MECHANICAL SPECIFICATION

SUBMITTALS:

- 1. SUBMIT ELECTRONIC COPIES IN PDF FORMAT. SUBMIT DRAWINGS TO SCALE WHERE APPLICABLE.
- 2. SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT AND MATERIALS. SUBMIT MANUFACTURERS' CERTIFIED EQUIPMENT DRAWINGS FOR ALL EQUIPMENT; THESE NEED NOT BE SCALE DRAWINGS, BUT MUST SHOW ALL DIMENSIONS, CLEARANCES, INSTALLATION REQUIREMENTS, ETC.
- 3. PREPARE COORDINATION DRAWINGS FOR EACH MECHANICAL, TRADE TO A SCALE OF 1/4"=1'-0" OR LARGER. THESE DRAWINGS SHALL BE NEW DRAWINGS, AS PREPARED BY THE CONTRACTOR. MARKED UP COPIES OF THE DESIGN ENGINEER'S DRAWINGS SHALL NOT BE USED FOR THIS PURPOSE. THESE DRAWINGS SHALL DETAIL ALL ELEMENTS, COMPONENTS, AND SYSTEMS OF MECHANICAL, OR OTHER EQUIPMENT AND MATERIALS IN RELATIONSHIP WITH OTHER SYSTEMS, INSTALLATIONS, AND BUILDING COMPONENTS. INDICATE LOCATIONS WHERE SPACE IS LIMITED FOR INSTALLATION AND ACCESS AND WHERE SEQUENCING AND COORDINATION OF INSTALLATIONS ARE OF IMPORTANCE TO THE EFFICIENT FLOW OF THE
- 4. INSTALL EQUIPMENT/DUCTWORK/PIPING IN ACCORDANCE WITH THESE DESIGN DRAWINGS. IF DEVIATIONS ARE REQUIRED THEN SUBMIT SCALE DRAWINGS FOR REVIEW PRIOR TO
- 5. SUBMIT ALL COORDINATION DRAWINGS AND/OR SHOP DRAWINGS PRIOR TO FABRICATION OR INSTALLATION OF ANY EQUIPMENT. ANY WORK STARTED OR EQUIPMENT RELEASED FOR FABRICATION PRIOR TO THE REVIEW OF SUBMITTED DRAWINGS BY THE DESIGN ENGINEER IS DONE AT THE CONTRACTOR'S RISK. THE OFFENDING CONTRACTOR SHALL BE ENTIRELY RESPONSIBLE FOR ALL CHANGES, MODIFICATIONS, AND/OR EXTRA SERVICES REQUIRED RESULTING FROM THE IMPROPER COORDINATION AND/OR IMPROPER SUBMITTAL PROCEDURES.

MISCELLANEOUS:

- I. PROVIDE PLASTIC EQUIPMENT LABELS AT EACH NEW PIECE OF EQUIPMENT WITH ALPHA-NUMERIC IDENTIFICATION. COORDINATE FINAL IDENTIFICATION WITH OWNER. IF OWNER HAS NO PREFERENCE, FOLLOW IDENTIFICATION UTILIZED ON DESIGN DRAWINGS.
- 2. PROJECT DESIGN IS BASED ON PARTICULAR EQUIPMENT MANUFACTURERS AS INDICATED IN THE SCHEDULES, AND ESTABLISHES THE QUALITY REQUIRED. USE OF EQUIPMENT BY ONE OF THE OTHER ACCEPTABLE MANUFACTURERS MAY REQUIRE ADDITIONAL WORK BE PERFORMED FOR PROPER INTEGRATION WITH THE BUILDING DESIGN. THE CONTRACTOR PROVIDING THE EQUIPMENT SHALL BE ENTIRELY RESPONSIBLE FOR COORDINATION, AND EXTRA LABOR AND MATERIAL REQUIRED AS A RESULT OF THE USE OF EQUIPMENT OTHER THAN THAT SCHEDULED, AND THE CONTRACTOR SHALL VERIFY THAT THIS EQUIPMENT FITS IN THE ALLOCATED SPACE. THIS RESPONSIBILITY SHALL INCLUDE ANY AND ALL EXTRA EXPENSE INCURRED BY AFFECTED CONTRACTORS; INCLUDING BUT NOT LIMITED TO THE GENERAL, MECHANICAL, PLUMBING, FIRE PROTECTION AND ELECTRICAL CONTRACTORS. THE CONTRACTOR PROVIDING THE EQUIPMENT SHALL ALSO BE RESPONSIBLE FOR ANY EXTRA EXPENSE INCURRED DUE TO CONSTRUCTION DELAYS AS A RESULT OF ANY ADDITIONAL COORDINATION AND/OR REVISION REQUIRED BY THE ALTERNATE EQUIPMENT MANUFACTURER SELECTION. ALL REVISIONS MUST BE REVIEWED BY THE ARCHITECT AND ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION.

- 1. IN GENERAL ALL DUCTWORK SHALL BE INSTALLED CONCEALED ABOVE FINISHED CEILINGS.
- 2. ALL DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEETMETAL OF LOCK-FORMING QUALITY, ASTM A 527, COATING DESIGNATION G 90 UNLESS NOTED OTHERWISE. INSTALLATION SHALL COMPLY TO SMACNA STANDARDS FOR DUCTWORK OF PRESSURE CLASSIFICATIONS AS INDICATED. PROVIDE CROSS BREAKING OR BEADING ON ALL RECTANGULAR DUCT SIDES GREATER THAN 12" TO PREVENT "OIL CANNING". SEAL ALL JOINTS AND SEAMS. APPLY SEALANT TO MALE END CONNECTORS BEFORE INSERTION, AND AFTERWARD TO COVER ENTIRE JOINT AND SHEET METAL SCREWS. DUCT SEALANTS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL 181B.
- 3, LOW PRESSURE SUPPLY DUCTWORK SHALL BE RATED AT +1.0" STATIC PRESSURE. LOW PRESSURE RETURN/EXHAUST DUCTWORK SHALL BE RATED AT -1.0" STATIC PRESSURE.
- 4. PROVIDE ALL GRILLE AND REGISTER BRANCHES WITH MANUAL BALANCING DAMPERS WHERE CONNECTED TO DUCTWORK SERVING MULTIPLE OUTLETS/INLETS, WHETHER SPECIFICALLY INDICATED OR NOT. MANUAL VOLUME DAMPERS SHALL GENERALLY BE LOCATED AT CONNECTION FROM MAIN, AS FAR AS POSSIBLE FROM AIR INLET/OUTLET, TO MINIMIZE NOISE TO INLET/OUTLET. FOR GRILLES AND REGISTERS CONNECTED TO DUCTWORK ABOVE HARD INACCESSIBLE CEILINGS, PROVIDE CABLE ACTUATED VOLUME CONTROL DAMPERS BASED ON METROPOLITAN AIR TECHNOLOGY RT SERIES W/ACTUATOR AND CABLE CONCEALED WITHIN THE DUCTWORK.
- 5. INTERNALLY LINE THE FOLLOWING DUCTWORK. DUCT LINING SHALL BE 1" THICK, 1-1/2 LB DENSITY. COMPLY WITH NFPA STANDARD 90A. MATERIALS SHALL COMPLY WITH ASTM C 1071, TYPE I, WITH COATED SURFACE EXPOSED TO AIRSTREAM TO PREVENT EROSION OF GLASS FIBERS. FLAME SPREAD RATING SHALL NOT BE MORE THAN 25 WITHOUT EVIDENCE OF CONTINUED PROGRESSIVE COMBUSTION AND A SMOKE DEVELOPED RATING OF NO HIGHER THAN 50, WHEN TESTED IN ACCORDANCE WITH ASTM C 411. LINER ADHESIVE SHALL COMPLY WITH NFPA STANDARD 90A AND ASTM C 916. SECURE WITH ADHESIVE AND PINS. PROVIDE MINIMUM 90% COVERAGE OF LINER ADHESIVE TO SHEETMETAL. DUCT SIZES SHOWN ARE AIRWAY DIMENSION. INCREASE SHEETMETAL SIZES ACCORDINGLY.
- a. ALL RECTANGULAR SUPPLY DUCTWORK.
- b. ALL RECTANGULAR RETURN DUCTWORK.
- 6. EXTERNALLY INSULATE THE FOLLOWING DUCTWORK. PROVIDE INSULATION WITH REINFORCED VAPOR BARRIER JACKET. COMPLY WITH NFPA STANDARD 90A AND ASTM C 553, TYPE 1, CLASS B-4.
- a. INSULATION SHALL BE TWO LAYERS OF 2.2" (R-12 TOTAL) THICK FOR OA DUCTS, EXHAUST DUCTWORK BETWEEN THE EXHAUST DAMPER AND THE CONNECTION TO OUTDOORS AND UNLINED SUPPLY & RETURN DUCTWORK LOCATED IN UNCONDITIONED SPACES.
- 7. PROVIDE ONLY RADIUSED ELBOWS AND TAPERED TRANSITIONS UNLESS OTHERWISE REQUIRED BY SPECIFIC OBSTRUCTIONS.
- 8. PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". TURNING VANES SHALL BE INSTALLED IN ALL SQUARE THROAT ELBOWS.
- 9. PROVIDE FIRE DAMPERS, OF TYPES AND SIZES INDICATED OR AS REQUIRED FOR DUCT APPLICATION. CONSTRUCT FRAMES OF MINIMUM 20-GA, GALVANIZED STEEL CHANNEL. PROVIDE FUSIBLE LINK RATED AT 160 TO 165 DEGREE F (71 TO 74 DEGREE C). BLADES SHALL BE MINIMUM 24 GA. GALVANIZED CURTAIN TYPE. DAMPERS AND INSTALLATION SHALL COMPLY WITH UNDERWRITERS LABORATORY UL 555 FOR DYNAMIC CLOSURE. PROVIDE DAMPER WITH POSITIVE LOCK IN CLOSED POSITION AND A STAINLESS STEEL CLOSURE SPRING. PROVIDE WALL SLEEVES AND ANGLES INSTALLED IN ACCORDANCE WITH THE DAMPER MANUFACTURER'S INSTALLATION INSTRUCTIONS. DAMPER STYLE SHALL BE TYPE B, OR TYPE C, CR, OR CO WITH BLADES OUT OF AIRSTREAM. COORDINATE DAMPER RATING WITH ASSOCIATED WALL FIRE RESISTANCE RATING AS INDICATED ON THE ARCHITECTURAL DRAWINGS. PROVIDE 1 1/2 HOUR RATED DAMPERS AT WALLS WITH A FIRE RESISTANCE RATING LESS THAN 3 HOURS, PROVIDE 3 HOUR DAMPERS AT WALLS WITH A FIRE RESISTANCE RATING 3 HOURS, PROVIDE (2) 3 HOUR DAMPERS IN A COMMON WALL SLEEVE AT WALLS WITH A FIRE RESISTANCE RATING OF 4 HOURS.
- 10.PROVIDE DUCT ACCESS DOORS AT ALL AUTOMATIC & BACKDRAFT DAMPERS, FIRE DAMPERS, REHEAT COILS, AND OTHER LOCATIONS WHERE INDICATED, LOCATE ACCESS DOOR TO ALLOW PROPER SERVICE OF ASSOCIATED DEVICE. CONSTRUCT OF SAME OR GREATER GAGE AS DUCTWORK SERVED. PROVIDE INSULATED DOORS FOR INSULATED OR LINED DUCTWORK, FLUSH FRAMES FOR UNINSULATED DUCTWORK, EXTENDED FRAMES FOR EXTERNALLY INSULATED DUCT. PROVIDE ONE SIDE HINGED, OTHER SIDE WITH ONE HANDLE-TYPE LATCH FOR DOORS 12" HIGH AND SMALLER, 2 HANDLE-TYPE LATCHES FOR LARGER DOORS.
- 11.PROVIDE FLEXIBLE DUCT CONNECTIONS WHEREVER DUCTWORK CONNECTS TO VIBRATION ISOLATED EQUIPMENT. CONSTRUCT FLEXIBLE CONNECTIONS OF NEOPRENE-COATED FLAMEPROOF FABRIC CRIMPED INTO DUCT FLANGES FOR ATTACHMENT TO DUCT AND EQUIPMENT. MAKE AIRTIGHT JOINT. PROVIDE ADEQUATE JOINT FLEXIBILITY TO ALLOW FOR THERMAL, AXIAL, TRANSVERSE, AND TORSIONAL MOVEMENT, AND ALSO CAPABLE OF ABSORBING VIBRATIONS OF CONNECTED EQUIPMENT.
- 12.NOT APPLICABLE TO RESIDENTIAL CONSTRUCTION: INSULATED FLEXIBLE DUCTS MAY BE USED AT CONNECTIONS TO DIFFUSERS. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FEET IN LENGTH PER DIFFUSER BRANCH. USE SHEET METAL DUCTWORK WHERE MORE THAN A 45 DEGREE TURN IS REQUIRED. PROVIDE FLEXIBLE DUCTWORK MEETING THE FLAME AND SMOKE SPREAD REQUIREMENTS OF NFPA 90A AND THE SYSTEM PRESSURE REQUIREMENTS INDICATED ABOVE. ALL FLEXIBLE DUCTWORK SHALL BE OF A TYPE APPROVED BY THE CITY OF CHICAGO.
- 13.INSTALL DUCTS WITH THE FEWEST POSSIBLE JOINTS. USE FABRICATED FITTINGS FOR ALL CHANGES IN DIRECTIONS, CHANGES IN SIZE AND SHAPE, AND CONNECTIONS.
- 14.COORDINATE LAYOUT WITH EXISTING STRUCTURE, PARTITION LAYOUT, SPRINKLER PIPING, LIGHTING LAYOUTS AND SIMILAR FINISHED WORK.
- 15.INSTALL ROUND AND RECTANGULAR DUCT WITH SUPPORT SYSTEMS INDICATED IN SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," TABLES 4-1 THROUGH 4-3 AND FIGURES 4-1 THROUGH 4-8. SUPPORT HORIZONTAL DUCTS WITHIN 2 FEET OF EACH ELBOW AND WITHIN 4 FEET OF EACH BRANCH INTERSECTION AND AT ADDITIONAL INTERVALS AS IDENTIFIED IN THE SMACNA STANDARDS. SUPPORT VERTICAL DUCTS AT A MAXIMUM INTERVAL OF 16 FEET AND AT EACH FLOOR.
- 16. VACUUM DUCTS SYSTEMS PRIOR TO FINAL ACCEPTANCE TO REMOVE DUST AND DEBRIS.

HVAC DUCT/EQUIPMENT CLEANING:

- 1. SYSTEMS AND COMPONENTS TO BE CLEANED:
- a. ALL EXISTING TO REMAIN DUCTWORK AND AIR DEVICES FOR SUPPLY, RETURN AND EXHAUST AIR.
- 2. USE THE EXISTING SERVICE OPENINGS WHERE POSSIBLE, AT VARIOUS POINTS OF THE HVAC SYSTEM FOR PHYSICAL AND MECHANICAL ENTRY AND FOR INSPECTION. CREATE SERVICE OPENINGS IN THE HVAC SYSTEM AS NECESSARY TO ACCOMMODATE CLEANING. NEW CLOSURE MATERIALS, INCLUDING INSULATION, SHALL MATCH OPENED MATERIALS AND SHALL HAVE REMOVABLE CLOSURE PANELS FITTED WITH GASKETS AND FASTENERS.
- 3. COMPLY WITH NADCA ACR 2006.
- 4. REMOVE VISIBLE SURFACE CONTAMINANTS AND DEPOSITS FROM WITHIN THE HVAC SYSTEM.
- 5. COLLECT DEBRIS REMOVED DURING CLEANING. ENSURE THAT DEBRIS IS NOT DISPERSED OUTSIDE THE HVAC SYSTEM DURING THE CLEANING PROCESS
- 6. DEBRIS REMOVED FROM THE HVAC SYSTEM SHALL BE DISPOSED OF ACCORDING TO APPLICABLE FEDERAL, STATE, AND LOCAL REQUIREMENTS
- 7. WORKING AREAS AROUND AND BY VENT SYSTEMS WILL BE PROTECTED AND LEFT CLEAN (IN CONDITION FOUND AT START OF JOB) AFTER THE JOB IS COMPLETE. THIS INCLUDES AREAS AROUND/UNDER DUCTS, FANS, ROOFS, HOODS, FLOORS IN WORKING AREA, CEILINGS UNDER DUCTS, ETC.

- 8. ELECTRICAL OUTLETS AND CONNECTIONS SHALL BE PROTECTED IN, AROUND AND UNDER THE CLEANING AREA.
- 9. PARTICULATE COLLECTION:
 - a. FOR PARTICULATE COLLECTION EQUIPMENT, INCLUDE ADEQUATE FILTRATION TO CONTAIN DEBRIS REMOVED. LOCATE EQUIPMENT DOWNWIND AND AWAY FROM ALL AIR INTAKES AND OTHER POINTS OF ENTRY INTO THE BUILDING.
- 10.CONTROL ODORS AND MIST VAPORS DURING THE CLEANING AND RESTORATION PROCESS.
- 11.CLEAN VISIBLE SURFACE CONTAMINATION DEPOSITS ACCORDING TO NADCA ACR 2006. ENSURE THAT A SUITABLE OPERATIVE DRAINAGE SYSTEM IS IN PLACE PRIOR TO BEGINNING
- 12.MARK THE POSITION OF MANUAL VOLUME DAMPERS AND AIR—DIRECTIONAL MECHANICAL DEVICES INSIDE THE SYSTEM PRIOR TO CLEANING. RESTORE THEM TO THEIR MARKED POSITION ON COMPLETION OF CLEANING.
- 13.CLEAN ALL AIR-DISTRIBUTION DEVICES, REGISTERS, GRILLES, DIFFUSERS, AND WALL LOUVERS.
- 14.CLEAN ROOF TOP UNITS, EXHAUST FANS AND FILTRATION EQUIPMENT.
- a. CLEAN ALL AIRSTREAM SURFACES, COMPONENTS, CONDENSATE COLLECTORS, AND DRAINS.
- b. CLEAN ALL INTERIOR SURFACES OF THE UNIT CASING, COIL SURFACES COMPARTMENT, CONDENSATE DRAIN PANS, FANS, FAN BLADES, AND FAN HOUSINGS.
- c. ENSURE THAT A SUITABLE OPERATIVE DRAINAGE SYSTEM IS IN PLACE PRIOR TO BEGINNING WASH-DOWN PROCEDURES.
- d. CLEAN EVAPORATOR COILS, REHEAT COILS, AND OTHER AIRSTREAM COMPONENTS.
- e. REPLACE ALL FILTRATION ELEMENTS (EXCLUDING SCRUBBER UNIT).

- a. MEASURE STATIC-PRESSURE DIFFERENTIAL ACROSS EACH COIL.
- b. SEE NADCA ACR 2013, "COIL SURFACE CLEANING" SECTION. TYPE 1, OR TYPE 1 AND TYPE 2, CLEANING METHODS SHALL BE USED TO RENDER THE COIL VISIBLY CLEAN AND CAPABLE OF PASSING COIL CLEANING VERIFICATION (SEE APPLICABLE NADCA ACR 2013).
- c. COIL DRAIN PANS SHALL BE SUBJECT TO NADCA ACR 2013, "NON-POROUS SURFACES CLEANING VERIFICATION." ENSURE THAT CONDENSATE DRAIN PANS ARE OPERATIONAL.
- d. ELECTRIC-RESISTANCE COILS SHALL BE DE-ENERGIZED, LOCKED OUT, AND TAGGED BEFORE CLEANING.
- e. CLEANING METHODS SHALL NOT CAUSE ANY APPRECIABLE DAMAGE TO, CAUSE DISPLACEMENT OF, INHIBIT HEAT TRANSFER, OR CAUSE EROSION OF THE COIL SURFACE OR FINS, AND SHALL COMPLY WITH COIL MANUFACTURER'S WRITTEN RECOMMENDATIONS WHEN AVAILABLE.
- f. RINSE THOROUGHLY WITH CLEAN WATER TO REMOVE ANY LATENT RESIDUES.

16.DUCT SYSTEMS:

a. MECHANICALLY CLEAN DUCT SYSTEMS SPECIFIED TO REMOVE ALL VISIBLE CONTAMINANTS SO THAT THE SYSTEMS ARE CAPABLE OF PASSING THE HVAC SYSTEM CLEANLINESS TESTS (SEE NADCA ACR 2006).

17.MECHANICAL CLEANING METHODOLOGY (NON KITCHEN EXHAUST DUCTWORK):

- a. SOURCE-REMOVAL CLEANING METHODS: THE HVAC SYSTEM SHALL BE CLEANED USING SOURCE-REMOVAL MECHANICAL CLEANING METHODS DESIGNED TO EXTRACT CONTAMINANTS FROM WITHIN THE HVAC SYSTEM AND TO SAFELY REMOVE THESE CONTAMINANTS FROM THE FACILITY. NO CLEANING METHOD, OR COMBINATION OF METHODS, SHALL BE USED THAT COULD POTENTIALLY DAMAGE COMPONENTS OF THE HVAC SYSTEM OR NEGATIVELY ALTER THE INTEGRITY OF THE SYSTEM.
- USE CONTINUOUSLY OPERATING VACUUM-COLLECTION DEVICES TO KEEP EACH SECTION BEING CLEANED UNDER NEGATIVE PRESSURE.
- ii. Cleaning methods that require mechanical agitation devices to dislodge debris that is adhered to interior surfaces of hvac system components shall BE EQUIPPED TO SAFELY REMOVE THESE DEVICES. CLEANING METHODS SHALL NOT DAMAGE THE INTEGRITY OF HVAC SYSTEM COMPONENTS OR DAMAGE POROUS SURFACE MATERIALS SUCH AS DUCT AND PLENUM LINERS.
- b. CLEANING MINERAL-FIBER INSULATION COMPONENTS:
- FIBROUS-GLASS THERMAL OR ACOUSTICAL INSULATION ELEMENTS PRESENT IN EQUIPMENT OR DUCTWORK SHALL BE THOROUGHLY CLEANED WITH HEPA VACUUMING EQUIPMENT WHILE THE HVAC SYSTEM IS UNDER CONSTANT NEGATIVE PRESSURE AND SHALL NOT BE PERMITTED TO GET WET ACCORDING TO NADCA ACR 2006.
- ii. CLEANING METHODS USED SHALL NOT CAUSE DAMAGE TO FIBROUS-GLASS COMPONENTS AND WILL RENDER THE SYSTEM CAPABLE OF PASSING THE HVAC SYSTEM CLEANLINESS TESTS (SEE NADCA ACR 2006).
- iii. FIBROUS MATERIALS THAT BECOME WET SHALL BE DISCARDED AND REPLACED.
- 18.UPON COMPLETION SUBMIT A WRITTEN VERIFICATION REPORT INCLUDING PHOTOGRAPHIC DOCUMENTATION IDENTIFYING "BEFORE" AND "AFTER" CONDITIONS FOR REPRESENTATIVE AREAS OF ALL SYSTEMS AND COMPONENTS.

BALANCING:

- . PROVIDE COMPLETE SYSTEM AIR BALANCING FOR ALL WORK COVERED UNDER THIS CONTRACT, INCLUDING MINIMUM OUTSIDE AIR QUANTITIES, AIR HANDLING UNITS, EXHAUST FANS AND GRILLES, REGISTERS, AND DIFFUSERS, SYSTEMS TO BE BALANCED INCLUDE THE FOLLOWING:
- a rooftop units-complete air balancing including fan airflows. Fan pressure readings. Fan motor actual & rated voltage and amperage, and airflows at ALL OUTLETS & INLETS. WHERE THE EXISTING EQUIPMENT UTILIZES A DIRECT DRIVE SUPPLY FAN, PRORATE THE INDICATED ROOM AIRFLOWS TO MATCH AS CLOSE AS POSSIBLE WITHIN THE LIMITS OF THE EXISTING FAN. WHERE THE EXISTING EQUIPMENT UTILIZES A BELT DRIVE SUPPLY FAN, ADJUST THE SHEAVES AS REQUIRED TO ACHIEVE THE INDICATED ROOM AIRFLOWS WITHIN THE LIMITS OF THE EXISTING FAN MOTOR. DO NOT OVERLOAD THE FAN MOTOR.
- b. ROOFTOP UNITS-MINIMUM OUTSIDE AIR DAMPER SETTINGS ADJUSTED TO PROVIDE SPECIFIED AIRFLOW.
- c. RETURN EXHAUST FANS (EXCLUDING RESIDENTIAL TOILET EXHAUST FANS) FAN AIRFLOWS, FAN PRESSURE READINGS, FAN MOTOR ACTUAL & RATED VOLTAGE AND AMPERAGE, AND AIRFLOWS AT ALL ASSOCIATED INLETS.
- 2. PROVIDE BALANCE REPORTS IN PDF FORMAT FOR ALL WORK, PREPARED BY A BALANCING FIRM CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC), NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), OR TESTING, ADJUSTING AND BALANCING BUREAU (TABB).
- 3. ALL INDIVIDUAL INLETS/OUTLETS SHALL BE BALANCED TO WITHIN 0 TO +10% OF THE SPECIFIED AIR QUANTITIES. EACH SYSTEM SHALL BE BALANCED TO 0 TO +5% OF THE SPECIFIED AIR QUANTITIES.
- 4. AFTER ALL SYSTEMS HAVE BEEN BALANCED, AND REPORTS HAVE BEEN PREPARED, THE CONTRACTOR SHALL DEMONSTRATE THE EFFECTIVENESS OF THE BALANCING IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE. UP TO 5% OF THE DEVICES WILL BE RANDOMLY SELECTED BY THE OWNER, AND THE AIR FLOWS WILL BE REREAD BY THE CONTRACTOR IN THEIR PRESENCE. IF MORE THAN 10% OF THOSE ITEMS TESTED ARE BEYOND +/- 5% OF THE DESIGN OR STATED BALANCED QUANTITIES, THEY SHALL BE REBALANCED. IN THE EVENT OF THIS OCCURRENCE, AN ADDITIONAL 5% OF THE DEVICES SHALL AGAIN BE RANDOMLY SELECTED. SHOULD MORE THAN 10% OF THESE DEVICES BE BEYOND +/- 5% OF THE DESIGN OR STATED BALANCED QUANTITIES, THE ENTIRE SYSTEM SHALL BE REBALANCED.

AUTOMATIC DAMPERS:

1. DAMPERS: PROVIDE AUTOMATIC CONTROL DAMPERS AS INDICATED, WITH DAMPER FRAMES NOT LESS THAN FORMED 13-GA. GALVANIZED STEEL. PROVIDE DAMPER BLADES NOT LESS THAN FORMED 16-GA. GALVANIZED STEEL, WITH MAXIMUM BLADE WIDTH OF 8". EQUIP DAMPERS WITH ELECTRIC MOTOR ACTUATOR WITH PROPER RATING FOR EACH APPLICATION. DAMPER BLADES SHALL BE GASKETED WITH NEOPRENE EDGE SEALS, AND SHALL BE OF THE LOW LEAKAGE TYPE. PROVIDE MULTIPLE DAMPER SECTIONS, ACTUATORS, JACK SHAFTS AND ASSOCIATED LINKAGES AS REQUIRED TO PROVIDE SUFFICIENT FORCE FOR PROPER DAMPER OPERATION.

CONTROLS:

- 1. PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT FOR EACH ROOF TOP UNIT AND FAN COIL UNIT.
- 2. TOILET EXHAUST FANS: PROVIDE LOCAL SWITCH WITH TIME DELAY TO START/STOP FAN. ADJUST TIME DELAY FOR FAN TO RUN 15 MINUTES AFTER SWITCH IS POSITIONED OFF.

· 62-041747 REGISTERED **PROFESSIONAL** ENGINEER EXPIRES 11/30/2019

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under my supervision and that they comply, to the best of my knowledge, with all the building codes and ordinances of the city of Chicago, IL.									
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