.
 

Sealant shall be as manufactured by united inc. or approved equal, sealant shall be smacna and ul approved, with a flame spread of 10 and a smoke developed of 0, non-toxic, and non-flammable. Sealant shall be approved for operating temperatures from 0 degrees F. to 200 degrees F.

Sealant system shall be installed in strict accordance with the manufacturer's recommendations and when applied shall provide a permanent seal without any deterioration.
  - G. All new supply ductwork down stream of interior vav boxes shall be lined on the interior for thermal and sound attenuation. Lining shall have a one (1) inch thickness and shall be glued with one hundred (100) percent coverage and additionally secured with pins. Increase duct sizes indicated two (2) inches direction to accommodate the interior lining.
  - H. Supply air diffusers shall have all steel construction, Titus model PAS perforated face and finished with #26 off-white enamel.
  - I. Return air device shall have all steel construction, Titus model PAS perforated face and finished with #26 off-white enamel.
  - J. Return air device shall be perforated type with built in fire damper at ceiling with all steel construction. Return air device (air transfer within oxygen room ceiling only) shall be Titus model PAR-FR with #26 off-white enamel finish.
  - K. 4'-0" linear supply slot diffuser shall be Titus, model TBD1-80, with 1" slot and 6" inlet. 1" slot and plenum extension. Finish with #26 off-white enamel. Procedure rooms shall have 4'-0" linear supply diffuser with no sound lining by Titus, model TBD-80.
  - M. Ceiling/in-line fans shall be gemini models as manufactured by cook. Fans shall have acoustically insulated housings and shall have a maximum sound level rating of 6.0 sones. Air deliveries shall be as indicated on the drawings and all fans shall bear the amca certified ratings seal and the U.L. label. Integral backdraft damper shall be totally chatterproof with no metal contact. Fan shall have true centrifugal wheels with inlet perpendicular to, or remote from, inlet grille. Grille shall be of aerodynamic design of white molded plastic eggcrate shape and provide eighty-five (85) percent free open area. Terminal box shall be provided on the housing with cord, plug, and receptacle inside the housing. Entire fan, motor and wheel assembly shall be easily removable without disturbing the housing. Motor speeds shall not exceed 1600 rpm and all fan motors shall be suitably grounded and mounted on rubber-in-shear vibration isolators. Fans shall be controlled by a wall mounted light switch. Switch and connection shall be by electrician.
- ## 7. SECTION 15450 - Controls
- A. The contractor under this heading shall furnish and install all wiring necessary for a complete electric system of automatic temperature control. The system shall include all necessary thermostats, relays, switches, etc. required for successful operation. Electrical work in connection with the temperature control system shall be performed by the control contractor.
  - B. New vav controller/thermostat to match existing thermostats in the field.
  - C. Temperature (heating/cooling) and humidity control for AHU-1 and AHU-2 by ATS CellAir systems.
  - D. The automatic temperature control contractor shall be responsible for the commissioning of the project to assure a fully functional, fine-tuned hvac system upon occupancy.
- Commissioning is defined as verification of the proper operation of all equipment, alarms, safeties and control and energy management systems serving mechanical systems installed or modified on this project as defined within the specifications and indicated on the contract drawings.
- Proper operation is defined as the activation of all controls, field or factory installed, to assure the correct sequencing of equipment and systems, including activation of all operating and safety controls, as hereinafter described.
- The automatic temperature control contractor shall report all system deficiencies to the mechanical contractor. The mechanical contractor shall instruct the copper trades to correct any deficiencies reported by the automatic temperature control contractor so that the project commissioning can be completed.
- Prior to the commencement of any commissioning work, the automatic temperature control contractor shall provide the engineer with a commissioning report format for review and approval. The report format shall be delivered to the engineer not more than thirty (30) days after award of the contract or not less than sixty (60) days prior to start of atc work, whichever is earlier.

- Commissioning report format shall include a list of all items to be verified, with the initials of the mechanic who verified the particular item/control and the date on which each item/control operation was verified.
- Three (3) commissioning reports are required. The first report shall be completed during the initial commissioning of the project prior to occupancy. The second and third reports shall be completed no more than two (2) months (1 report/month) after occupancy of the building. All controls/safeties shall be verified in the presence of the owner/owner's representative. The final report shall also contain the signature of the owner or owner's representative for each item verified.

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RENOVATIONS TO:  
**RMS LIFELINE**  
 DETROIT

## MECHANICAL OUTLINE SPECIFICATIONS

REV#	DATE	REVISIONS	DESCRIPTION

DRAWING NO.  
**M6**  
 SHEET 6 OF 6  
 DATE 1/4/01  
 DRAWN BY JLL  
 JOB NUMBER 1-100C  
 CHECKED BY GVR