MECHANICAL SPECIFICATIONS

SECTION 1 – GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. THESE DOCUMENTS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO INDICATE EXACT CONDITIONS. THE DESIGN INDICATES SIZE, GENERAL LOCATIONS AND ROUTING, PERFORMANCE REQUIREMENTS AND OVERALL QUALITY OF CONSTRUCTION. THE DRAWINGS SHALL NOT BE SCALED BY THE CONTRACTOR. THIS CONTRACT INCLUDES ALL MATERIALS, EQUIPMENT AND LABOR NECESSARY TO PROVIDE COMPLETE, FULLY FUNCTIONAL MECHANICAL SYSTEMS AS INDICATED IN THE CONSTRUCTION DOCUMENTS.

B. THE BUILDING ARCHITECTURAL DESIGN AND (WHERE APPLICABLE) EXISTING CONDITIONS INDICATED IN THESE DOCUMENTS ARE APPROXIMATE AND FOR REFERENCE ONLY. THE CONTRACTOR SHALL ADJUST LOCATION AND ROUTING OF EQUIPMENT AND SYSTEMS AS REQUIRED TO ACHIEVE THE DESIGN INTENT.

C. THE CONTRACTOR SHALL ENSURE THAT CONSTRUCTION DOES NOT CONTAMINATE, HARM OR CAUSE DAMAGE TO ADJACENT TENANTS OR PROPERTY. PROVIDE DUST BARRIERS, TEMPORARY FILTERS (OVER ALL TRANSFER OPENINGS AND EQUIPMENT RA INLETS SERVING THIS SCOPE), ETC. AS REQUIRED FOR DURATION OF PROJECT.

1.02 CONTRACTOR SCOPE

A. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL REQUIREMENTS SPECIFIED HEREIN ARE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE INCLUDED IN THE ORIGINAL BID.

1.03 CODES AND REGULATIONS

A. ALL MECHANICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND LAWS (WITH ALL AMENDMENTS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION) AND THESE SPECIFICATIONS. WHERE CONFLICTING REQUIREMENTS OCCUR, THE MORE STRINGENT SHALL GOVERN.

PART 2 PRODUCTS

2.01 ALL PRODUCTS USED FOR THIS PROJECT SHALL BE NEW.

PART 3 EXECUTION

3.01 INSTALLATION

A. INSTALL CONSTRUCTION PER CODE, MANUFACTURER'S RECOMMENDATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS. SHOULD CONFLICTING REQUIREMENTS ARISE, THE MORE STRINGENT SHALL GOVERN.

B. CONTRACTOR SHALL REPAIR ANY DAMAGE TO BUILDING STRUCTURE OR FINISHES RESULTING FROM HIS WORK. REPAIR SHALL MATCH SURROUNDING CONSTRUCTION.

C. NEW EQUIPMENT, FIXTURES AND DEVICES SHALL BE STORED IN CLEAN, DRY ENVIRONMENT ON WOODEN PALLETS AND COVERED WITH 6 MIL PLASTIC WRAP UNTIL READY FOR INSTALLATION. CLEAN AND REPAIR ANY DAMAGE TO CABINET OR FINISH TO LIKE-NEW CONDITION UPON PROJECT COMPLETION.

D. PROVIDE ACCESS PANELS WHERE REQUIRED IN HARD CEILINGS AND WALLS TO ALLOW ACCESS FOR MAINTENANCE OF EQUIPMENT AND BALANCING OF SYSTEM. ACCESS PANELS IN FIRE-RATED ASSEMBLIES SHALL BE UL LISTED TO MATCH ASSEMBLY RATING, AND INSTALLED IN COMPLIANCE WITH UL LISTING.

3.03 COORDINATION OF MECHANICAL SYSTEMS

A. THE BASIS-OF-DESIGN PRODUCTS WERE USED TO DETERMINE DIMENSIONS, INSTALLATION AND ACCESS CLEARANCES, SUPPORTS, ELECTRICAL SERVICE, CONNECTION ARRANGEMENTS, ETC. WHERE ALTERNATE PRODUCTS ARE PROVIDED, IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL REQUIREMENTS AND RECTIFY ANY CONFLICTS AT NO ADDITIONAL COST TO THE OWNER.

B. COORDINATE MECHANICAL CONSTRUCTION WITH ALL OTHER TRADES PRIOR TO INSTALLATION TO AVOID CONFLICTS. CONFLICTS WHICH ARISE DUE TO LACK OF COORDINATION SHALL BE RESOLVED BY THE CONTRACTOR AT NO ADDITIONAL COST.

C. COORDINATE WITH ALL ARCHITECTURAL ELEMENTS, INCLUDING (BUT NOT LIMITED TO): CEILING ASSEMBLIES, LIGHTING, RATED AND NON-RATED PARTITIONS, ETC. – REFER TO ARCHITECTURAL DOCUMENTS.

D. COORDINATE ELECTRICAL REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR, INCLUDING (BUT NOT LIMITED TO): SERVICE CHARACTERISTICS (VOLTS, PHASE, HZ), MINIMUM CIRCUIT AMPS, MAXIMUM OVER CURRENT PROTECTION, STARTERS (WHERE NOT PROVIDED WITH PACKAGED EQUIPMENT), DISCONNECTS, ETC. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL ELECTRICAL DISCONNECTS SHALL BE FURNISHED BY THE EQUIPMENT PROVIDER.

E. COORDINATE OPENINGS REQUIRED IN BUILDING STRUCTURE, SLABS, FLOORS, EXTERIOR WALLS AND ROOF WITH THE ARCHITECT, LANDLORD, AND STRUCTURAL ENGINEER. ALL CUTTING AND PATCHING REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR.

F. COORDINATE EQUIPMENT WEIGHTS AND PROPOSED SUPPORTING METHODS WITH THE STRUCTURAL ENGINEER FOR ALL EQUIPMENT AND ASSEMBLIES WHICH ARE SUPPORTED BY THE BUILDING STRUCTURE.

G. COORDINATE UTILITY AND METERING REQUIREMENTS (ELECTRICITY, WATER, SEWER, FIRE PROTECTION WATER, GAS, ETC.) WITH THE APPROPRIATE AGENCIES.

SECTION 2 – CONTRACT ADMINISTRATION

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. SUBMITTALS WHICH FAIL TO MEET THE MINIMUM REQUIREMENTS OF THESE, AND DIVISION 1, SPECIFICATIONS MAY BE SUMMARILY REJECTED WITHOUT REVIEW. CONTRACTOR ASSUMES ALL LIABILITY FOR DELAY IN CONSTRUCTION WHICH MAY ARISE OUT OF NON-COMPLIANCE WITH THESE SPECIFICATIONS.

B. ALL SUBMITTALS SHALL BEAR THE NAME AND CONTACT INFORMATION OF THE CONTRACTOR. THE CONTRACTOR SHALL REVIEW AND SIGN THE SUBMITTAL PRIOR TO SUBMISSION.

C. ENGINEER REVIEW OF CONTRACTOR SUBMITTALS IS FOR GENERAL COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS ONLY. THE CONTRACTOR SHALL COORDINATE ALL DIMENSIONS, WEIGHTS, QUANTITIES, ELECTRICAL REQUIREMENTS, ETC. WITH THE APPROPRIATE TRADES. ANY DEVIATIONS OR OMISSIONS WHICH ARE NOT SPECIFICALLY NOTED IN THE SUBMITTAL AND APPROVED BY THE ENGINEER ARE THE RESPONSIBILITY OF THE CONTRACTOR.

PART 2 PRODUCTS

2.01 PRODUCT SUBMITTALS AND FABRICATION SHOP DRAWINGS

A. PROVIDE MANUFACTURER'S ENGINEERING DATA FOR ALL NEW EQUIPMENT AND ACCESSORIES TO BE PROVIDED UNDER THIS CONTRACT. SUBMITTAL SHALL INCLUDE PERFORMANCE CURVES AND DATA (AT CONDITIONS SPECIFIED IN THESE CONSTRUCTION DOCUMENTS), DIMENSIONS, WEIGHTS, UTILITY (ELECTRICAL, GAS, WATER, DRAIN, ETC.) REQUIREMENTS, STANDARD FEATURES PLUS ALL OPTIONS AND ACCESSORIES TO BE PROVIDED, START-UP PROCEDURES AND SPARE PARTS RECOMMENDED BY THE MANUFACTURER, AND LISTING / CERTIFICATION BY THE APPROPRIATE AGENCY.

B. EQUIPMENT SUBMITTALS SHALL BE LEGIBLE (TYPEWRITTEN OR PRINTED – HANDWRITING IS NOT ACCEPTABLE) AND SHALL CLEARLY INDICATE THE EQUIPMENT TAG AND THE SPECIFIC EQUIPMENT, WITH ALL FEATURES AND ACCESSORIES, SUBMITTED. ANY DEVIATIONS FROM SPECIFIED REQUIREMENTS SHALL BE IDENTIFIED IN RED INK. INCOMPLETE OR ILLEGIBLE SUBMITTALS WILL BE REJECTED WITHOUT REVIEW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY IMPACT TO THE CONSTRUCTION SCHEDULE OR COSTS RESULTING FROM FAILURE TO COMPLY WITH THESE SPECIFICATIONS.

C. FABRICATION SHOP DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR IN AUTOCAD AND IN SAME SIZE AND SCALE AS THE ENGINEERING DRAWINGS AND SHALL NOT BE DUPLICATES OR "MARK-UPS" OF ENGINEERING DOCUMENTS NOR BEAR THE NAME OR LOGO OF THE ARCHITECT OR ENGINEER. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION FROM THE ARCHITECT AND ENGINEER TO USE ELECTRONIC FILES FOR PREPARATION OF SHOP DRAWINGS.

2.02 TESTING, ADJUSTING AND BALANCING (TAB) REPORT

A. PROVIDE TAB SERVICES PERFORMED BY AN INDEPENDENT NEBB OR AABC LICENSED AGENCY WHICH HAS BEEN IN BUSINESS PROVIDING TAB SERVICE FOR SIMILAR PROJECTS FOR A MINIMUM OF 5 YEARS.

B. PROVIDE COMPLETE TAB REPORT FOR THE PROJECT. REPORT FORMAT AND CONTENT SHALL BE PER AABC OR NEBB STANDARDS AND SHALL INCLUDE, AT THE MINIMUM, THE FOLLOWING INFORMATION (BOTH DESIGN AND BALANCED QUANTITIES): EQUIPMENT TAGS; CONNECTION AND FACE SIZES; PERFORMANCE (FLOW, PRESSURE, TEMPERATURE RISE/DROP, ETC.); MOTOR RPM AND HP; FAN/PUMP RPM AND VERIFICATION OF PROPER ROTATION; ELECTRICAL CHARACTERISTICS (V/PH/A); VERIFICATION OF PROPER RESPONSE OF SYSTEM TO CONTROLS PER MANUFACTURER'S OPERATING SEQUENCES AND AS SPECIFIED HEREIN. TAB REPORTS SHALL BE LEGIBLE (TYPEWRITTEN OR PRINTED – HANDWRITING IS NOT ACCEPTABLE) AND SHALL CLEARLY INDICATE ALL REQUIRED INFORMATION. INCOMPLETE OR ILLEGIBLE REPORTS WILL BE REJECTED WITHOUT REVIEW.

C. ALL NEW AND EXISTING SYSTEMS AND EQUIPMENT SERVING AREAS UNDER THIS CONTRACT SHALL BE BALANCED TO THE DESIGN QUANTITIES INDICATED. TEST AND BALANCE ALL SYSTEMS PER PROCEDURES OUTLINED BY LICENSING AGENCY, AND AS SPECIFIED BELOW:

1. TEST ALL EQUIPMENT FOR PROPER OPERATION. TEST CONTROLS FOR PROPER RESPONSE TO ALL SEQUENCES AND OPERATING SCHEDULES. RECALIBRATE EXISTING CONTROLLERS SERVING SPACES UNDER THIS CONTRACT TO ENSURE PROPER OPERATION.
2. EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE, ALL SYSTEM FLOWRATES SHALL BE BALANCED TO WITHIN 90–110 PERCENT OF DESIGN VALUES. WHERE FINAL BALANCED CONDITIONS ARE OUTSIDE THIS RANGE, MEASURE AND REPORT DIAGNOSTIC INFORMATION AND POSSIBLE PROBLEMS.

D. TAB SHALL BE PERFORMED AFTER CONSTRUCTION IS COMPLETE AND ALL TEMPORARY CONSTRUCTION FILTERS/SCREENS ARE REPLACED WITH NEW, CLEAN PERMANENT FILTERS/SCREENS.

2.03 AS-BUILT DOCUMENTS

A. PROVIDE AS-BUILT DOCUMENTATION OF ACTUAL INSTALLED CONDITIONS OF ALL MECHANICAL CONSTRUCTION UNDER THIS CONTRACT. DOCUMENTS SHALL INDICATE EXACT LOCATIONS, SIZES AND CONFIGURATION OF ALL EXISTING AND NEW CONSTRUCTION WITHIN THE SCOPE OF WORK. ALL DRAWINGS SHALL BE OF SAME SIZE AND FORMAT AS ENGINEERING DOCUMENTS AND SHALL BE BOUND TOGETHER.

B. AS-BUILT DOCUMENTS SHALL BE PREPARED BY THE CONTRACTOR WITH AUTOCAD IN SAME SIZE AND FORMAT AS THE ENGINEERING DRAWINGS AND SHALL NOT BE DUPLICATES OR "MARK-UPS" OF ENGINEERING DOCUMENTS NOR BEAR THE NAME OR LOGO OF THE ARCHITECT OR ENGINEER. THE CONTRACTOR SHALL OBTAIN WRITTEN PERMISSION OF THE ARCHITECT TO USE ELECTRONIC FILES FOR PREPARATION OF AS-BUILTS.

C. PROVIDE DRAFT COPY FOR ENGINEER REVIEW. REVISED COPIES, WITH COMMENTS INCORPORATED, SHALL BE PROVIDED IN HARD COPY (FULL-SIZE PLOTS) AND SOFT COPY (AUTOCAD 2019 OR EQUIVALENT) FORMATS. PROVIDE NUMBER OF COPIES AS SPECIFIED IN DIVISION 1.

2.04 OPERATIONS AND MAINTENANCE MANUALS

A. PROVIDE OPERATIONS AND MAINTENANCE (O&M) MANUALS FOR ALL SYSTEMS AND EQUIPMENT PROVIDED UNDER THIS CONTRACT. O&M MANUALS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING INFORMATION: CONTRACTOR NAME AND CONTACT INFORMATION; TABLE OF CONTENTS; STATEMENT OF WARRANTY; SERVICE CONTRACT; MANUFACTURER'S INSTALLATION, OPERATION AND SERVICE MANUALS AND TROUBLESHOOTING GUIDES; COMPREHENSIVE PARTS LISTS; MSDS SHEETS (WHERE APPLICABLE); EMERGENCY PROCEDURES; FINAL TEST & BALANCE REPORT; AND START-UP/COMMISSIONING REPORTS FOR ALL SYSTEMS.

PART 3 EXECUTION

3.01 SUBMITTALS

A. ALL SUBMITTALS, REPORTS AND LITERATURE REQUIRED AS PART OF THIS CONTRACT SHALL BE COMPLETE (INCLUDING ALL COMPONENTS, ACCESSORIES AND OPTIONS), LEGIBLE (PRINTED OR TYPEWRITTEN – HANDWRITING IS NOT ACCEPTABLE), PRESENTED IN 8.5X11 OR 11X17 FORMAT (UNLESS SPECIFIED OTHERWISE), BOUND TOGETHER (3-RING BINDER, SPIRAL, COMB, ETC.), AND PROVIDED IN SUFFICIENT QUANTITY (AS SPECIFIED IN DIVISION 1 BUT NOT LESS THAN 5 COPIES OF SUBMITTALS AND 2 COPIES OF RECORD DOCUMENTS). ANY DEVIATION FROM THE CONTRACT DOCUMENTS SHALL BE HIGHLIGHTED IN RED. PROVIDE TITLE SHEET FOR EACH SUBMITTAL WITH 4"X4" SPACE FOR ENGINEER REVIEW STAMP.

B. SHOP DRAWINGS AND RECORD DOCUMENTS SHALL NOT BEAR THE NAME, LOGO OR TITLE BLOCK OF THE ARCHITECT OR ENGINEER. SUBMITTALS SHALL NOT BE EXACT DUPLICATE COPIES OF ENGINEERING DRAWINGS.

3.02 EQUIPMENT START-UP AND COMMISSIONING

A. PROVIDE EQUIPMENT START-UP PRIOR TO TAB. EQUIPMENT START-UP SHALL BE PERFORMED BY EQUIPMENT MANUFACTURER'S AUTHORIZED AGENTS ONLY. FOLLOW PROCEDURES OUTLINED BY EQUIPMENT MANUFACTURER'S PUBLISHED INSTALLATION LITERATURE.

B. PROVIDE COMPLETED START-UP CHECKLISTS AND COMMISSIONING REPORTS, SIGNED BY AGENT, IN THE O&M MANUALS.

C. PROVIDE OWNER TRAINING FOR ALL NEW SYSTEMS, EQUIPMENT AND CONTROLS TO BE PROVIDED UNDER THIS CONTRACT.

SECTION 3 – MECHANICAL MEANS AND METHODS

PART 1 GENERAL

1.01 SUMMARY

A. ALL CONSTRUCTION SHALL BE NEW, FIRST QUALITY EXCEPT WHERE SPECIFICALLY NOTED AS EXISTING. ANY EQUIPMENT OR DEVICES TO BE RE-USED SHALL BE THOROUGHLY CLEANED AND SERVICED TO GOOD WORKING CONDITION.

B. ALL NEW EQUIPMENT SHALL BEAR THE LABEL OF THE SPECIFIED LISTING AGENCY.

C. ALL CONSTRUCTION WITHIN HVAC PLENUMS SHALL HAVE A MAXIMUM FLAME SPREAD/SMOKE DEVELOPED RATING OF 25/50 AS REQUIRED BY CODE AND NFPA.

1.02 HANGERS AND SUPPORTS

A. SUPPORT ALL PIPING AS REQUIRED BY CODE AND IN ACCORDANCE WITH MSS SP-69 (HVAC AND PLUMBING), NFPA (FIRE PROTECTION AND FUEL GAS), PER SPECIFIC REQUIREMENTS FOR PIPING MATERIALS, SERVICE TEMPERATURE, AND INSULATION. SUPPORT ALL DUCTWORK AS REQUIRED BY CODE AND IN ACCORDANCE WITH SMACNA. SUPPORT EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.

B. PROVIDE TYPE 40 STEEL INSULATION SHIELDS AT ALL PIPE HANGERS. SHIELDS SHALL COVER MINIMUM 120 DEGREE ARC AND SHALL BE SIZED (LENGTH) PER INSULATION MANUFACTURER'S REQUIREMENTS FOR SUPPORT SPACING.

C. PROVIDE CAPABILITY FOR PIPING SYSTEM EXPANSION AND CONTRACTION WITHOUT IMPARTING UNACCEPTABLE STRESS TO PIPING SYSTEM, EQUIPMENT CONNECTIONS AND BUILDING STRUCTURE. ANCHOR PIPING TO SUBSTANTIAL BUILDING STRUCTURE AND PROVIDE EXPANSION BENDS/LOOPS BETWEEN ANCHORS. CONTRACTOR SHALL SUBMIT PIPING SHOP DRAWINGS (WITH ANCHORS, GUIDES AND EXPANSION LOOPS INDICATED AND DIMENSIONED, AND SUPPORTING CALCULATIONS) FOR ENGINEER REVIEW.

D. PIPING SHALL BE SUPPORTED AT MINIMUM SPACING PER CODE AND NFPA, AT ALL CHANGES IN DIRECTION, AND AT ALL CONCENTRATED LOADS (VALVES, INLINE PUMPS, ETC.). PROVIDE ADDITIONAL SUPPORTS FOR INSULATED PIPING AS RECOMMENDED BY INSULATION MANUFACTURER.

E. PIPING ON ROOF OR OUTSIDE BUILDING FOOTPRINT SHALL BE SUPPORTED BY MANUFACTURED PIPING SUPPORTS; HEAVY DUTY ONE-PIECE MOLDED RUBBER OR POLYCARBONATE BASE AND PIPE SUPPORT CRADLE; RADIUSED EDGES TO PREVENT GOUGING OF MEMBRANE OR BUILT-UP ROOFING; ROLLER, CLEVIS, OR STRUT PIPE SUPPORT WITH CHANNEL MOLDED INTO BASE; PROVIDE NEOPRENE PAD TO PROTECT ROOF MEMBRANE WHERE RECOMMENDED BY SUPPORT OR ROOFING MANUFACTURER; MIRO INDUSTRIES OR APPROVED EQUIVALENT.

F. PROVIDE CONTINUOUS STEEL ROOF CURBS FOR ALL EQUIPMENT, FACTORY WELDED 18 GA. GALVANIZED STEEL WITH PRESSURE TREATED WOOD NAILER, ROOF FLANGE, MINIMUM 14" HEIGHT. SECURE CURB TO BUILDING STRUCTURE AND FLASH TO ROOF. BOLT EQUIPMENT TO CURB AND SEAL ALL ANCHOR POINTS WATER TIGHT WITH APPROVED SEALANT.

G. ANCHOR SUPPORTS TO THE BUILDING STRUCTURE ONLY. DO NOT SUPPORT FROM OTHER PIPING, DUCTWORK, CEILING SYSTEM, CONDUIT, ETC. SUPPORT SYSTEMS (HANGERS, FRAMES, ANCHORS, ETC.) SHALL BE RATED FOR MINIMUM 200% OF THE TOTAL SUPPORTED WEIGHT (EQUIPMENT, PIPING, DUCTWORK, INSULATION, WORKING FLUIDS, ETC.) FOR THE SPECIFIC INSTALLATION CONDITIONS.

1.03 NOISE AND VIBRATION CONTROL

A. PROVIDE VIBRATION ISOLATION AT ALL EQUIPMENT WITH ROTATING PARTS. INSTALL AND ADJUST VIBRATION ISOLATORS IN ACCORDANCE WITH THE (EQUIPMENT AND ISOLATOR) MANUFACTURER'S RECOMMENDATIONS. NOMINAL STATIC DEFLECTION SHALL BE AS RECOMMENDED BY ISOLATOR MANUFACTURER FOR SPECIFIC APPLICATION.

1.04 MECHANICAL INSULATION

A. INSULATION SYSTEMS SHALL BE CONTINUOUS THROUGH WALL/FLOOR PENETRATIONS, SUPPORTS, VALVES, FITTINGS AND ACCESSORIES. PROVIDE PRE-MOLDED INSULATION ASSEMBLIES FOR PIPING, VALVES AND ACCESSORIES. REPAIR INSULATION AT EXISTING DUCTWORK WHICH HAS BEEN REWORKED. TEARS AND PUNCTURES OF VAPOR BARRIER SHALL BE REPAIRED AND SEALED. ALL PIPING AND DUCTWORK PRESSURE TESTING SHALL BE PERFORMED BEFORE INSULATION IS APPLIED. ALL INSULATION SHALL BE 100% ASBESTOS FREE.

B. SUPPORTS FOR INSULATED PIPING SHALL BE OUTSIDE INSULATION. INSTALL HIGH DENSITY INSERTS AT ALL HANGERS WHERE RECOMMENDED BY INSULATION MANUFACTURER. INSERTS MAY BE CELLULAR GLASS, HIGH DENSITY POLYISOCYANURATE OR PRESSURE TREATED LUMBER (OUTDOOR INSTALLATIONS ONLY), FORMED TO THE PIPE AND HANGER DIAMETERS.

C. PROVIDE CONTINUOUS VAPOR BARRIER FOR DOMESTIC COLD WATER PIPING SYSTEMS, HVAC DUCTWORK, AND PIPING SYSTEMS WITH OPERATING SERVICE TEMPERATURE BELOW ROOM TEMPERATURE. SEAL PER MANUFACTURER'S RECOMMENDATIONS AT ALL JOINTS, SEAMS AND PENETRATIONS BY MECHANICAL SYSTEM APPURTENANCES.

D. EXTERIOR DUCTWORK, HVAC AND WATER PIPING: PRIME AND APPLY 2 COATS OF UV-RESISTANT, WEATHERPROOF EXTERIOR GRADE PAINT TO UNINSULATED STEEL PIPING. PROVIDE WEATHER-PROOF 0.016" ALUMINUM OR STAINLESS STEEL JACKET WITH EPOXY COATED INTERIOR FOR ALL EXTERIOR INSULATED DUCT AND PIPING SYSTEMS. INSTALL WITH DRIP EDGES AT ALL JOINTS AND SEAMS TO PREVENT INTRUSION OF WATER, SEAL WITH EXTERIOR-GRADE SILICON CAULK.

E. HEAT TRACE ALL HVAC AND DOMESTIC WATER AND SANITARY WASTE PIPING WHICH IS SUBJECT TO FREEZING CONDITIONS.

F. WHERE MULTIPLE LAYERS OF INSULATION ARE REQUIRED, ALL SEAMS SHALL BE STAGGERED MINIMUM 3 INCHES.

G. INSULATION SYSTEMS: SUBJECT TO COMPLIANCE WITH THE SPECIFICATIONS, THE PRODUCTS OF 3M, ARMSTRONG, CERTAINTEED, DOW, JOHNS MANVILLE, KNAUF, NELSON, OWENS CORNING AND PITTSBURGH CORNING ARE ACCEPTABLE. INSULATION SHALL BE MANUFACTURED AND INSTALLED PER NAIMA STANDARDS AND MANUFACTURER'S RECOMMENDATIONS FOR INTENDED SERVICE.

1. DUCT WRAP: FIBERGLASS BLANKET INSULATION; 1PCF, R-4.0 PER INCH, 0-250F SERVICE; FOIL VAPOR BARRIER; FORMALDEHYDE FREE; JOHNS MANVILLE "MICROLITE XG" OR APPROVED EQUIVALENT.
2. DUCT LINER: FIBERGLASS DUCT LINER; 1" THICK, 1.5 PCF, 0-250F SERVICE, 6000 FPM RATED, 0.7 NRC; NEOPRENE COATING AND AN ANTI-MICROBIAL TREATMENT ON ALL SURFACED EXPOSED TO AIRFLOW; JOHNS MANVILLE "LINACOUSTIC RC" OR APPROVED EQUIVALENT. PROVIDE CONTINUOUS PROTECTION OF LEADING EDGE OF LINER PER MANUFACTURER'S RECOMMENDATIONS.
3. ELASTOMERIC PIPE INSULATION: PREFORMED CLOSED CELL FLEXIBLE ELASTOMERIC FOAM, K=0.28 BTU/HR-SF-F-IN, 0.08 PERM-INCH, 0-220F SERVICE; 25/50 RATED UP TO 1-1/2" THICKNESS; JOINTS AND SEAMS SEALED WITH MANUFACTURER'S LIQUID APPLIED CONTACT SEALANT TO PROVIDE CONTINUOUS VAPOR BARRIER; ARMACELL "AP ARMAFLEX" OR APPROVED EQUIVALENT.
4. FIBERGLASS PIPE INSULATION: PREFORMED FIBERGLASS PIPE INSULATION; K=0.26 BTU/HR-SF-F-IN, 0-850F SERVICE; GLASS FIBER REINFORCED ALL-SERVICE JACKET WITH ADHESIVE LAP STRIPS; OWENS CORNING "FIBERGLAS" OR APPROVED EQUIVALENT.
5. ADA PIPING GUARDS: CLOSED CELL VINYL (K=1.2 BTU/HR-SF-F-IN), MOLDED [illegible] COVER SINK P-TRAPS, TRAP ARM, STOP VALVES, AND HW & CW RISERS FOR ADA COMPLIANCE; NON-ABSORBENT, ANTIMICROBIAL FINISH; INTERNALLY RIBBED; REUSABLE [illegible] SNAP CLIPS; WHITE FINISH; TRUEBRO "LAV-GUARD" OR APPROVED EQUIVALENT.

G. PIPING INSULATION SCHEDULE:

1. CONDENSATE DRAINAGE PIPING INSIDE BUILDING SHALL BE INSULATED WITH 1/2" THICK ELASTOMERIC PIPE INSULATION.
2. DOMESTIC HOT WATER PIPING SHALL BE INSULATED WITH 3/4" THICK FIBERGLASS PIPE INSULATION.
3. RAINWATER (ROOF DRAIN) PIPING AND UNDERSIDE OF DRAIN BODY SHALL BE INSULATED WITH 1" THICK FIBERGLASS DUCT WRAP.
4. PIPING EXPOSED BELOW LAVATORIES AND SINKS SHALL BE INSULATED WITH ADA PIPING GUARDS.

H. DUCTWORK INSULATION SCHEDULE:

1. SUPPLY DUCTWORK CONCEALED ABOVE CEILING SHALL BE INSULATED WITH 2" THICK FIBERGLASS DUCT WRAP. ALL CONCEALED AND EXPOSED SUPPLY DUCTWORK WITHIN 10 FEET OF ROOFTOP UNIT CONNECTION SHALL ALSO BE INTERNALLY LINED WITH 1" THICK ACOUSTICAL DUCT LINER.
2. RETURN DUCTWORK WITHIN 10 FEET OF ROOFTOP UNIT RETURN CONNECTION SHALL BE INTERNALLY LINED WITH 1" THICK ACOUSTICAL DUCT LINER. ALL CONCEALED RETURN DUCTWORK WHICH IS NOT INTERNALLY LINED SHALL BE INSULATED WITH 1" FIBERGLASS DUCT WRAP.
3. RESTROOM EXHAUST DUCTWORK UPSTREAM OF FAN SHALL BE INTERNALLY LINED WITH 1" THICK ACOUSTICAL DUCT LINER.

1.05 WALL, FLOOR AND ROOF PENETRATIONS

A. PROVIDE SLEEVES FOR ALL WALL AND FLOOR PENETRATIONS. PROVIDE UL LISTED FIRESTOP SYSTEM AT ALL PENETRATIONS OF FIRE RATED ASSEMBLIES. PROVIDE ESCUTCHEONS FOR ALL VISIBLE WALL AND CEILING PENETRATIONS.

B. ALL EXTERIOR WALL AND ROOF PENETRATIONS SHALL BE FLASHED AND SEALED WEATHERTIGHT.

C. PROVIDE ROOF CURB FOR ALL ROOF MOUNTED EQUIPMENT. ROOF CURBS SHALL BE INSULATED, MINIMUM 14" TALL, COMPATIBLE WITH AND MATED TO ROOFING SYSTEM, SPECIFICALLY DESIGNED TO MATCH THE SIZE AND WEIGHT OF THE SUPPORTED EQUIPMENT, SLOPED TO PROVIDE LEVEL MOUNTING FOR EQUIPMENT, AND MANUFACTURED PER NRCA STANDARDS. CURB WALLS SHALL BE INSULATED MINIMUM R-4. PENETRATIONS OF PIPING AND CONDUIT SHALL BE MIN 8" ABOVE FINISHED ROOF AND SHALL BE SEALED WEATHERTIGHT.

D. PROVIDE A WEATHER TIGHT PIPE PORTAL, COMPATIBLE WITH ROOF SYSTEM, FOR PIPING AND CONDUIT PENETRATIONS SEPARATE 14" HIGH ROOF CURB WITH CURB CAP (MIN 4" OVERHAND ON ALL SIDES) FOR MISCELLANEOUS PIPING AND CONDUIT PENETRATIONS THROUGH ROOF. PENETRATE AT MINIMUM 8" ABOVE FINISHED ROOF AND SEAL WEATHERTIGHT. DIRECT PENETRATIONS THROUGH ROOF ARE NOT ACCEPTABLE.

1.06 MECHANICAL IDENTIFICATION

A. EQUIPMENT AND CONTROLS: LABEL ALL EQUIPMENT WITH PERMANENT LABEL (EMBOSSED METAL, ENGRAVED PLASTIC OR EQUAL – HANDWRITTEN MARKER IS NOT ACCEPTABLE) INDICATING DESIGNATION. LABEL ALL THERMOSTATS AND CONTROL DEVICES WITH PERMANENT PRINTED (HANDWRITING IS NOT ACCEPTABLE) LABEL INDICATING DESIGNATION OF CONTROLLED EQUIPMENT. LABELS SHALL NOT COVER NAMEPLATES OR OPERATING INSTRUCTIONS.

B. PIPING: LABEL ALL PIPING SYSTEM WITH PERMANENT LABELS. NEW PIPING SYSTEMS SHALL BE LABELED PER ANSI A13.1. EXTENSIONS TO EXISTING PIPING SYSTEMS SHALL BE LABELED PER THE BUILDING STANDARD (COORDINATE WITH LANDLORD). LABELS SHALL BE METAL OR PLASTIC, STRAPPED TO THE OUTSIDE OF THE INSULATION SYSTEM, EASILY READABLE FROM FLOOR LEVEL, COLOR CODED PER ANSI A13.1, AND SIZED PER CODE. PROVIDE LABELS AT MAXIMUM 20 FT CENTERS, ALL BRANCH TAKE-OFF'S, EQUIPMENT CONNECTIONS, AND ON BOTH SIDES OF WALL/FLOOR PENETRATIONS.

C. VALVES AND PIPING APPURTENANCES: LABEL ALL VALVES, SENSORS AND OTHER PIPING SYSTEM APPURTENANCES WITH PERMANENT LABEL (EMBOSSED METAL, ENGRAVED PLASTIC OR EQUAL – HANDWRITTEN PERMANENT MARKER IS NOT ACCEPTABLE) INDICATING DESIGNATION.

1.07 EXCAVATION AND BACKFILL

A. PROVIDE ALL EXCAVATION AND BACKFILL REQUIRED FOR CONSTRUCTION UNDER THIS CONTRACT.

PART 3 EXECUTION

3.01 DELIVERY AND STORAGE

A. CONTRACTOR SHALL DELIVER EQUIPMENT AND MATERIALS TO THE PROJECT SITE. SAFEGUARD AND PROVIDE STORAGE IN CLEAN, DRY LOCATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

3.02 INSTALLATION

A. INSTALL ALL PRODUCTS PER CODE AND MANUFACTURER'S RECOMMENDATIONS FOR THE APPLICATION.

3.03 WARRANTY

A. PROVIDE MINIMUM 1 YEAR PARTS AND LABOR WARRANTY FOR ALL NEW EQUIPMENT, MATERIALS AND WORKMANSHIP FROM THE DATE OF BENEFICIAL OCCUPANCY. PROVIDE ADDITIONAL 5 YEAR PARTS-ONLY WARRANTY FOR ALL NEW COMPRESSORS. ADDITIONAL SUPPLEMENTAL WARRANTY SHALL BE PROVIDED WHERE SPECIFIED.

SECTION 4 – FIRE PROTECTION

PART 1 GENERAL

1.01 SCOPE

A. THIS IS A NEW FACILITY WHICH IS TO BE SERVED BY A NEW, COMPLETE WATER-BASED FIRE PROTECTION SYSTEM. PROVIDE NEW HYDRAULICALLY CALCULATED FIRE PROTECTION SYSTEM TO COVER ALL AREAS PER NFPA 13 AND LOCAL REQUIREMENTS. PROVIDE/MOVE SPRINKLERS AND PIPING AS REQUIRED – REUSE EXISTING WHERE POSSIBLE.

B. THE CONTRACTOR SHALL PROVIDE DETAILED FP SYSTEM DESIGN, HYDRAULIC CALCULATIONS, FABRICATION DRAWINGS, ETC. DESIGN, FABRICATION AND INSTALLATION SHALL BE PROVIDED BY FIRMS WITH NOT LESS THAN 5 YEARS EXPERIENCE IN FIRE PROTECTION SYSTEMS SIMILAR TO THIS PROJECT AND SHALL BE STAMPED AND SIGNED BY CONTRACTOR'S REGISTERED PROFESSIONAL ENGINEER OR NICET CERTIFIED FIRE PROTECTION CONTRACTOR LICENSED BY THE STATE OF SYSTEM INSTALLATION.

PART 2 PRODUCTS

2.01 GENERAL SPRINKLER SYSTEMS

A. ALL FIRE PROTECTION PRODUCTS SHALL BE UL LISTED AND FM APPROVED FOR SPECIFIC APPLICATION.

B. PIPING: WET SYSTEM PIPING SHALL BE BLACK STEEL, ASTM A 53, WITH CAST IRON OR MALLEABLE IRON FITTINGS; DRY AND PREACTION SYSTEM PIPING AND FITTINGS SHALL BE HOT DIP GALVANIZED STEEL WITH GALVANIZED FITTINGS. PIPING 2" AND SMALLER SHALL BE SCHEDULE 40, 2-1/2" AND LARGER SHALL BE SCHEDULE 10. JOINTS SHALL BE AS APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION. PIPING SYSTEMS SHALL BE RATED FOR 50 PSI ABOVE THE OPERATING PRESSURE. PLASTIC PIPING SYSTEMS, INCLUDING THOSE APPROVED BY NFPA 13, ARE PROHIBITED.

C. SPRINKLER HEADS: PROVIDE SEMI-RECESSED TYPE, WITH ESCUTCHEONS, AT ALL LAY-IN CEILINGS; CONCEALED FLUSH TYPE, WITH COVERPLATES, AT HARD CEILINGS; UPRIGHT TYPE IN AREAS WITHOUT CEILINGS; SIDEWALL TYPE IN ALL HORIZONTAL INSTALLATIONS. SPRINKLERS SHALL BE CENTERED IN CEILING TILES, +/- 2". LOCATIONS OF SPRINKLERS IN HARD CEILINGS SHALL BE APPROVED BY THE ARCHITECT. NO PORTION OF SPRINKLER HEAD, ESCUTCHEON OR COVERPLATE MAY BE PAINTED OR MODIFIED EXCEPT BY FACTORY IN CONFORMANCE WITH UL LISTING AND FM APPROVAL. NEW SPRINKLERS SHALL MATCH EXISTING IN APPEARANCE AND SHALL HAVE SAME TEMPERATURE AND RESPONSE RATING.

D. PROVIDE ENTRANCE RISER WITH FIRE DEPARTMENT CONNECTION WHERE INDICATED ON PLANS. INSTALL COMPLETE WITH ALL REQUIRED VALVING, TRIM, AND MONITORING PER NFPA 13 AND NFPA 72 (INCLUDING INDICATOR VALVE, FLOW AND TAMPER SWITCHES, SYSTEM DRAIN AND LOCAL WATER FLOW ALARM). COORDINATE SPECIFIC LOCAL REQUIREMENTS FOR SIZES, LOCATIONS, ARRANGEMENT, ETC., WITH FIRE MARSHAL.

PART 3 EXECUTION

3.01 GENERAL

A. SPRINKLER SYSTEM SHALL BE DESIGNED AND INSTALLED PER NFPA TO PROTECT ALL AREAS.

B. PROVIDE SPRINKLER SYSTEM FABRICATION DRAWINGS AND HYDRAULIC CALCULATIONS FOR PERMITTING. COORDINATE SPECIFIC REQUIREMENTS WITH THE LAHJ.

C. PROVIDE SIGNAGE, DRAINS AND TEST CONNECTIONS PER NFPA 13.

D. SPRINKLERS IN LAY-IN CEILINGS SHALL BE CENTERED IN TILES (+/- 2"). SPRINKLER LAYOUT IN HARD CEILINGS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.

E. PROVIDE STOCK OF SPARE SPRINKLERS AND TOOLS PER NFPA 13.

F. PROVIDE HANGERS, SUPPORTS AND RESTRAINTS PER NFPA 13.

G. FLUSH, CLEAN AND PRESSURE TEST ENTIRE PIPING SYSTEM PER NFPA 13 BEFORE PLACING INTO SERVICE.

H. DEGREASE, CLEAN, PRIME AND PAINT ALL PIPING AND FITTINGS (DO NOT PAINT SPRINKLERS) WHICH ARE VISIBLE FROM FINISHED SPACES. FINAL COLOR SHALL BE SELECTED BY THE ARCHITECT.

I. INSTALL AND TEST FIRE PUMP IN ACCORDANCE WITH NFPA 20.

3.02 HYDRAULIC DESIGN

A. CONDUCT A FLOW TEST AS CLOSE TO THE SITE AS POSSIBLE. AS A MINIMUM, THE FLOW TEST SHALL INCLUDE: LOCATION/ELEVATION OF PRESSURE TEST GAUGES, FLOW LOCATION, STATIC AND RESIDUAL PRESSURES, FLOW, DATE/TIME, NAME AND CONTACT INFORMATION OF TESTING ENGINEER.

B. HYDRAULIC CALCULATIONS SHALL BE OF THE METHODS AND CRITERIA SPECIFIED BY NFPA 13. PROVIDE MINIMUM 15% OR 10 PSI SAFETY FACTOR, WHICHEVER IS GREATER, IN DESIGN TO ALLOW FOR FUTURE VARIATIONS IN THE AVAILABLE WATER SUPPLY. VELOCITY IN SYSTEM PIPING SHALL NOT EXCEED 20 FT/SEC.

3.03 COORDINATION

A. IT IS THE SOLE RESPONSIBILITY OF THE FP SUB-CONTRACTOR TO COORDINATE THE FP SYSTEM WITH ALL OTHER TRADES TO AVOID CONFLICTS. SUBMIT COORDINATION DRAWINGS FOR APPROVAL BY THE GENERAL CONTRACTOR PRIOR TO INSTALLATION. DRAWINGS SHALL BE COORDINATED WITH, AND SHALL INDICATE, ALL CONSTRUCTION REQUIRING COORDINATION (CEILING FEATURES, LIGHTING, DUCTWORK, OTHER PIPING SYSTEMS, EQUIPMENT, CABLE TRAYS, ETC.). WHERE CONFLICTS ARISE DUE TO LACK OF COORDINATION, THE SPRINKLER SUB-CONTRACTOR SHALL RESOLVE AT NO ADDITIONAL COST TO THE OWNER – NO EXCEPTIONS. NO ALLOWANCE WILL BE MADE FOR REWORK REQUIRED BY FP SYSTEM RESULTING FROM LACK OF PROPER COORDINATION.

B. COORDINATE INSTALLATION WITH HVAC DUCTWORK TO AVOID CONFLICTS AND ENSURE ADEQUATE COVERAGE AROUND AND BELOW OBSTRUCTIONS. REFER TO HVAC PLANS FOR GENERAL COORDINATION AND VERIFY WITH HVAC CONTRACTOR.

C. COORDINATE INSTALLATION WITH ELECTRICAL EQUIPMENT TO ENSURE ALL CLEARANCES AROUND AND ABOVE EQUIPMENT REQUIRED BY NFPA 70: NATIONAL ELECTRICAL CODE ARE OBSERVED. REFER TO ELECTRICAL PLANS FOR GENERAL COORDINATION AND VERIFY WITH ELECTRICAL CONTRACTOR.

SECTION 5 – PLUMBING

PART 1 GENERAL

1.01 SUMMARY

A. PIPING SYSTEM CONSTRUCTION SHALL COMPLY WITH APPLICABLE STANDARDS REFERENCED BY CODE FOR PIPING MATERIAL AND SERVICE.

B. SUBJECT TO COMPLIANCE WITH THE SPECIFICATIONS AND PLUMBING FIXTURE SCHEDULE, THE PRODUCTS OF THE FOLLOWING MANUFACTURERS SHALL BE DEEMED ACCEPTABLE:
1. FLOOR DRAINS: JR SMITH, JOSAM, ZURN
2. SPECIALTIES: ENGINEERING BRASS, JOSAM, JR SMITH, MCGUIRE, PRECISION PLUMBING, WATTS, ZURN

PART 2 PRODUCTS

2.01 DOMESTIC WATER SUPPLY SYSTEMS

A. DOMESTIC COLD WATER AND HOT WATER PIPING: INSIDE BUILDING SHALL BE TYPE L HARD DRAWN SEAMLESS COPPER WITH WROUGHT FITTINGS AND SOLDERED (UP TO 100 PSIG) OR BRAZED (UP TO 200 PSIG) JOINTS; UNDERGROUND SHALL BE TYPE K SEAMLESS COPPER WITH WROUGHT FITTINGS AND BRAZED JOINTS. SOLDER/BRAZING ALLOY SHALL NOT CONTAIN LEAD AND SHALL BE APPROVED BY THE LAHJ FOR POTABLE WATER USE.

2.02 WASTE AND VENT (DWV) SYSTEMS

A. ABOVE-GROUND WASTE AND VENT PIPING SHALL BE NO-HUB SERVICE WEIGHT CAST IRON PIPING AND FITTINGS, ASPHALT COATED, WITH MECHANICAL COUPLINGS (ELASTOMERIC SLEEVE WITH STAINLESS STEEL CLAMPS), COMPLYING WITH CISPI 310; UNDERGROUND WASTE AND VENT PIPING SHALL BE DWV PVC WITH SOLVENT WELD JOINTS AND FITTINGS. DWV PVC MAY BE SUBSTITUTED FOR ABOVE GROUND WASTE AND VENT PIPING WHICH IS NOT INSTALLED WITHIN AN HVAC PLENUM, DOES NOT PENETRATE A FIRE-RATED ASSEMBLY, AND IS APPROVED BY THE LAHJ. PROVIDE DRAINAGE PATTERN FITTINGS. SLOPE CLEAR WASTE AND SANITARY PIPING 2-1/2" AND SMALLER PIPING AT MIN 2%; 3" AND LARGER PIPING AT 1%.

2.03 STORM DRAINAGE SYSTEMS

A. ABOVE-GROUND STORM DRAINAGE PIPING SHALL BE NO-HUB SERVICE WEIGHT CAST IRON PIPING AND FITTINGS, PETROLEUM ASPHALT COATED INSIDE AND OUT, WITH MECHANICAL COUPLINGS (ELASTOMERIC SLEEVE WITH STAINLESS STEEL CLAMPS), COMPLYING WITH CISPI 310; UNDERGROUND STORM DRAINAGE PIPING SHALL BE HUB AND SPIGOT ASPHALT COATED CAST IRON PIPING WITH NEOPRENE GASKETS, COMPLYING WITH ASTM A 74. PROVIDE DRAINAGE PATTERN FITTINGS AND SLOPE PIPING AT MINIMUM 1" PER 8 FEET UNLESS NOTED OTHERWISE.

2.04 NATURAL GAS SYSTEMS

A. GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE, ASTM A 53, WITH STANDARD WEIGHT WROUGHT STEEL FITTINGS AND THREADED JOINTS. THREAD COMPOUNDS SHALL BE LISTED SPECIFICALLY FOR NATURAL GAS SERVICE AND FOR THE PIPE MATERIAL. UNDERGROUND NATURAL GAS PIPING SHALL BE ASPHALTUM COATED AND WRAPPED IN 10 MIL POLYETHYLENE. PIPING EXPOSED TO WEATHER SHALL BE PRIMED AND PAINTED WITH 2 COATS UV RESISTANT, WEATHERPROOF PAINT IN A COLOR TO BE APPROVED BY THE ARCHITECT.

B. PROVIDE UL LISTED FLEXIBLE CONNECTION, UNION, DIRT LEG, GAS COCK, AND REDUCER (IF REQUIRED) AT ALL EQUIPMENT AND APPLIANCE CONNECTIONS.

C. GAS PIPING SHALL NOT BE ROUTED WITHIN INACCESSIBLE ASSEMBLIES (ABOVE HARD CEILINGS, WITHIN WALLS, ETC.) EXCEPT WHERE SPECIFICALLY APPROVED BY THE LAHJ. WHERE APPROVED, PROVIDE GAS TIGHT CAST IRON PIPE ENCLOSURE WITH MIN 1" ANNULAR SPACE, EXTEND 2" BEYOND BOTH ENDS OF THE INACCESSIBLE SPACE WITH BOTH ENDS SEALED AND VENTED TO ATMOSPHERE.

D. PROVIDE GAS PRESSURE REGULATOR AT ALL EQUIPMENT CONNECTIONS. PRESSURE REGULATORS SHALL CONTROL SUPPLY PRESSURE TO MIN/MAX RANGE SPECIFIED BY EQUIPMENT MANUFACTURER. VENT PRESSURE RELIEF TO OUTDOORS PER NFPA 54.

2.05 FIXTURES

A. FLOOR DRAIN, LIGHT DUTY: ROUND BRASS BODY AND STRAINER; TRAP PRIMER CONNECTION; JR SMITH 2005, OR APPROVED EQUIVALENT.

B. NON-FREEZE WALL HYDRANT: NON-FREEZE WALL HYDRANT, ANSI A112.21.3; NICKEL PLATED BRONZE VALVE, VACUUM BREAKER AND 3/4" HOSE CONNECTION; RECESSED 1/4 TURN VALVE (COORDINATE DEPTH WITH WALL ASSEMBLY); 16 GA STAINLESS STEEL RECESSED VALVE BOX WITH CONTINUOUS PIANO HINGE AND LOCKING COVER WITH 180-DEGREE OPENING; KEY-OPERATED VALVE WITH "T" HANDLE SQUARE-HEAD KEY (SAME KEY TO UNLOCK COVER AND OPERATE VALVE); JR SMITH MODEL SCHEDULED OR APPROVED EQUIVALENT.

PART 3 EXECUTION

3.01 SUMMARY

A. ALL PIPING SYSTEMS SHALL PASS PRESSURE TESTS PER CODE PRIOR TO COVERING WITH PERMANENT CONSTRUCTION OR PLACING INTO SERVICE. PRESSURIZED PIPING SYSTEMS SHALL BE TESTED TO 1.5 TIMES THE DESIGN OPERATING PRESSURE FOR 2 HOURS, GRAVITY PIPING SYSTEMS SHALL BE TESTED TO 10 FT WC FOR 15 MINUTES.

B. PIPING SHALL BE PROTECTED FROM WATER, DIRT, DEBRIS, SCALE, CORROSION AND DAMAGE DURING CONSTRUCTION. CAP ALL OPEN ENDS UNTIL READY FOR FINAL CONNECTION AND USE.

C. CLEAN AND SANITIZE ALL DOMESTIC COLD AND HOT WATER PIPING SYSTEMS AS REQUIRED BY CODE BEFORE POTABLE USE. FLUSH WITH A CLEANING AND DEGREASING AGENT AND RINSE WITH CLEAN WATER, THEN FLUSH WITH AN APPROVED SANITIZING AGENT AND RINSE AGAIN WITH CLEAN WATER. SERVICE SHALL BE PERFORMED BY LICENSED AGENTS ONLY.

D. INSTALL ALL OVERHEAD PIPING AS HIGH AS POSSIBLE. MAINTAIN MINIMUM REQUIRED SLOPE FOR ALL SLOPED PIPING.

E. PROVIDE CLEANOUTS AT ALL CHANGES IN DIRECTION AND AT MINIMUM INTERVALS AS REQUIRED BY CODE IN DWV AND STORM DRAINAGE PIPING.

F. PROVIDE 1/4 TURN ANGLE STOP BALL VALVES AT ALL PLUMBING FIXTURES AND APPLIANCES (DISHWASHER, ICEMAKER, ETC.). STOP VALVES SHALL HAVE CHROME PLATED BRASS BODY, STEM, HANDLE, AND ESCUTCHEON PLATE. FLEXIBLE CONNECTIONS TO PLUMBING FIXTURES SHALL BE BRAIDED STEEL OR COPPER TUBING ONLY, PLASTIC TUBING IS NOT ACCEPTABLE.

G. PROVIDE BALL VALVES AT ALL EQUIPMENT (WATER HEATERS) AND HVAC SYSTEM CONNECTIONS. BALL VALVE SHALL HAVE BRONZE BODY, BRASS BALL, AND TEFLON SEAT AND PACKING.

H. PROVIDE PRESSURE REDUCING VALVES WHERE REQUIRED TO LIMIT DOMESTIC WATER SUPPLY PRESSURE TO 75 PSIG AT ALL FIXTURES AND EQUIPMENT CONNECTIONS.

I. PROVIDE BACKFLOW PREVENTION APPROVED BY THE LAHJ AT MAIN BUILDING ENTRANCE AND AT ALL CONNECTIONS TO MECHANICAL SYSTEMS AND EQUIPMENT.

J. PROVIDE DIELECTRIC UNIONS AT ALL CONNECTIONS BETWEEN DISSIMILAR METALS.

K. PROVIDE WATERLESS TRAP GUARDS FOR ALL FLOOR DRAINS.

SECTION 6 – HVAC PIPING

PART 1 GENERAL

1.01 SUMMARY

A. PIPING SYSTEM MATERIALS AND CONSTRUCTION SHALL COMPLY WITH CODE FOR PIPING SERVICE AND APPLICATION.

PART 2 PRODUCTS

2.01 PIPING

A. COOLING COIL CONDENSATE DRAINAGE: SCHEDULE 40 PVC WITH PCV FITTINGS AND SOLVENT WELD JOINTS. SLOPE AT MINIMUM 1/8" PER FOOT.

PART 3 EXECUTION

A. ALL PIPING SYSTEMS SHALL PASS PRESSURE TEST TO HOLD TEST PRESSURE FOR MINIMUM 2 HOURS. PRESSURIZED PIPING SYSTEMS SHALL BE TESTED TO 1.5 TIMES THE DESIGN OPERATING PRESSURE ([illegible] PSIG MINIMUM), GRAVITY PIPING SYSTEMS SHALL BE TESTED TO 10 FT WC. PLASTIC PIPING SYSTEMS SHALL BE TESTED WITH PRESSURIZED WATER, DO NOT PRESSURE TEST WITH COMPRESSED AIR OR OTHER GAS.

B. INSTALL ALL OVERHEAD PIPING ABOVE CEILING AS HIGH AS POSSIBLE. PIPING INSTALLATION SHALL NOT INTERFERE WITH EQUIPMENT ACCESS. DO NOT ROUTE PIPING ABOVE ELECTRICAL EQUIPMENT. MAINTAIN MINIMUM REQUIRED SLOPE FOR ALL SLOPED PIPING.

C. PROVIDE CLEANOUTS AT ALL CHANGES IN DIRECTION AND AT MINIMUM INTERVALS AS REQUIRED BY CODE IN DRAINAGE PIPING.

D. COOLING COIL CONDENSATE DRAINAGE PIPING SHALL BE SIZED PER THE PLANS, BUT NOT SMALLER THAN THE EQUIPMENT CONNECTION SIZE. PROVIDE P-TRAP AT UNIT (DRAIN SEAL: [illegible] GREATER THAN THE SUPPLY FAN TOTAL STATIC PRESSURE). PROVIDE MIN 1/8" PER FOOT SLOPE, FREE OF LOCAL HIGH OR LOW POINTS (PROVIDE CONDENSATE PUMP WHERE REQUIRED TO MAINTAIN MIN SLOPE). TERMINATE AT SINK TAILPIECE, ABOVE HUB/FLOOR DRAINS (WITH FUNNEL), ON ROOF (WITH SPLASH BLOCK), OR AT BUILDING EXTERIOR (WITH DRY WELL).

E. REFRIGERANT LINES SHALL BE SIZED AND INSTALLED PER THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS FOR THE SPECIFIC, AS-INSTALLED CONDITIONS. INSTALL TRAPS, DOUBLE RISERS, HARD SHUT-OFF SOLENOID VALVES AND OTHER ACCESSORIES WHERE RECOMMENDED. CLEAN, EVACUATE, AND PRESSURE TEST ENTIRE SYSTEM PRIOR TO INITIAL REFRIGERANT CHARGE. ALL WORK SHALL BE PERFORMED ONLY BY A CONTRACTOR LICENSED TO HANDLE THE APPLICABLE REFRIGERANT – NO EXCEPTIONS.

SECTION 7 – HVAC DUCTWORK

PART 1 GENERAL

1.01 SUMMARY

A. GENERAL HVAC DUCTWORK SYSTEMS SHALL BE FABRICATED AND INSTALLED PER SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" AND SHALL MEET THE FOLLOWING SMACNA PRESSURE AND SEAL CLASSIFICATIONS:

SUPPLY:	1" WG / A SEAL
RETURN:	-1" WG / A SEAL
EXHAUST:	-1" WG / B SEAL

B. ALL JOINTS AND SEAMS IN GENERAL DUCT SYSTEMS SHALL BE SEALED WITH UL 181 WATER-BASED MASTIC (TAPE IS NOT AN ACCEPTABLE DUCT SEALANT); FLANGED CONNECTIONS SHALL BE SEALED WITH GASKETS AND MECHANICALLY FASTENED. ALL AUDIBLE LEAKS SHALL BE SEALED.

PART 2 PRODUCTS

2.01 DUCTWORK:

A. GENERAL SUPPLY, RETURN AND EXHAUST AIR METAL: G90 GALVANIZED STEEL, LOCK-FORMING QUALITY, FABRICATED AND INSTALLED PER SMACNA AND CODE. FIBERGLASS DUCT BOARD MAY NOT BE SUBSTITUTED FOR STEEL DUCTWORK. DUCTWORK SHALL BE RECTANGULAR OR ROUND PER DRAWINGS – SIZES INDICATED ON DRAWINGS ARE NET CLEAR INSIDE DIMENSIONS (ADD LINER THICKNESS FOR SHEETMETAL SIZES). PROVIDE "PAINT GRIP" (MILL PHOSPHATIZED) GALVANIZED STEEL WHERE DUCTWORK IS TO BE PAINTED.

B. EXPOSED ROUND DUCTWORK SHALL BE SPIRAL.

C. FLEXIBLE DUCT: UL 181 CLASS 1, WITH REINFORCED INNER LAYER, STEEL WIRE HELIX, MINIMUM R-4.2 INSULATION AND OUTER VAPOR BARRIER. FLEXIBLE DUCT MAY BE USED FOR FINAL CONNECTIONS TO AIR DEVICES (MAX. 10') AND SHALL BE RATED FOR OPERATING PRESSURE OF SYSTEM IN WHICH INSTALLED. SECURE INNER AND OUTER LAYER TO HARD ROUND DUCT, AIR DEVICE OR TERMINAL UNIT CONNECTION PER SMACNA AND SEAL VAPOR BARRIER WITH FOIL TAPE.

2.02 DUCT ACCESSORIES

A. TAKE-OFF'S FOR ROUND DUCT RUNOUTS: SPIN-IN OR FLANGED FITTING WITH LOCKING MANUAL BALANCING DAMPER (INSTALL WITH DAMPER AXIS PARALLEL TO TRUNK DUCT AXIS) AND NO EXTRACTOR SCOOP. PROVIDE FOAM GASKET FOR FLANGED TAKE-OFF AND SECURE TO TRUNK DUCT WITH SHEETMETAL SCREWS AROUND TAP AT MAX. 6" CENTERS. PROVIDE CONICAL FITTINGS OR 45 DEGREE BOOTS AT TAKE-OFFS IN MEDIUM PRESSURE DUCT SYSTEMS.

B. ELBOWS: SMOOTH RADIUS WITH CENTERLINE RADIUS EQUAL TO 1.5 TIMES THE DUCT WIDTH IN PLANE OF TURN. SHORT RADIUS (CENTERLINE RADIUS 1.0 TIMES DUCT WIDTH, MIN. 6" INSIDE RADIUS) OR 90 DEGREE MITRED ELBOWS WITH SINGLE THICKNESS (DOUBLE THICKNESS OVER 30" LENGTH) TURNING VANES MAY BE SUBSTITUTED IN DUCT LESS THAN 1500 FPM; SHORT RADIUS ELBOWS WITH 3 FULL LENGTH SPLITTER VANES (PER SMACNA) MAY BE SUBSTITUTED IN HIGHER VELOCITY DUCT.

C. TRANSITIONS: TRANSITIONS SHALL BE MADE WITH MAXIMUM 30 DEGREE DIVERGENCE AND 45 DEGREE CONVERGENCE.

D. MANUAL BALANCING DAMPERS: GALVANIZED STEEL; TRIPLE-V BLADES OR ROUND BLADES WITH CRIMPED EDGES RATED FOR 1500 FPM; OPPOSED BLADE ARRANGEMENT WITH LINKAGE OUTSIDE AIRSTREAM; PERMANENTLY LUBRICATED STAINLESS STEEL BEARINGS; MANUAL LEVER WITH QUADRANT LOCK; EXTERNAL DAMPER POSITION INDICATOR; RUSKIN MD35 (RECTANGULAR), MDRS25 (ROUND) OR APPROVED EQUIVALENT.

E. BACKDRAFT DAMPERS: GALVANIZED STEEL, COUNTER-BALANCED WITH ADJUSTABLE COUNTERWEIGHTS, AND RATED FOR THE DESIGN DUCT VELOCITIES (MIN. AND MAX.) IN WHICH INSTALLED. BD'S INSTALLED AT FAN DISCHARGE SHALL BE ORIENTED WITH BLADES PERPENDICULAR TO FAN AXIS OF ROTATION.

F. ALL ROUND DUCT SYSTEM ELBOWS AND FITTINGS SHALL BE FACTORY OR SHOP FABRICATED, FIELD FABRICATED FITTINGS ARE NOT ACCEPTABLE.

2.03 FIRE AND SMOKE DAMPERS

A. ALL FIRE, SMOKE AND COMBINATION FIRE AND SMOKE DAMPERS SHALL BE UL555 (UL555S) LISTED AND LABELED, SHALL MATCH THE FIRE/SMOKE RATING OF THE ASSEMBLY PENETRATED, AND SHALL BE RATED FOR 110 PERCENT OF DESIGN OPERATING VELOCITY. INSTALL PER MANUFACTURER'S UL LISTING INSTRUCTIONS.

B. FIRE DAMPERS: UL 555 (1-1/2-HR RATED DAMPER FOR ASSEMBLIES UP TO 2-HR; 3-HR RATED FOR ASSEMBLIES OVER 2-HR); DYNAMIC RATED; UP TO 1800 FPM DESIGN SHALL BE 2000 FPM RATED, CURTAIN TYPE FIRE DAMPER WITH TYPE B OR C FRAME (BLADES HOUSED OUTSIDE AIRSTREAM), RUSKIN DIBD OR APPROVED EQUIVALENT; OVER 1800 FPM DESIGN SHALL BE 2500 FPM RATED, MULTIPLE BLADE TYPE WITH AIRFOIL BLADES, RUSKIN FD60, OR APPROVED EQUIVALENT.

PART 3 EXECUTION

3.01 SUMMARY

A. ALL METAL DUCT SYSTEMS SHALL BE INSTALLED PER SMACNA GUIDELINES, NFPA AND CODE FOR SPECIFIC SERVICE. MANUFACTURED DUCT SYSTEMS (METALLIC AND NON-METALLIC) SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

B. INSTALL NEW DUCTWORK AS HIGH AS POSSIBLE, TIGHT TO STRUCTURE ABOVE, BUT NOT HIGHER THAN 48" ABOVE CEILING ELEVATION IN SECTIONS REQUIRING ACCESS FOR MAINTENANCE AND INSPECTION. RELOCATE EXISTING DUCTWORK AS REQUIRED TO AVOID CONFLICTS WITH NEW CONSTRUCTION.

C. PROVIDE FIRE DAMPERS IN ALL DUCT PENETRATIONS AND TRANSFER OPENINGS IN FIRE RATED ASSEMBLIES. FIRE DAMPERS MAY BE OMITTED IN 1-HR ASSEMBLIES WHERE ALLOWED BY CODE. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS AND RATINGS OF ALL ASSEMBLIES.

D. RUNOUTS TO AIR DEVICES SHALL MATCH THE CONNECTION (NECK) SIZE, UNLESS NOTED OTHERWISE. PROVIDE SUFFICIENT ROUND STEEL DUCT AND ELBOWS TO MAINTAIN MAXIMUM FLEX DUCT LENGTH SPECIFIED.

E. FLEX DUCT SHALL BE INSTALLED FREE OF KINKS AND SAGS (MAX. 1/2" PER FOOT DEFLECTION ALLOWED). ELBOWS IN LOW PRESSURE FLEX DUCT SHALL HAVE INSIDE RADIUS NOT LESS THAN DIAMETER OF DUCT.

F. RUNOUT CONNECTIONS TO TRUNK DUCTWORK SHALL BE MIN 5 FT DOWNSTREAM OF EQUIPMENT DISCHARGE AND SHALL BE MIN 3 FT DOWNSTREAM OF ELBOWS OR OTHER TAKE-OFFS.

G. DUCT SIZES INDICATED ARE CLEAR INSIDE REQUIREMENTS FOR AIR FLOW. ADJUST SHEET METAL SIZE AS REQUIRED FOR DUCT LINER.

H. PROVIDE ACCESS DOORS IN DUCTWORK FOR ALL COMPONENTS REQUIRING ACCESS FOR MAINTENANCE OR INSPECTION (E.G., FIRE DAMPERS). ACCESS DOORS SHALL BE HINGED, GASKETED FOR POSITIVE CLOSURE SEAL, MATCH CONSTRUCTION AND PRESSURE CLASSIFICATION OF THE DUCT SYSTEM, AND SHALL BE SIZED AND LOCATED TO FACILITATE THE REQUIRED FUNCTION. ACCESS DOORS SHALL BE LOCATED OVER ACCESSIBLE (LAY-IN) CEILINGS WHERE POSSIBLE.

I. PORTIONS OF CONCEALED DUCTWORK VISIBLE THROUGH AIR DISTRIBUTION DEVICES SHALL BE PAINTED FLAT BLACK.

SECTION 8 – HVAC EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. ALL EQUIPMENT SHALL BE UL OR ETL LISTED AND LABELED.

B. ALL EQUIPMENT SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS OF ASHRAE 90.1 AND ALL GOVERNING ENERGY CODES. ALL MOTORS 1HP AND LARGER SHALL BE NEMA PREMIUM EFFICIENCY.

C. ALL FANS SHALL BE AMCA LABELED.

D. EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE IN THE ELECTRICAL CONSTRUCTION DOCUMENTS, THE MECHANICAL CONTRACTOR SHALL FURNISH ELECTRICAL DISCONNECTS AND STARTERS FOR ALL EQUIPMENT PROVIDED UNDER THIS CONTRACT.

E. ALL EQUIPMENT SHALL BE NEW, FIRST QUALITY.

F. EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE, SEPARATE COMPONENTS OF A FINISHED SYSTEM AND RELATED CONTROLS SHALL BE BY A SINGLE MANUFACTURER.

G. REFER TO EQUIPMENT SCHEDULES FOR ADDITIONAL REQUIREMENTS.

PART 2 PRODUCTS

2.01 AIR CONDITIONING SYSTEMS

A. PACKAGED ROOFTOP UNITS, GAS HEAT: ROOFTOP MOUNTED, VERTICAL INTAKE AND DISCHARGE; UL AND CGA LISTED NATURAL GAS HEATING FURNACE AND DX COOLING COIL UNIT, SPECIFICALLY MANUFACTURED FOR OUTDOOR INSTALLATION; HEAVY GAUGE STEEL CABINET, BAKED ENAMEL FINISH; SEAMLESS TOP; HINGED ACCESS PANELS; FORWARD CURVED, FACTORY BALANCED EVAPORATOR FAN WITH ADJUSTABLE BELT DRIVE; MANUFACTURER'S ALUMINIZED STEEL HEAT EXCHANGER WITH INDUCED DRAFT BLOWER AND SPARK PILOT IGNITION; ALUMINUM FIN/COPPER TUBE EVAPORATOR COIL WITH FREEZESTAT; FILTER RACK WITH 1" PLEATED MEDIA MERV-8 FILTERS; SCROLL COMPRESSORS; THERMOSTATIC EXPANSION VALVE; ALUMINUM FIN/COPPER TUBE CONDENSER COIL WITH HAIL GUARD; DIRECT DRIVE PROPELLER TYPE CONDENSER FAN; EXTERNAL SERVICE VALVES; REFRIGERANT FILTER DRYER; CRANKCASE HEATER; COMPRESSOR START ASSIST; SHORT CYCLE, THERMAL AND HI/LO PRESSURE COMPRESSOR OVERLOAD PROTECTION; CONTROL VOLTAGE TRANSFORMER; 14" ROOF CURB; 2-POSITION MOTORIZED OA DAMPER OR OA ECONOMIZER WITH ENTHALPY CONTROLS, AS NOTED ON EQUIPMENT SCHEDULE; BAROMETRIC RELIEF KIT; LOW AMBIENT KIT FOR COOLING OPERATION DOWN TO 0F; SINGLE POINT ELECTRICAL CONNECTION AND ELECTRICAL DISCONNECT; R-410A REFRIGERANT; 1 YEAR PARTS AND LABOR WARRANTY FOR ENTIRE UNIT AND 5 YEAR PARTS ONLY COMPRESSOR WARRANTY.

B. PACKAGED ROOFTOP UNITS, ELECTRIC HEAT: ROOFTOP MOUNTED, VERTICAL INTAKE AND DISCHARGE; UL AND LISTED ELECTRIC HEATING FURNACE AND DX COOLING COIL UNIT, SPECIFICALLY MANUFACTURED FOR OUTDOOR INSTALLATION; HEAVY GAUGE STEEL CABINET, BAKED ENAMEL FINISH; SEAMLESS TOP; HINGED ACCESS PANELS; FORWARD CURVED, FACTORY BALANCED EVAPORATOR FAN WITH ADJUSTABLE BELT DRIVE; MANUFACTURER'S OPEN WIRE ELECTRIC RESISTANCE HEATER WITH PRIMARY AND SECONDARY OVER-TEMPERATURE [illegible]; ALUMINUM FIN/COPPER TUBE EVAPORATOR COIL WITH FREEZESTAT; FILTER RACK WITH 1" PLEATED MEDIA MERV-8 FILTERS; SCROLL COMPRESSORS; THERMOSTATIC EXPANSION VALVE; ALUMINUM FIN/COPPER TUBE CONDENSER COIL WITH HAIL GUARD; DIRECT DRIVE PROPELLER TYPE CONDENSER FAN; EXTERNAL SERVICE VALVES; REFRIGERANT FILTER DRYER; CRANKCASE HEATER; COMPRESSOR START ASSIST; SHORT CYCLE, THERMAL AND HI/LO PRESSURE COMPRESSOR OVERLOAD PROTECTION; CONTROL VOLTAGE TRANSFORMER; 14" ROOF CURB; 2-POSITION MOTORIZED OA DAMPER OR OA ECONOMIZER WITH ENTHALPY CONTROLS, AS NOTED ON EQUIPMENT SCHEDULE; BAROMETRIC RELIEF KIT; LOW AMBIENT KIT FOR COOLING OPERATION DOWN TO 0F; SINGLE POINT ELECTRICAL CONNECTION AND ELECTRICAL DISCONNECT; R-410A REFRIGERANT; 1 YEAR PARTS AND LABOR WARRANTY FOR ENTIRE UNIT AND 5 YEAR PARTS ONLY COMPRESSOR WARRANTY.

PART 3 EXECUTION

3.01 GENERAL

A. INSTALL ALL EQUIPMENT PER THESE DOCUMENTS, MANUFACTURER'S RECOMMENDATIONS, AND CODE REQUIREMENTS FOR SPECIFIC APPLICATION.

B. PROVIDE UL LISTED SMOKE DETECTOR IN THE SUPPLY DUCT OPENINGS OF ALL RE-CIRCULATING AIR HANDLING SYSTEMS ABOVE 2000 CFM. SMOKE DETECTORS SHALL BE COMPATIBLE WITH THE FACP. SMOKE DETECTORS SHALL BE UL LISTED FOR DUCT MOUNTING, WITH INSERTION TUBE EXTENDING THROUGH ENTIRE DUCT WIDTH. INSTALL PER MANUFACTURER'S RECOMMENDATIONS, AND UPSTREAM OF ANY SUPPLY BRANCH TAKE-OFFS.

C. PROVIDE START-UP, PROGRAMMING AND ADJUSTMENT FOR ALL NEW EQUIPMENT BY A FACTORY-AUTHORIZED AGENT TRAINED AND CERTIFIED BY THE MANUFACTURER TO PROVIDE START-UP SERVICE FOR THE SPECIFIC EQUIPMENT.

D. INSTALL ALL NEW EQUIPMENT, AND RELOCATE EXISTING AS REQUIRED, TO PROVIDE MINIMUM REQUIRED CLEARANCES FOR OPERATION, MAINTENANCE AND INSPECTION.

E. THERMOSTATS AND SPACE SENSORS SHALL BE LOCATED PER THE PANS AND AS FOLLOWS. WALL-MOUNTED T'STATS SHALL BE MOUNTED PER ADA REQUIREMENTS FOR WHEELCHAIR ACCESS (54" AFF FOR SIDE FACING ACCESS, 48" AFF FOR FRONT FACING ACCESS ONLY). DO NOT LOCATE THERMOSTATS IN THE SAME WALL STUD SPACE AS DIMMERS AND RHEOSTATS (COORDINATE WITH ELECTRICAL) OR WHERE OPERATION OR ACCESS WILL BE BLOCKED BY FURNITURE (COORDINATE WITH ARCHITECTURAL). THERMOSTATS SHALL NOT BE LOCATED IN THE DIRECT THROW OF ANY AIR DEVICE.

F. PROVIDE SEAMLESS AUXILIARY DRAIN PAN FOR ALL WATER STORAGE EQUIPMENT AND ALL CONCEALED EQUIPMENT WITH WATER COILS OR COOLING COILS. DRAIN PAN SHALL BE CONTINUOUSLY WELDED ALONG ALL SEAMS, DOUBLE-SLOPED TO 1/2" NPS DRAIN OUTLET. PAN SHALL BE SIZED AND MOUNTED TO EXTEND 3" BEYOND ALL UNIT SIDES AND SUPPORTS.

SECTION 9 – NOT USED

SECTION 10 – HVAC CONTROLS AND SEQUENCE OF OPERATIONS

PART 1 GENERAL

1.01 SUMMARY

A. ALL SYSTEMS PROVIDED UNDER THIS CONTRACT SHALL BE PROVIDED WITH COMPLETE CONTROLS FOR PROPER OPERATION AND PER THE SEQUENCES SPECIFIED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE ALL CONTROLS ARE COMPATIBLE WITH CONTROLLED EQUIPMENT.

B. COORDINATE ALL SETPOINTS AND DAILY SCHEDULING WITH OWNER.

PART 2 PRODUCTS

2.01 THERMOSTATS

A. 7-DAY PROGRAMMABLE THERMOSTAT: DIGITAL THERMOSTAT; 7-DAY PROGRAMMABLE WITH 4 EVENT SETTINGS PER DAY AND HOLIDAY SCHEDULING; 2 HOUR PROGRAM OVERRIDE; INDEPENDENTLY ADJUSTABLE COOLING AND HEATING SETPOINTS; 5 DEGREE F DEADBAND; COMPRESSOR SHORT CYCLE PROTECTION; SYSTEM MODE (AUTO/COOLING/HEATING/OFF) SELECTION, AND FAN MODE (ON/AUTO) SELECTION; NON-VOLATILE PROGRAM MEMORY, BATTERY-FREE PERMANENT STORAGE OF PROGRAMMING SETTINGS; BACKLIT TOUCHSCREEN DISPLAY AND INTERFACE.

PART 3 SEQUENCE OF OPERATION

3.01 ROOFTOP UNITS (RTU'S): SHALL BE CONTROLLED VIA WALL-MOUNTED AUTOMATIC CHANGEOVER, PROGRAMMABLE THERMOSTAT. THERMOSTAT SHALL CONTROL FAN(S), COMPRESSOR(S) AND HEATER(S) PER FACTORY-PROGRAMMED SEQUENCES TO MAINTAIN COOLING AND HEATING SETPOINTS.

A. SETPOINTS:

OCCUPIED:	70F MIN, 75F MAX
UNOCCUPIED:	55F MIN, 85F MAX

B. SUPPLY FAN: SHALL OPERATE WHEN THERE IS A CALL FOR COOLING, HEATING, OR DEHUMIDIFICATION ONLY, AND SHALL BE OFF AT ALL OTHER TIMES.

C. OUTSIDE AIR DAMPERS: DURING NORMAL OPERATION, DAMPER SHALL BE OPEN WHEN FAN IS ON AND CLOSED WHEN FAN IS OFF. DURING MORNING WARM-UP/COOL DOWN MODES, DAMPER SHALL BE CLOSED.

D. MORNING WARM-UP: SUPPLY FAN SHALL BE ON, OA DAMPER SHALL BE CLOSED, AND UNIT SHALL INITIATE A CALL FOR HEATING FROM THE HYDRONIC HEATING BOILER.

E. SMOKE DETECTORS (WHERE SCHEDULED): UNIT SHALL BE DISABLED AND SUPPLY FAN TURNED OFF UPON DETECTION OF SMOKE BY ITS RESPECTIVE SUPPLY SMOKE DETECTOR. UNIT SHALL REMAIN DISABLED UNTIL ALL ALARMS HAVE BEEN SATISFIED AND THE SMOKE DETECTOR HAS BEEN RESET.

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Salem Gate Market

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CONYERS, GEORGIA

HVAC, PLUMBING, AND FIRE PROTECTION SPECIFICATIONS

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