DIVISION 01 - DIV 01 - GENERAL REQUIREMENTS
SECTION 23 00 02 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A THIS SECTION DELINEATES THE REQUIREMENTS OF THE CONTRACTOR IN THE EXECUTION OF THE COMMISSIONING PROCESS FOR THE FOLLOWING ACTIVITIES:
1. PARTICIPATION IN COMMISSIONING MEETINGS
2. COMMISSIONING SUBMITTAL REQUIREMENTS
3. SCHEDULING AND COORDINATION OF COMMISSIONING ACTIVITIES
4. FUNCTIONAL OPERATIONAL DEMONSTRATION OF SYSTEM PERFORMANCE
5. DOCUMENTATION
6. CORRECTION OF DEFICIENCIES IDENTIFIED DURING COMMISSIONING

1.02 EQUIPMENT AND SYSTEMS INCLUDED IN THE COMMISSIONING PROGRAM

A THE FOLLOWING SYSTEMS/EQUIPMENT ARE INCLUDED IN THE COMMISSIONING PROGRAM:
1. BUILDING AUTOMATION SYSTEM
2. VARIABLE AIR VOLUME (VAV) TERMINAL UNITS
3. COMPUTER ROOM AIR CONDITIONING (CRAC) UNITS
4. SENSORS (TEMPERATURE SENSORS, THERMOSTATS, HYDROGEN SENSORS, ETC.)
5. LIGHTING CONTROLS (OCCUPANCY SENSORS, TIME CLOCK CONTROLS, DAYLIGHTING CONTROLS, ETC.)

1.03 COORDINATION

A THE CXA (COMMISSIONING AGENT) MAY WITNESS TEST ACTIVITIES SPECIFIED IN THE TECHNICAL SPECIFICATIONS AND DESIGN DOCUMENTS AS WELL AS SELECT CONSTRUCTION TESTS (E.G. PIPING PRESSURE TESTS, DUCT LEAKAGE TEST, ETC.) AND EQUIPMENT START-UP TESTS. THE OWNERS REPRESENTATIVE MAY WITNESS COMMISSIONING ACTIVITIES AS APPROPRIATE.

B CONTRACTOR SHALL PROVIDE A MINIMUM OF 48 HOURS NOTICE TO THE OWNERS REPRESENTATIVE OF ANY CHANGES IN DATE, TIME, AND LOCATION OR ANTICIPATED DURATION OF START-UP AND TEST ACTIVITIES.

C TESTS THAT ARE NOT PERFORMED AS SCHEDULED SHALL BE CONSIDERED A FAILED TEST UNLESS A MINIMUM 48 HOURS NOTIFICATION OF CANCELLATION OR RESCHEDULING WAS RECEIVED BY ALL PARTIES. CONTRACTOR SHALL REIMBURSE THE OWNER FOR COSTS INCURRED BY THE OWNER AS THE RESULT OF FAILURE TO PROVIDE TIMELY NOTICE OF CHANGES IN DATE, TIME, LOCATION, OR ANTICIPATED DURATION OF START-UP AND TEST ACTIVITIES, INCLUDING COSTS ASSOCIATED WITH THE CXA INVOLVEMENT.

D MEETINGS:
1. COMMISSIONING MEETING(S) SHALL BE HELD PERIODICALLY BEFORE AND DURING THE FUNCTIONAL PERFORMANCE TESTING PHASE TO REVIEW STATUS OF TESTING DISCREPANCIES AND SCHEDULING OF TESTS, RETESTS, AND VERIFICATIONS.

E SCHEDULING:
1. IN COOPERATION WITH THE CXA, THE CONTRACTOR SHALL INTEGRATE COMMISSIONING ACTIVITIES INTO THE MASTER CONSTRUCTION SCHEDULE.

1.04 SUBMITTALS

A 48 HOURS PRIOR TO FUNCTIONAL PERFORMANCE TESTING, CONTRACTOR SHALL PROVIDE CXA WITH DOCUMENTATION REQUIRED FOR COMMISSIONING ACTIVITIES. AT MINIMUM, DOCUMENTATION SHALL INCLUDE MANUFACTURER AND MODEL NUMBER, MANUFACTURER'S PRINTED INSTALLATION AND DETAILED START-UP PROCEDURES, FULL SEQUENCES OF OPERATION, O&M DATA, PERFORMANCE DATA, ANY PERFORMANCE TEST PROCEDURES, CONTROL DRAWINGS, TEST AND BALANCE REPORTS, AND DETAILS OF OWNER CONTRACTED TESTS.

B THE CXA WILL REVIEW SUBMITTALS FOR CRITERIA AS RELATED TO COMMISSIONING. REVIEW IS PRIMARILY INTENDED TO AID IN DEVELOPMENT OF FUNCTIONAL TESTING PROCEDURES AND SECONDARILY TO VERIFY COMPLIANCE WITH EQUIPMENT SPECIFICATIONS. THE CXA WILL NOTIFY THE CONTRACTOR, OWNERS REPRESENTATIVE, AND DESIGN PROFESSIONAL OF MISSING ITEMS OR WHERE ISSUES MAY EXIST.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 CONTRACTOR SCOPE OF WORK:

A PROVIDE ALL DOCUMENTATION OF PRODUCTS AND SYSTEMS REQUIRED BY COMMISSIONING AGENT (CXA).

B PROVIDE SCHEDULING AND COORDINATION OF COMMISSIONING ACTIVITIES WITH SUBCONTRACTORS AND CXA.

C PERFORM AND VERIFY EQUIPMENT INSTALLATION AND START UP

D VERIFY THE FUNCTIONAL READINESS OF SYSTEMS TO BE TESTED PRIOR TO SCHEDULING AND DEMONSTRATING THE FUNCTIONAL OPERATIONAL PERFORMANCE

E CONDUCT FUNCTIONAL PERFORMANCE TESTING IN THE PRESENCE OF THE CXA

F CORRECT DEFICIENCIES

G PERFORM FUNCTIONAL PERFORMANCE RETEST AS NECESSARY

H PROVIDE DOCUMENTATION OF THE EFFORT

3.02 COMMISSIONING OVERVIEW

A THE FOLLOWING PROVIDES A BRIEF OVERVIEW OF TYPICAL COMMISSIONING TASKS DURING CONSTRUCTION AND GENERAL ORDER IN WHICH THEY OCCUR.
1. DURING NORMAL SUBMITTAL PROCESS,CONTRACTOR SUBMITS TO CXA ANY .
2. DESIGN TEAM REVIEWS SUBMITTALS AND RETURNS TO CONTRACTORS.
3. THE CONTRACTOR COORDINATES PROPER INSTALLATION OF EQUIPMENT.
4. THE CONTRACTOR COORDINATES PROPER START-UP OF SYSTEMS AND EQUIPMENT AND COMPLETES TESTING AND BALANCING OF THE SYSTEMS.
5. CXA PROVIDES A COMMISSIONING PLAN TO OUTLINE THE COMMISSIONING PROCESS INCLUDING THE ROLES AND RESPONSIBILITIES OF THE OWNER, DESIGN PROFESSIONAL, AND COMMISSIONING AGENT. THE PLAN SHALL ALSO IDENTIFY THE LOGISTICS, SCHEDULES AND MANAGEMENT PROTOCOLS ASSOCIATED WITH THE COMMISSIONING PROCESS.
6. CONTRACTOR PROVIDES COORDINATION OF COMMISSIONING ACTIVITIES WITH SUBCONTRACTORS IN COMPLIANCE WITH THE COMMISSIONING COMPLIANCE CHECKLIST.
7. CXA COMPLETES DEVELOPMENT OF FUNCTIONAL PERFORMANCE TEST PROCEDURES BASED ON SUBMITTED DOCUMENTATION AND SUBMITS TO COMMISSIONING TEAM FOR REVIEW AND COMMENT, APPROXIMATELY ONE WEEK PRIOR TO FUNCTIONAL PERFORMANCE TESTING. FINAL FORMAT OF TESTING PROTOCOLS, BASED ON REVIEW COMMENTS, ARE PREPARED BY CXA AND DISTRIBUTED.
8. FUNCTIONAL PERFORMANCE TESTING FOR A SYSTEM SHALL BE SCHEDULED UPON COMPLETION OF EQUIPMENT INSTALLATION, EQUIPMENT STARTUP, AND SYSTEM TESTING AND BALANCING.
9. THE CONTRACTOR WITH RESPONSIBILITY FOR THE FUNCTIONALITY OF A SYSTEM DEMONSTRATES SYSTEM FUNCTIONALITY TO CXA.
10. CXA COMPILES FINAL COMMISSIONING REPORT RECOMMENDING ACCEPTANCE OF PERFORMANCE AND FUNCTIONALITY OR RECOMMENDS REMEDIAL ACTION AND RE-TESTING. THE FINAL COMMISSIONING REPORT OUTLINES THE FUNCTIONAL TESTING PROCEDURES, SUMMARIZES THE RESULTS OF THE FUNCTIONAL PERFORMANCE TESTING, IDENTIFIES ANY OUTSTANDING DEFICIENCIES, AND INCLUDES THE COMMISSIONING COMPLIANCE CHECKLIST.

3.03 FUNCTIONAL PERFORMANCE TESTING

A OBJECTIVES AND SCOPE:
1. EACH SYSTEM SHALL BE OPERATED THROUGH ALL MODES OF OPERATION (SEASONAL, OCCUPIED, UNOCCUPIED, WARM-UP, COOL-DOWN, PART- AND FULL-LOAD, ETC.) WHERE THERE IS A SPECIFIED SYSTEM RESPONSE. VERIFYING EACH SEQUENCE IN THE SPECIFIED SEQUENCE OF OPERATION IS REQUIRED INCLUDING RESPONSES TO CONDITIONS SUCH AS POWER FAILURE, FREEZE CONDITION, LOW OIL PRESSURE, NO FLOW, EQUIPMENT FAILURE, ETC.
2. TESTING SHALL AFFIRM WINTER AND SUMMER DESIGN CONDITION AND FULL OUTSIDE AIR CONDITIONS.
3. THE CONTRACTOR RESPONSIBLE FOR THE DYNAMIC OPERATION OF A SYSTEM SHALL DEMONSTRATE COMPREHENSIVE FUNCTIONALITY OF THAT SYSTEM. ALL CONTRACTORS THAT HAVE CONTRIBUTED TO THE INSTALLATION OF THE SAME SYSTEM SHALL NOT BE REQUIRED TO DIRECTLY PARTICIPATE IN THE FUNCTIONAL TESTING ACTIVITY BUT SHALL BE REQUIRED TO BE IMMEDIATELY AVAILABLE FOR RESOLUTION OF ISSUES THAT FALL WITHIN THEIR SCOPE AND RESPONSIBILITY DURING TESTING.

B COORDINATION AND SCHEDULING:
1. FUNCTIONAL PERFORMANCE TESTING IS CONDUCTED FOLLOWING EQUIPMENT INSTALLATION, EQUIPMENT START-UP, AND SYSTEM TESTING AND BALANCING.
2. WHEN THE CONTRACTOR COMPLETES A SYSTEM PRIOR TO THE COMPLETION DATE AS SHOWN ON THE PROJECT SCHEDULE, THE CONTRACTOR MAY REQUEST INITIATION OF FPT.
3. COORDINATION AND FINAL SCHEDULING CONFIRMATION OF FUNCTIONAL PERFORMANCE TESTING SHALL OCCUR DURING REGULARLY SCHEDULED COMMISSIONING MEETINGS.
4. ALL COMMISSIONING ACTIVITIES SHALL BE FULLY INTEGRATED INTO THE CONSTRUCTION ACTIVITY SCHEDULE. THIS INCLUDES MILESTONE DEADLINES FOR COMPLETION OF INSTALLATION OF MAJOR SYSTEM COMPONENTS AND THE DURATIONS FOR FUNCTIONAL TESTING OF A SYSTEM.
5. THE GC SHALL PROVIDE 48 HOURS NOTICE TO CXA REGARDING CHANGES TO THE COORDINATED COMPLETION SCHEDULE FOR SYSTEMS TESTING.
6. CXA SHALL WITNESS AND DOCUMENT FUNCTIONAL PERFORMANCE TESTING OF SYSTEMS. DESIGNATED SUB-CONTRACTOR OR VENDOR RESPONSIBLE FOR DYNAMIC OPERATION OF A SYSTEM OR DEVICE SHALL DEMONSTRATE SYSTEM FUNCTIONALITY TO CXA.
7. FUNCTIONAL AND INSTALLATION ISSUES SHALL BE ADDED TO THE DEFICIENCY LIST AND CORRECTION SHALL FOLLOW PROTOCOL AS DESCRIBED IN THE GENERAL CONDITIONS.

C TEST STRATEGY
1. EACH CONTRACTOR SHALL COMPREHENSIVELY TEST ALL SYSTEMS FOR WHICH THEY ARE RESPONSIBLE TO PROVIDE TO THE PROJECT.
2. SYSTEMS THAT CONTAIN MANY REPEATED IDENTICAL DEVICES MAY BE SELECTED AND DEMONSTRATED TO THE PROJECT TEAM BASED ON A SAMPLING STRATEGY AT THE OPTION OF THE CXA. HOWEVER, NO FEWER THAN THE GREATER OF 10 DEVICES OR 10 PERCENT OF ANY GROUP OF IDENTICAL DEVICES SHALL UNDERGO FUNCTIONAL TESTING.

D NON-CONFORMANCE:
1. CXA SHALL DOCUMENT RESULTS OF FUNCTIONAL PERFORMANCE TEST ON FPT FORMS. DEFICIENCY OR NON-CONFORMANCE ISSUES SHALL BE NOTED AND REPORTED TO COMMISSIONING TEAM AS A DEFICIENCY LIST ITEM WITH SPECIFIC RESPONSIBILITY INDICATED.
2. CORRECTIONS OF MINOR DEFICIENCIES IDENTIFIED MAY BE MADE DURING TESTING AT DISCRETION OF CXA. IN SUCH CASE, DEFICIENCY AND RESOLUTION SHALL BE DOCUMENTED ON PROCEDURE FORM AND TO DEFICIENCY LIST AS A RESOLVED ISSUE.
3. EVERY EFFORT SHALL BE MADE TO EXPEDITE TESTING AND MINIMIZE UNNECESSARY DELAYS, WHILE NOT COMPROMISING INTEGRITY OF PROCEDURES.
4. DEFICIENCIES ARE HANDLED IN THE FOLLOWING MANNER:
   a. WHEN THERE IS NO DISPUTE ON DEFICIENCY AND SUB-CONTRACTOR ACCEPTS RESPONSIBILITY FOR REMEDIAL ACTION:
      1) CXA DOCUMENTS DEFICIENCY AND CONTRACTOR'S RESPONSE AND INTENTION. CXA POSTS ISSUE TO ACTION LIST. CONTRACTOR CORRECTS DEFICIENCY AND RESUBMITS TO CXA. CONTRACTOR ADDRESSES ALL ISSUES NOTED ON ACTION LIST BY CORRECTING DEFICIENCIES OR BY POSTING DATE FOR COMPLETION OF RESOLUTION OF DEFICIENCY.
      2) THE GC RESCHEDULES TEST WITH CXA AND CONTRACTOR AS NECESSARY. NEW TEST TIME IS POSTED TO PROJECT SCHEDULE.
   b. WHEN THERE IS A DISPUTE ABOUT A DEFICIENCY, REGARDING WHETHER IT IS A DEFICIENCY OR WHO IS RESPONSIBLE:
      1) CXA DOCUMENTS DEFICIENCY AND CONTRACTOR'S RESPONSE AND TESTING PROCEEDS ON SUBSEQUENT TEST OR SEQUENCE. CXA POSTS ISSUE TO DEFICIENCY LIST AND DISTRIBUTES TO TEAM.
      2) THE GC FACILITATES RESOLUTION OF DEFICIENCY. OTHER PARTIES ARE BROUGHT INTO DISCUSSIONS AS NEEDED. FINAL INTERPRETIVE AUTHORITY IS WITH A/E. FINAL ACCEPTANCE AUTHORITY IS WITH THE OWNER.
      3) CXA DOCUMENTS RESOLUTION PROCESS.
      4) ONCE INTERPRETATION AND RESOLUTION HAS BEEN DECIDED, APPROPRIATE PARTY CORRECTS DEFICIENCY, AND CXA IS GIVEN NOTICE TO PROCEED FOR RETEST AS NECESSARY. THE GC AND CXA RESCHEDULE TEST. NEW TEST TIME IS POSTED TO PROJECT SCHEDULE.

E COST OF RETESTING:
1. COST TO CONTRACTOR TO RE EXECUTE FPT, IF THEY ARE RESPONSIBLE FOR DEFICIENCY OR FAILURE, SHALL BE THEIRS. IF CONTRACTOR IS NOT RESPONSIBLE, COST RECOVERY FOR RE-VISITATION SHALL BE NEGOTIATED WITH THE GC.
2. TIME FOR CXA AND THE GC TO DIRECT ANY RETESTING REQUIRED BECAUSE A SPECIFIC INSTALLATION OR START-UP TEST ITEM REPORTED TO HAVE BEEN SUCCESSFULLY COMPLETED, BUT DETERMINED DURING FUNCTIONAL PERFORMANCE TESTING TO BE FAULTY, SHALL BE BACKCHARGED TO THE CONTRACTOR.
3. CONTRACTORS SHALL BE HELD RESPONSIBLE FOR EXPENSES INCURRED BY OWNER FOR RETESTING DUE TO THE CONTRACTOR'S STATE OF REPORTED READINESS OR LACK THEREOF. EXPENSES COULD INCLUDE, BUT NOT BE LIMITED TO, RETESTING LABOR COSTS, TRAVEL EXPENSES, AND REMOBILIZATION FOR OWNER AND CONSULTING TEAMS.

F APPROVAL:
1. CXA NOTES EACH SATISFACTORILY DEMONSTRATED FUNCTION ON TEST FORM. CXA, GC, AND OWNER REPRESENTATIVE PROVIDE FORMAL APPROVAL OF FPT AFTER REVIEW.

G DEFERRED TESTING
1. UNFORESEEN DEFERRED TESTS:
   a. ANY CHECK OR TEST NOT COMPLETED DUE TO BUILDING STRUCTURE, REQUIRED OCCUPANCY CONDITION, OR OTHER DEFICIENCY, MAY BE DELAYED UPON APPROVAL OF OWNER. THESE TESTS SHALL BE CONDUCTED AS SOON AS POSSIBLE.

END OF SECTION

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EXP: 12/31/2025

PROJECT

OCC DALLAS

2ND FLOOR EXPANSION

THE FOUNDATION FOR SECURE MARKETS

OPTIONS CLEARNING CORPORATION

KEY PLAN

ISSUE CHART

MARK	ISSUE	DATE
1	ISSUE FOR BID/PERMIT	09/05/2025

Job Number 240100092

TITLE

COMMISSIONING SPECIFICATION

SHEET NUMBER

M0.01

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)
SECTION 23 00 01 - GENERAL CONDITIONS AND REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL NOTES

A THE WORK UNDER THESE SPECIFICATIONS SHALL INCLUDE ALL LABOR, SERVICES, MATERIALS AND EQUIPMENT, AND PERFORMANCE OF ALL WORK REQUIRED FOR THE INSTALLATION OF ALL MECHANICAL WORK AS SHOWN ON THE DRAWINGS AND HEREIN SPECIFIED.

B SHOULD THERE BE ANY DISCREPANCIES OR A QUESTION OF INTENT, REFER THE MATTER TO THE ARCHITECT FOR A DECISION BEFORE ORDERING ANY EQUIPMENT OR MATERIALS OR BEFORE STARTING ANY RELATED WORK.

C WHERE WORK CONNECTS TO THAT OF ANOTHER TRADE, OR TO PIPING OR EQUIPMENT IN PLACE, TAKE MEASUREMENTS IN THE FIELD TO MAKE CONNECTING WORK COME TRUE AND LINE UP WITH THE ITEM BEING CONNECTED.

D MINOR ITEMS AND ACCESSORIES OR DEVICES REASONABLY INFERABLE AS NECESSARY, TO THE COMPLETE AND PROPER INSTALLATION AND OPERATION OF ANY SYSTEM, SHALL BE PROVIDED BY THE CONTRACTOR FOR SUCH SYSTEM WHETHER OR NOT THEY ARE SPECIFICALLY CALLED FOR BY THE SPECIFICATIONS OR DRAWINGS.

E IF NEW WORK IS TO CONNECT TO EXISTING BASE-BUILDING SYSTEMS OR RISERS, A TEST AND BALANCE CONTRACTOR SHALL PROVIDE INITIAL PRESSURE, SUPPLY TEMPERATURES AND FLOW MEASUREMENTS AT MAJOR CONNECTION LOCATIONS AND DURING NORMAL SYSTEM OPERATION PRIOR TO ANY DEMOLITION OR NEW WORK BEING ACCOMPLISHED. ADDITIONAL INFORMATION IS PROVIDED UNDER SECTION 230593.

F PRIOR TO START OF DEMOLITION WORK, CONTRACTOR TO PROVIDE TESTING AND VERIFICATION AS REQUIRED TO ENSURE EXISTING EQUIPMENT INDICATED TO REMAIN OR BE REUSED IS IN ACCEPTABLE WORKING ORDER.

G ALL MATERIALS AND EQUIPMENT SHALL BE ERECTED, INSTALLED, TOOLED, CONNECTED, CLEANED, ADJUSTED, TESTED, CONDITIONED, AND PLACED IN SERVICE IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS, REQUIREMENTS AND RECOMMENDATIONS, INCLUDING UL REQUIREMENTS.

H CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE AND VERIFYING ALL EXISTING FIELD CONDITIONS PRIOR TO SUBMISSION OF THEIR BID. THE CONTRACT DOCUMENTS INDICATE APPROXIMATE LOCATION OF EXISTING DUCTWORK AND SYSTEM COMPONENTS AND ARE DIAGRAMMATIC IN NATURE. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE ACTUAL LOCATION, ROUTING AND SIZE OF THE DUCTWORK AND COMPONENTS. NO EXTRA CHARGES WILL BE ACCEPTED BY THE BUILDING OWNER'S REPRESENTATIVE FOR WORK THAT HAS TO BE PERFORMED DUE TO THE MECHANICAL CONTRACTOR'S FAILURE TO ADEQUATELY VERIFY EXISTING CONDITIONS.

I CONTRACTOR SHALL INCLUDE ALL LABOR, MATERIALS, AND COSTS REQUIRED TO FACILITATE CONSTRUCTION OF THE NEW WORK AND REMODELING OF THE EXISTING SYSTEMS.

J THE COST FOR ALL PERMITS, LICENSES, APPROVALS, AND OTHER ARRANGEMENTS FOR WORK SHALL BE INCLUDED IN THE CONTRACTOR'S BID.

K CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS NECESSARY FOR THE INSTALLATION OF A COMPLETE AND PROPER FUNCTIONING SYSTEM.

L CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND INCLUDING ANY ITEMS NOT INDICATED ON THE DRAWINGS BUT NECESSARY FOR THE PROPER OPERATION OF THE MECHANICAL SYSTEMS.

M CONTRACTOR IS RESPONSIBLE FOR COORDINATING MECHANICAL WORK WITH THE WORK OF ALL OTHER TRADES, MAKING ANY NECESSARY MODIFICATIONS INCLUDING OFFSETS TO MECHANICAL WORK AT NO ADDITIONAL COST.

N REFER TO ARCHITECTURAL, ELECTRICAL, PLUMBING, AND SPRINKLER DRAWINGS FOR ADDITIONAL DETAILS.

O REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF EQUIPMENT, PARTITIONS, WALLS, LIGHT FIXTURES AND GENERAL CONSTRUCTION.

P SUBMIT SKETCHES INDICATING ANY DEVIATIONS FROM THE DRAWINGS TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.

Q THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND REFLECT DESIGN INTENT. THESE DESIGN DRAWINGS SHALL GUIDE THE CONTRACTOR IN PREPARING SHOP DRAWINGS, THE CONTRACTOR IS RESPONSIBLE FOR INCORPORATING BEST CONSTRUCTION PRACTICES, TRADE/CEILING COORDINATION, AND COORDINATION WITH ACTUAL FIELD CONDITIONS. ALL CHANGES FROM DRAWINGS NECESSARY TO MAKE THE WORK OF EACH CONTRACTOR CONFORM TO THE BUILDING CONSTRUCTION AND THE WORK OF OTHER TRADE CONTRACTORS SHALL BE DONE AT THE APPROPRIATE TRADE CONTRACTOR'S EXPENSE.

R IN GENERAL, ALL PIPING, DUCTWORK AND SIMILAR ITEMS SHALL BE INSTALLED CONCEALED FROM VIEW ABOVE THE CEILING, IN PARTITIONS, SHAFTS, OR CHASES, UNLESS OTHERWISE INDICATED.

S LOCATION OF ITEMS NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY AND EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS SHALL BE DETERMINED AT THE SITE, SUBJECT TO REVIEW.

T SPACES THAT ARE SEPARATED FROM THE RETURN AIR PLENUM WITH SLAB TO SLAB PARTITIONS WILL REQUIRE TRANSFER AIR OPENINGS TO ALLOW SPACE EXHAUST AIR TO RETURN TO THE RISER. TRANSFER AIR OPENINGS SHALL BE SIZED NOT TO EXCEED 300 FPM AND SHALL BE REVIEWED WITH ARCHITECT

U CONTRACTOR SHALL PROTECT ALL EXISTING BUILDING SURFACES, EQUIPMENT, AND FIXTURES FROM DAMAGE FROM THE CONSTRUCTION WORK FOR THIS PROJECT. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

V CONTRACTOR SHALL MAKE ALL ARRANGEMENTS WITH THE BUILDING OWNER'S REPRESENTATIVE REGARDING BUILDING RULES AND REGULATIONS INCLUDING WORKING HOURS, REFUSE DISPOSAL, SECURITY, INTERRUPTIONS OF BUILDING UTILITIES OR FUNCTIONS, OWNERSHIP OF SALVAGED MATERIALS AND ANY OTHER ITEM DEEMED TO BE OF MUTUAL INTEREST.

W IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO STORE THEIR MATERIALS IN A MANNER THAT WILL MAINTAIN AN ORDERLY CLEAN APPEARANCE. IF STORED ON-SITE IN OPEN OR UNPROTECTED AREAS, ALL EQUIPMENT AND MATERIAL SHALL BE KEPT OFF THE GROUND BY MEANS OF PALLETS OR RACKS AND COVERED WITH TARPAULINS. EQUIPMENT AND MATERIAL, IF LEFT OUT IN THE OPEN AND DAMAGED, SHALL BE REPAINTED OR OTHERWISE REFURBISHED AT THE DISCRETION OF THE BUILDING OWNER'S REPRESENTATIVE. EQUIPMENT AND MATERIAL IS SUBJECT TO REJECTION AND REPLACEMENT IF, IN THE OPINION OF THE ENGINEER OR MANUFACTURER, THE EQUIPMENT HAS DETERIORATED OR BEEN DAMAGED TO THE EXTENT THAT ITS IMMEDIATE USE IS QUESTIONABLE, ITS APPEARANCE HAS BEEN COMPROMISED OR THAT ITS NORMAL LIFE EXPECTANCY HAS BEEN CURTAILED.

X PROVIDE ALL HOLES, SLEEVES, CUTTING, PATCHING AND CAULKING FOR INSTALLATION OF THIS WORK. CAULKING SHALL CONFORM TO THE FIRE RATING OF THE WALLS. SEAL ALL PENETRATIONS THROUGH BLOCK WALLS.

Y CONTRACTOR SHALL BE RESPONSIBLE FOR RELOCATION OF ANY MINOR INTERFERENCES, INCLUDING CONDUIT, HANGERS, ETC., AT NO ADDITIONAL COST TO OWNER.

Z WHERE PIPES ARE LOCATED INSIDE PARTITIONS, OR FURRED OUT SPACES AND CHASES, OBTAIN INFORMATION AS TO THEIR EXACT LOCATION AND SIZE AND INSTALL WORK SO AS TO BE ENTIRELY CONCEALED IN THE ALLOTTED SPACE. IF CONFLICTS ARISE MAKING THIS IMPOSSIBLE, OBTAIN INSTRUCTIONS FROM THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

AA CONTRACTOR SHALL COMPLY WITH BASE BUILDING SPECIFICATIONS FOR ALL STANDARDS OF WORKMANSHIP REQUIRED, METHODS OF CONTROL, SAFETY DEVICES, ETC., FOR ALL NEW EQUIPMENT AND MATERIALS BEING INSTALLED.

BB DURING CONSTRUCTION, PROVIDE FILTER MEDIA ON RETURN AIR OPENINGS AND ALL EQUIPMENT INCLUDING FAN POWERED BOX RECIRCULATION INLETS (NEW AND EXISTING). FILTER MEDIA SHALL BE CHANGED IF REQUIRED DURING THE DURATION OF THE PROJECT AND REMOVED AT THE CONCLUSION OF THE PROJECT.

CC ALL SYSTEMS SHALL BE INDEPENDENTLY SUPPORTED.

DD VOLTAGE FOR ALL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING.

EE THE CONTRACTOR SHALL REPLACE ANY FIREPROOFING REMOVED IN THE PERFORMANCE OF THE CONTRACTOR'S WORK.

FF FINAL INSPECTION AND TESTS SHALL BE COORDINATED WITH THE BUILDING OWNER'S REPRESENTATIVE BY THE CONTRACTOR RESPONSIBLE FOR THE INSTALLATION. ALL NEW AND EXISTING EQUIPMENT INCLUDED IN THE SCOPE OF WORK SHALL BE CLEANED AND ADJUSTED AS REQUIRED TO OPERATE SATISFACTORILY. EACH CONTRACTOR SHALL SUPPLY ALL LABOR, MATERIALS, INSTRUMENTS, AND MISCELLANEOUS EQUIPMENT REQUIRED FOR TESTS.

GG PROVIDE COMPETENT OPERATING TECHNICIAN TO INSTRUCT THE BUILDING OWNER'S REPRESENTATIVE IN THE OPERATION AND MAINTENANCE OF THE INSTALLED EQUIPMENT.

HH CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIAL FOR ONE YEAR AFTER FINAL ACCEPTANCE AGAINST ALL DEFECTS OF MATERIAL, EQUIPMENT, AND WORKMANSHIP. ANY DEFECTIVE MATERIALS OR WORKMANSHIP AS WELL AS DAMAGE TO THE WORK OF ALL TRADES RESULTING FROM SAME SHALL BE REPLACED OR REPAIRED AS DIRECTED FOR THE DURATION OF THE STIPULATED GUARANTEE PERIOD.

II CONTRACTOR SHALL PROVIDE ACCESS TO ALL COMPONENTS OF THE HVAC SYSTEM REQUIRING SERVICE. THIS INCLUDES BUT IS NOT LIMITED TO VOLUME DAMPERS, FIRE/SMOKE DAMPERS, VALVES, DUCT ACCESS PANELS, AND EQUIPMENT ACCESS. CONTRACTOR SHALL COORDINATE CEILING ACCESS PANEL LOCATIONS AND SIZES AS REQUIRED WITH ARCHITECT.

JJ ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL OF GAUGES AND CONSTRUCTION IN ACCORDANCE WITH SMACNA AND ASHRAE STANDARDS.

KK ALL DUCT JOINTS, SEAMS AND CONNECTIONS SHALL BE SEALED IN ACCORDANCE WITH THE INTERNATIONAL ENERGY CONSERVATION CODE.

LL FLEXIBLE DUCTS SHALL NOT BE LONGER THAN 5'-0".

MM THE CONTRACTOR SHALL GUARANTEE THAT THE PLENUM CHAMBER USED FOR RECIRCULATION OF AIR WILL BE OF TIGHT CONSTRUCTION AND THAT ALL SOURCES OF AIR CONTAMINATION FROM TRAPS, SOIL STACKS, DOWNSPOUTS, VENTS, BE ENCLOSED SO THAT NO CONTAMINATED AIR WILL BE RECIRCULATED.

NN ALL EQUIPMENT INSTALLED IN A PLENUM CEILING SHALL HAVE A U.L., CSA, OR ETL LABEL AND MUST BE APPROVED FOR USE IN THE CITY OF DALLAS.

OO EQUIPMENT NOISE LEVEL SHALL NOT EXCEED 55 DB AT THE LOT LINE.

PP ALL FRESH AIR INTAKE OPENINGS SHALL BE A MINIMUM OF 15'-0" AWAY FROM ANY EXHAUST OR POINT OF CONTAMINATED DISCHARGE AND MINIMUM 10'-0" ABOVE GRADE OR HAVE ADEQUATE MEANS TO REMOVE DUST.

1.02 REFRIGERATION

A THERE IS NO REFRIGERATION AS PART OF THIS PROJECT.

END OF SECTION

SECTION 23 00 03 - SERVICES EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A EACH MAJOR COMPONENT OF EQUIPMENT SHALL HAVE THE MANUFACTURER'S NAME, ADDRESS, MODEL NUMBER AND RATING ON A PLATE SECURELY AFFIXED IN A CONSPICUOUS PLACE.

B CODE RATINGS, LABELS OR OTHER DATA WHICH ARE DIE-STAMPED OR OTHERWISE AFFIXED TO THE SURFACE OF THE EQUIPMENT SHALL BE IN A VISIBLE LOCATION.

C ALL EQUIPMENT PROVIDED UNDER THESE SPECIFICATIONS SHALL PERFORM WITH THE LEAST POSSIBLE NOISE AND VIBRATION CONSISTENT WITH ITS DUTY. QUIETNESS OF OPERATION OF ALL EQUIPMENT IS A REQUIREMENT. ANY EQUIPMENT, AS DETERMINED BY THE BUILDING OWNER'S REPRESENTATIVE, OR ENGINEER TO BE PRODUCING OBJECTIONABLE NOISE OR TRANSMITTING NOISE OR VIBRATION TO THE BUILDING SHALL BE REPAIRED OR REMOVED AND REPLACED.

D ALL WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES. THESE CODES SHALL BE FOLLOWED AS A MINIMUM. CONTRACTOR SHALL PROVIDE HIGHER GRADES OF MATERIAL AND WORKMANSHIP THAT MAY EXCEED MINIMUM CODE REQUIREMENTS WHERE SPECIFIED OR REQUIRED. PROVIDE ALL TESTS REQUIRED BY LOCAL CODES AND AS SPECIFIED.

1.02 SUBMITTALS, SHOP DRAWINGS AND AS-BUILTS

A SHOP DRAWINGS, PRODUCT DATA AND/OR SAMPLES SHALL BE SUBMITTED FOR ALL EQUIPMENT AS SPECIFIED OR SCHEDULED. SHOP DRAWING PLANS SHALL BE MINIMUM 1/4"=1'-0" SCALE AND SHALL INDICATE COORDINATED AND DIMENSIONED LAYOUT OF ALL EQUIPMENT, DUCTS, DIFFUSERS, BOXES, PIPING, THERMOSTATS, AS WELL AS ASSOCIATED SIZES AND CFMS. SUBMIT SECTIONS AND ELEVATIONS AS REQUIRED TO CLARIFY LAYOUT OF VERTICAL DUCT AND PIPE SECTIONS. MODIFIED COPIES OF DESIGN DOCUMENTS ARE NOT ACCEPTABLE. SUBMIT DIGITAL FILE (PDF FORMAT) OF ALL SUBMITTALS AND SHOP DRAWINGS FOR ARCHITECT REVIEW.

B FINAL AS-BUILT DUCTWORK, EQUIPMENT AND PIPING PLAN LAYOUTS: SHOP DRAWINGS SHALL BE UPDATED ELECTRONICALLY TO REFLECT FINAL AS-BUILT CONDITIONS INCLUDING ALL FIELD MODIFICATIONS DURING CONSTRUCTION. CONTRACTOR SHALL SUBMIT ONE SET OF AUTOCAD FILES, ONE SET OF DIGITAL COPIES (PDF FORMAT) AND TWO SETS OF FULL-SIZE PRINTS TO BUILDING OWNER'S REPRESENTATIVE. AND ONE SET OF AUTOCAD FILES AND DIGITAL COPIES (PDF FORMAT) TO ENGINEER SHOWING AS-BUILT CONDITIONS OF ALL CONTRACT WORK.

C PRODUCT DATA/O & M MANUALS: FURNISH OWNER WITH THREE INSTRUCTION MANUALS IN BOUND FORM CONTAINING DATA COVERING CAPACITIES, MAINTENANCE, AND OPERATION OF ALL EQUIPMENT AND APPARATUS. MANUALS SHALL BE EDITED TO BE PROJECT SPECIFIC FOR PRODUCTS AND ACCESSORIES ACTUALLY INSTALLED.

D ALL REQUESTS FOR SUBSTITUTIONS SHALL BE SUBMITTED TO ARCHITECT FOR APPROVAL IN A TIMELY MANNER, AND INCLUDE REASON FOR SUBSTITUTION, DOCUMENTATION TO SHOW THAT SUBSTITUTED PRODUCT IS EQUAL TO OR BETTER THAN SPECIFIED PRODUCT, OWNER COST SAVINGS AND/OR OTHER BENEFITS PROVIDED, AND COMPATIBILITY WITH OTHER DISCIPLINES OR PORTIONS OF THE PROJECT. SUBSTITUTION CANNOT REQUIRE ADDITIONAL WORK OR COST FOR OTHER TRADES, ARCHITECT OR OWNER.

1.03 DEMOLITION AND DISPOSITION OF REMOVED EQUIPMENT

A THE CONTRACTOR SHALL REMOVE EXISTING MECHANICAL EQUIPMENT AND MATERIALS AS SPECIFIED OR AS REQUIRED, WHETHER SHOWN ON THE DRAWINGS OR NOT TO PREPARE FOR THE NEW WORK. CONTRACTOR SHALL TAKE POSSESSION OF REMOVED EQUIPMENT AND MATERIALS AND REMOVE THEM FROM THE SITE PROMPTLY, EXCEPT AS SPECIFIED BELOW OR UNLESS OTHERWISE NOTED ON THE DRAWINGS.

B ALL SALVAGEABLE MATERIAL AND EQUIPMENT, INCLUDING BUT NOT NECESSARILY LIMITED TO HEATING UNITS, AC UNITS, TERMINAL UNITS, ETC., SHALL BE REMOVED AND MAINTAINED IN AS GOOD CONDITION AS POSSIBLE AND TURNED OVER TO THE BUILDING OWNER'S REPRESENTATIVE. HOWEVER, IF THE BUILDING OWNER'S REPRESENTATIVE DECIDES ANY SUCH MATERIALS ARE OF NO VALUE TO THE BUILDING THEN THEY SHALL BECOME THE PROPERTY OF THE CONTRACTOR WHO SHALL REMOVE SUCH DISCARDED WORK FROM THE PREMISES AND DISPOSE OF SAME.

C EXISTING EQUIPMENT OR SYSTEMS WHICH ARE SPECIFIED TO BE REPLACED BY NEW EQUIPMENT OR SYSTEMS SHALL NOT BE REMOVED FROM SERVICE UNTIL THE NEW EQUIPMENT OR SYSTEMS HAVE ACTUALLY ARRIVED AT THE PROJECT SITE.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING AND BALANCING

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A TESTING AND BALANCING CONTRACTOR SHALL BE INDEPENDENT OF THE MECHANICAL CONTRACTOR AND A CERTIFIED MEMBER OF EITHER ASSOCIATED AIR BALANCE COUNCIL (AABC), NATIONAL BALANCING COUNCIL (NBC), NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) OR TESTNG ADJUSTING AND BALANCING BUREAU (TABB). THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AND BALANCING CONTRACTOR AND SHALL PROVIDE SUFFICIENT TIME BEFORE FINAL COMPLETION OF THEIR WORK, SO THAT TESTING AND BALANCING CAN BE ACCOMPLISHED. THE CONTRACTOR SHALL PROVIDE ALL LABOR AND TOOLS TO MAKE ANY CORRECTIONS TO THE SYSTEM WHEN REQUIRED TO BALANCE THE SYSTEM WITHOUT UNDUE DELAY TO THE TESTING AND BALANCING CONTRACTOR.

B IF NEW WORK IS TO CONNECT TO EXISTING BASE-BUILDING SYSTEMS OR RISERS, A PROVIDE INITIAL PRESSURE, SUPPLY TEMPERATURES AND FLOW MEASUREMENTS AT MAJOR CONNECTION LOCATIONS AND DURING NORMAL SYSTEM OPERATION PRIOR TO ANY DEMOLITION OR NEW WORK BEING ACCOMPLISHED.

C PRIOR TO START OF DEMOLITION WORK, CONTRACTOR TO PROVIDE TESTING AND VERIFICATION AS REQUIRED TO ENSURE EXISTING EQUIPMENT INDICATED TO REMAIN OR BE REUSED IS IN ACCEPTABLE WORKING ORDER.

D THE CONTRACTOR SHALL PUT ALL EQUIPMENT INTO FULL OPERATION AND CONTINUE ITS OPERATION DURING EACH WORKING DAY OF TESTING AND BALANCING. NO TESTING AND BALANCING WORK SHALL START UNTIL ALL OF THE AIR HANDLING EQUIPMENT HAS NEW FILTERS INSTALLED AND COILS HAVE BEEN CLEANED BY THE CONTRACTOR. THE TESTING AND BALANCING CONTRACTOR SHALL BE KEPT INFORMED DURING THE CONSTRUCTION OF THE PROJECT OF ANY MAJOR CHANGES MADE TO THE HVAC SYSTEM. TESTING AND BALANCING CONTRACTOR SHALL BE PROVIDED WITH ONE (1) SET OF SHOP DRAWINGS ON ALL EQUIPMENT WHICH THEY WILL BE REQUIRED TO WORK ON WHEN BALANCING THE HVAC SYSTEM.

E CONTRACTOR SHALL NOTIFY THE ARCHITECT AND BUILDING ENGINEER OF THE T&B SCHEDULE A MINIMUM OF 5 DAYS PRIOR TO T&B ACTIVITIES.

F DURING TESTING AND BALANCING, NOTIFY ARCHITECT IMMEDIATELY OF ANY EQUIPMENT OR OUTLETS THAT CANNOT BE SATISFACTORILY BALANCED TO DESIGN REQUIREMENTS, BUILDING EQUIPMENT CANNOT BE SET TO SIMULATE PEAK DESIGN CONDITIONS, OR THERE IS EXCESSIVE NOISE OR VIBRATION FROM EQUIPMENT OR SYSTEMS.

G TESTING AND BALANCING WILL NOT BE CONSIDERED COMPLETE UNTIL ALL ISSUES HAVE BEEN ADDRESSED AND ALL DEVICES ARE ADJUSTED AND BALANCED TO THE SATISFACTION OF THE ARCHITECT AND BUILDING ENGINEER.

H THE FINAL TEST RESULTS SHALL BE TABULATED AND DIGITAL COPIES (PDF FORMAT) SHALL BE SUBMITTED FOR REVIEW THROUGH THE NORMAL SUBMITTAL PROCEDURES PRIOR TO PUNCH LIST WALK-THROUGH. ALL EQUIPMENT SHOWN IN BALANCING REPORT SHALL HAVE AN EQUIPMENT ID TAG WHICH SHALL CORRESPOND TO TAG SHOWN ON MECHANICAL AS BUILT DRAWING.

I MECHANICAL CONTRACTOR SHALL ADJUST PATTERNS OF ADJUSTABLE OUTLETS FOR PROPER DISTRIBUTION TO ELIMINATE DRAFTS OR AS INDICATED ON DRAWINGS PRIOR TO ANY BALANCING ACTIVITIES. COOLING OUTLETS TO BE SET FOR AIR DIFFUSION ALONG CEILING AND HEATING ONLY OUTLETS TO BE SET TO DIRECT AIR AT PERIMETER.

1.02 AIR SYSTEMS

A BALANCING CONTRACTOR SHALL VERIFY THAT RETURNS, SPECIFICALLY LIGHTING FIXTURE SLOTS, ARE OPEN AND SHALL NOTIFY MECHANICAL CONTRACTOR IF THEY ARE NOT.

B CONTRACTOR TO CONFIRM FILTERS ARE CLEAN.

C BALANCE EACH AIR SUPPLY AND EXHAUST SYSTEM TO WITHIN 10% OF QUANTITY SHOWN ON DRAWINGS.

D FOR VAV SYSTEMS, BALANCING CONTRACTOR TO DETERMINE AND RECORD MINIMUM DUCT STATIC PRESSURE SETPOINT REQUIRED TO ACHIEVE PROPER AIRFLOW AT ALL OUTLETS.

E BALANCING CONTRACTOR SHALL COORDINATE WITH CONTROLS CONTRACTOR TO SET ALL SCHEDULED MINIMUM AND MAXIMUM SETPOINTS AND CORRESPONDING CONTROL SIGNALS.

F BALANCING REPORT MUST SHOW PRIMARY AIR INLET STATIC PRESSURE, MAXIMUM SETPOINT CFM AND MINIMUM SHUT-OFF CFM AT EACH TERMINAL UNIT. REPORT MUST ALSO SHOW MINIMUM AND MAXIMUM PRIMARY AND FAN CFMS AND CORRESPONDING CONTROL SIGNALS DURING HEATING AND COOLING MODE.

G RECORD DISCHARGE AIR TEMPERATURE AT RISER, BOX, AND DIFFUSER IN BOTH COOLING AND HEATING MODES OF OPERATION.

END OF SECTION

SECTION 23 07 00 - HVAC INSULATION

PART 1

1.01 SUMMARY

A SECTION INCLUDES INSULATION REQUIREMENTS FOR THE FOLLOWING:
1. DUCTWORK INSULATION AND JACKETING.

PART 2 PRODUCTS

2.01 GLASS FIBER FLEXIBLE BLANKET – TYPE F9

A MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. KNAUF INSULATION: FRIENDLY FEEL DUCT WRAP.
2. JOHNS-MANVILLE: MICRO LITE XG
3. OWENS CORNING: DUCT WRAP

B FLEXIBLE FIBER GLASS BLANKET: ASTM C553 TYPE I, II AND III, AND ASTM C 1290; FHC 25/50 PER ASTM E 84.
1. "K" VALUE: ASTM C177, 0.29 AT 75°(F) MEAN TEMPERATURE.
2. MAXIMUM SERVICE TEMPERATURE: FACED: 250° (F); UNFACED: 350°(F)
3. FACTORY-APPLIED VAPOR RETARDER JACKET: TYPE J1, J2 OR J8. SEE SECTION 3.17 DUCT AND PLENUM INSULATION SCHEDULE.
4. INSTALLATION: MAXIMUM ALLOWABLE COMPRESSION: 25%
5. DENSITY:
a. CONCEALED AREAS: MINIMUM 0.75 PCF
b. EXPOSED TO VIEW AREAS: MINIMUM 1.0 PCF.
c. EXPOSED TO VIEW IN MECHANICAL ROOMS: MINIMUM 1.5 PCF.

2.02 INSULATION ACCESSORIES

A ADHESIVES, MASTICS, INSULATING CEMENTS, LAGGING ADHESIVES, AND SEALANTS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES TO WHICH APPLIED, AND SUITABLE FOR OPERATING TEMPERATURES OF EQUIPMENT, PIPING AND DUCT SYSTEMS.
1. FOR INDOOR APPLICATIONS, VOC CONTENT SHALL BE 50 G/L OR LESS.
2. FOR JOINT SEALANTS, VOC CONTENT SHALL BE 420 G/L OR LESS.
3. FOR WATER-BASED VAPOR-BARRIER MASTIC, PERMEANCE SHALL BE 0.013 PERM OR BETTER.
4. FOR SOLVENT BASED VAPOR-BARRIER MASTIC, PERMEANCE SHALL BE 0.05 PERM OR BETTER.
5. FOR WATER-BASED BREATHER MASTIC, PERMEANCE SHALL BE 1.8 PERMS OR BETTER.

B FABRIC REINFORCING MESH AND CLOTH:
1. WOVEN GLASS-FIBER FABRIC: APPROXIMATELY 2 OZ./SQ. YD. WITH A THREAD COUNT OF 10 STRANDS BY 10 STRANDS/SQ. IN. FOR COVERING PIPE AND PIPE FITTINGS.
2. WOVEN POLYESTER FABRIC: APPROXIMATELY 1 OZ./SQ. YD. WITH A THREAD COUNT OF 10 STRANDS BY 10 STRANDS/SQ. IN. IN A LENO WEAVE, FOR PIPE.
3. WOVEN GLASS-FIBER FABRIC: COMPLY WITH MIL-C-20079H, TYPE I, PLAIN WEAVE, AND PRESIZED A MINIMUM OF 8 OZ./SQ. YD.

C TAPES
1. VAPOR-RETARDER TAPE MATCHING FACTORY- OR FIELD-APPLIED JACKET WITH ACRYLIC ADHESIVE, AND COMPATIBLE WITH JACKET MANUFACTURER'S REQUIREMENTS.

D SECUREMENTS
1. BANDS: STAINLESS STEEL, TYPE 304, 0.015 INCH THICK, ¾ INCH WIDE WITH WING SEAL.
a. FOR USE ON ALUMINUM JACKETS: ALUMINUM, ALLOY 3003, 3005, 3105 OR 5005; TEMPER H-14, 0.020 INCH THICK, ¾ INCH WIDE WITH WING SEAL.
2. STAPLES: OUTWARD-CLINCHING INSULATION STAPLES, NOMINAL ¾ INCH WIDE, STAINLESS STEEL OR MONEL.
3. WIRE: 0.062 INCH SOFT-ANNEALED, STAINLESS STEEL.

2.03 FACTORY-APPLIED JACKETS

A INSULATION SYSTEM SCHEDULES INDICATE FACTORY-APPLIED JACKETS ON VARIOUS APPLICATIONS. WHEN FACTORY-APPLIED JACKETS ARE INDICATED, COMPLY WITH THE FOLLOWING:
1. FSK JACKET – TYPE J2:
a. ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

PART 3 EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET IN EITHER WET OR DRY STATE.

B INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS.

C INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED.

D DO NOT WELD BRACKETS, CLIPS, OR OTHER ATTACHMENT DEVICES TO PIPING, FITTINGS, AND SPECIALTIES.

E KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING.

F INSTALL INSULATION WITH TIGHT LONGITUDINAL SEAMS AND END JOINTS. BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.

G INSTALL INSULATION WITH LEAST NUMBER OF JOINTS PRACTICAL.

H WHERE VAPOR BARRIER IS INDICATED, SEAL JOINTS, SEAMS, AND PENETRATIONS IN INSULATION AT HANGERS, SUPPORTS, ANCHORS, AND OTHER PROJECTIONS WITH VAPOR-BARRIER MASTIC.
1. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR ATTACHMENTS.
2. FOR INSULATION APPLICATION WHERE VAPOR BARRIERS ARE INDICATED, EXTEND INSULATION ON ANCHOR LEGS FROM POINT OF ATTACHMENT TO SUPPORTED ITEM TO POINT OF ATTACHMENT TO STRUCTURE. TAPER AND SEAL ENDS AT ATTACHMENT TO STRUCTURE WITH VAPOR-BARRIER MASTIC.
3. INSTALL INSERT MATERIALS AND INSTALL INSULATION TO TIGHTLY JOIN THE INSERT. SEAL INSULATION TO INSULATION INSERTS WITH ADHESIVE OR SEALING COMPOUND RECOMMENDED BY INSULATION MATERIAL MANUFACTURER.
4. COVER INSERTS WITH JACKET MATERIAL MATCHING ADJACENT PIPE INSULATION. INSTALL SHIELDS OVER JACKET, ARRANGED TO PROTECT JACKET FROM TEAR OR PUNCTURE BY HANGER, SUPPORT, AND SHIELD.

I APPLY ADHESIVES, MASTICS, AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE RATE AND WET AND DRY FILM THICKNESSES.

J INSTALL INSULATION WITH FACTORY-APPLIED JACKETS AS FOLLOWS:
1. DRAW JACKET TIGHT AND SMOOTH.
2. COVER CIRCUMFERENTIAL JOINTS WITH 3-INCH- (75-MM-) WIDE STRIPS, OF SAME MATERIAL AS INSULATION JACKET.
3. COVER JOINTS AND SEAMS WITH TAPE, ACCORDING TO INSULATION MATERIAL MANUFACTURER'S WRITTEN INSTRUCTIONS, TO MAINTAIN VAPOR SEAL.
4. WHERE VAPOR BARRIERS ARE INDICATED, APPLY VAPOR-BARRIER MASTIC ON SEAMS AND JOINTS AND AT ENDS ADJACENT TO PIPE FLANGES AND FITTINGS.

K CUT INSULATION IN A MANNER TO AVOID COMPRESSING INSULATION MORE THAN 75 PERCENT OF ITS NOMINAL THICKNESS.

L FINISH INSTALLATION WITH SYSTEMS AT OPERATING CONDITIONS. REPAIR JOINT SEPARATIONS AND CRACKING DUE TO THERMAL MOVEMENT.

M REPAIR DAMAGED INSULATION FACINGS BY APPLYING SAME FACING MATERIAL OVER DAMAGED AREAS. EXTEND PATCHES AT LEAST 4 INCHES (100 MM) BEYOND DAMAGED AREAS. ADHERE, STAPLE, AND SEAL PATCHES SIMILAR TO BUTT JOINTS.

N FOR ABOVE-AMBIENT SERVICES, DO NOT INSTALL INSULATION TO THE FOLLOWING:
1. VIBRATION-CONTROL DEVICES.
2. TESTING AGENCY LABELS AND STAMPS.
3. NAMEPLATES AND DATA PLATES.
4. MANHOLES.
5. HANDHOLES.
6. CLEANOUTS.

3.02 DUCT INSULATION SCHEDULE

A FOR ALL LOW PRESSURE UNLINED CONCEALED SUPPLY DUCTWORK, PROVIDE 1-1/2" TYPE F9 INSULATION WITH J2 FACTORY APPLIED JACKET.

B SEAL ALL DUCT INSULATION SEAMS WITH TAPE AND ADHESIVE PER MANUFACTURERS INSTRUCTIONS TO PROVIDE A CONTINUOUS AND UNBROKEN VAPOR BARRIER

END OF SECTION

SECTION 23 31 00 - HVAC DUCTS AND ACCESSORIES

PART 1 GENERAL

PART 2 PRODUCTS

2.01 DUCT CONSTRUCTION

A ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL AND MEET THE REQUIREMENTS OF "HVAC DUCT CONSTRUCTION STANDARDS" PUBLISHED BY "SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC.," LATEST EDITION. DUCT PRESSURE CLASSES SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:
1. DUCTS DOWNSTREAM OF TERMINAL UNITS: +1.0" W.G.
2. TRANSFER DUCTS AND EXHAUST DUCTS: -1.0" W.G.
3. RETURN DUCTS: -2.0" W.G.
4. SUPPLY DUCTS UPSTREAM OF TERMINAL UNITS: +4.0" W.G.

B ALL SUPPLY AND RETURN DUCTWORK SHALL BE CONSTRUCTED TO SMACNA SEAL CLASS "A". SEALANT MUST COMPLY WITH UL181B.

2.02 FLEXIBLE DUCTWORK

A FLEXIBLE DUCTWORK SHALL BE FACTORY FABRICATED ASSEMBLY OF CORROSION RESISTANT REINFORCING WIRE HELIX PERMANENTLY BONDED AND ENCLOSED IN HEAVY COATED FIBERGLASS FABRIC. DUCT SHALL BE UL LISTED 181 CLASS I AND SHALL COMPLY WITH NFPA 90A AND 90B AND ALL OTHER GOVERNMENTAL AUTHORITIES HAVING JURISDICTION.

B DUCT MATERIAL SHALL BE FACTORY WRAPPED WITH FIBERGLASS INSULATION WITH A CONDUCTIVITY OF .23 BTU/H-SQ. FT.-F PER INCH THICKNESS OR LESS. THE INSULATION SHALL BE ENCASED IN A FIRE RETARDANT VAPOR BARRIER JACKET.

C FLEXIBLE DUCT SHALL BE FLEXMASTER 4M OR APPROVED EQUAL.

2.03 DUCT LINING

A ALL ACOUSTICAL DUCT LINING MATERIALS SHALL HAVE FIRE AND FUEL CONTRIBUTED AND SMOKE HAZARD RATINGS, AS TESTED BY PROCEDURE ASTM E-84, NOT GREATER THAN:
1. FLAME SPREAD – 25
2. FUEL CONTRIBUTED & SMOKE DEVELOPED – 50

B DUCT LINING, WHERE INDICATED, AND/OR AS HEREINAFTER SPECIFIED SHALL HAVE MAXIMUM CONDUCTIVITY AS FOLLOWS:
1. TYPE I, FLEXIBLE: 0.27 BTU/H-SQ. FT.-F PER INCH THICKNESS AT 75 DEG F MEAN TEMPERATURE.
2. TYPE II, RIGID: 0.23 BTU/H-SQ. FT.-F PER INCH THICKNESS AT 75 DEG F MEAN TEMPERATURE
3. TYPE I LINER SHALL BE USED WITH RECTANGULAR DUCTS AND TYPE II WITH ROUND DUCTS.

2.04 ACCESS PANELS

A ACCESS PANELS IN DUCTWORK SHALL BE OF 22 GAUGE GALVANIZED SHEET METAL WITH NEOPRENE GASKETS. PANELS IN INSULATED DUCTWORK, SHALL HAVE 1" THICK FIBERGLASS INSULATION BETWEEN TWO THICKNESS OF SHEET METAL. THE AIRSIDE SHEET METAL ON INSULATED PANELS SHALL BE WELDED OR MECHANICALLY LOCKED IN POSITION. PANELS UP TO 15" SHALL BE PROVIDED WITH TWO CAM LATCHES, ONE ON EACH SIDE. PANELS OVER 15" SHALL BE PROVIDED WITH FOUR CAM LATCHES, TWO ON EACH SIDE. ALL PANELS SHALL BE OF SUFFICIENT SIZE FOR EASY ACCESS TO AND THE SERVICING OF DAMPERS, DAMPER MOTORS, COILS, ETC.

2.05 FIRE DAMPERS

A ALL FIRE DAMPERS ARE TO BE DYNAMIC TYPE

B FIRE DAMPERS SHALL BE FUSIBLE LINK CURTAIN OR LOUVER TYPE AND SHALL BE UL LABELED AND INSTALLED IN ACCORDANCE WITH UL STANDARD 555 AND NFPA 90A.

PART 3 EXECUTION

3.01 DUCT INSTALLATION

A ALL DUCT SIZES SHOWN ON PLAN SHALL BE INSIDE CLEAR DIMENSIONS. MECHANICAL CONTRACTOR SHALL COORDINATE DUCTS WITH SPECIFIED INSULATION AND DUCT LINING TO PROVIDE THE REQUIRED INSIDE CLEAR FREE AREA.

B MECHANICAL CONTRACTOR SHALL PROVIDE (AT NO EXTRA COST) ALL NECESSARY RISES, DROPS, AND OFFSETS IN DUCTWORK TO SATISFY FIELD CONDITIONS AND COORDINATE WITH OTHER TRADES.

C UPON COMPLETION OF THE INSTALLATION OF DUCTWORK, CLEAN ENTIRE SYSTEM OF RUBBISH, PLASTER, DIRT, ETC. BEFORE INSTALLING GRILLES OR DIFFUSERS.

D PROVIDE VOLUME DAMPERS AT ALL BRANCH TAKE-OFFS AND DIFFUSER TAKEOFFS. VOLUME DAMPERS ARE TO BE MINIMUM 5 FT FROM DIFFUSER FACE. PROVIDE CABLE OPERATED DAMPERS FOR ALL VOLUME DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS WITH CABLE ADJUSTMENT PROVIDED AT FACE OF DIFFUESR. COORDINATE REQUIRED CABLE LENGTH WITH DAMPER PLACEMENT.

E DUCTWORK SHALL BE SUPPORTED FROM STRUCTURE WITH STANDARD GALVANIZED BAND STEEL HANGERS.

F FLEXIBLE CONNECTIONS AND TAKE-OFF TO DIFFUSERS SHALL BE THE SIZE OF THE DIFFUSER INLET.

G ALL NEW DUCTWORK CONSTRUCTED FOR +4.0" W.G. SHALL BE LEAK TESTED IN ACCORDANCE WITH SMACNA LEAK TESTING MANUAL, LEAKAGE CLASS 6.

H PROTECT DUCTWORK FROM THE ELEMENTS AND FOREIGN MATERIAL AND COMPLY WITH INTERMEDIATE DUCT CLEANLINESS LEVEL IN ACCORDANCE WITH SMACNA'S "DUCT CLEANLINESS FOR NEW CONSTRUCTION GUIDELINES".

3.02 DUCTWORK FITTINGS

A ALL NEW DUCT TURNS, ELBOWS, AND TEES SHALL BE INSTALLED WITH TURNING VANES OR MINIMUM 1-1/2 RADIUS ELBOWS.

B RADIUS ELBOWS, 18" WIDTH AND LARGER, SHALL BE PROVIDED WITH TURNING BLADES AT 1/3 AND 1/2 THE WIDTH OF THE DUCT FROM THE INSIDE RADIUS. TURNING VANES SHALL BE PROVIDED WITH HEMMED ENDS.

C SQUARE ELBOWS SHALL BE USED ONLY WHERE INDICATED OR WHERE REQUIRED TO FIT CONSTRUCTION AND ONLY ON LOW PRESSURE SYSTEMS. PROVIDE ALL SQUARE ELBOWS WITH DOUBLE-WALL TURNING VANES.

D PROVIDE CONICAL, BELLMOUTH OR MITERED RECTANGULAR TO ROUND FITTING AT ALL RECTANGULAR TO ROUND TAKEOFFS IN MEDIUM PRESSURE DUCTWORK AND AT INLETS TO TERMINAL UNITS.

E PROVIDE CONICAL, BELLMOUTH, FLANGED OR SPIN-IN FITTING WITH VOLUME DAMPER AT ALL RECTANGULAR TO ROUND DUCT TAKEOFFS IN LOW PRESSURE DUCTWORK. PROVIDE EXTENDED COLLAR FOR DAMPER SHAFT AT ALL LOCATIONS WHERE DUCTWORK IS TO BE INSULATED.

3.03 FLEXIBLE DUCTWORK

A FLEXIBLE DUCTS SHALL NOT BE LONGER THAN 5'-0"

B FLEXIBLE DUCTWORK SHALL BE SUPPORTED. SHARP BENDS, KINKS, AND CONDITIONS THAT RESTRICT AIR FLOW IN ANY WAY WILL NOT BE ACCEPTED.

3.04 DUCT LINING

A SHOP APPLICATION OF DUCT LINER FOR RECTANGULAR DUCTS SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

B SHOP APPLICATION OF DUCT LINER FOR ROUND DUCTS SHALL COMPLY WITH INSULATION MANUFACTURER'S INSTALLATION INSTRUCTIONS.

C PROVIDE 1" ACOUSTICAL DUCT LINING AS FOLLOWS UNLESS OTHERWISE NOTED ON PLANS:
1. ALL TRANSFER DUCTS
2. LOW PRESSURE SUPPLY DUCTWORK FOR FIRST 15'-0" DOWNSTREAM OF CRAC AND HEAT PUMP UNITS.
3. RETURN DUCTWORK FOR FIRST 15'-0" DOWNSTREAM OF AC AND HEAT PUMP UNITS (AS APPLICABLE)
4. LOW PRESSURE SUPPLY DUCTWORK FOR FIRST 10'-0" DOWNSTREAM OF TERMINAL UNITS
5. RETURN BOOTS PROVIDED FOR TERMINAL UNITS, HEAT PUMP UNITS, AC UNITS AND FAN COIL UNITS.

3.05 ACCESS PANELS

A PROVIDE ACCESS PANELS IN ALL DUCTS AT THE FOLLOWING LOCATIONS AND MINIMUM SIZES (IF DUCT SIZE DOES NOT ALLOW PANEL SIZE SHOWN, PROVIDE REMOVABLE DUCT SECTION WITH 8X5 ACCESS PANEL):
1. ADJACENT TO AUTOMATIC DAMPERS (HEAD/SHOULDER: 21X14)
2. AT FIRE DAMPERS AND SMOKE DAMPERS (HEAD/SHOULDER: 21X14)

3.06 FIRE DAMPERS

A PROVIDE 1-1/2 HOUR FIRE DAMPERS IN DUCT PENETRATIONS THROUGH ALL RATED WALLS OF 1 HOUR AND 2 HOURS. PROVIDE 3 HOUR RATED DAMPERS IN ALL DUCT PENETRATIONS THROUGH RATED WALLS 3 HOURS OR GREATER.

B PROVIDE 1-1/2 HOUR FIRE DAMPERS IN TRANSFER OPENINGS THROUGH ALL RATED WALLS OF 1 HOUR AND 2 HOURS. PROVIDE 3 HOUR RATED DAMPERS IN ALL TRANSFER OPENINGS THROUGH RATED WALLS OF 3 HOURS OR GREATER.

C ALL FIRE DAMPERS ARE TO BE DYNAMIC TYPE

D FIRE DAMPERS SHALL BE FUSIBLE LINK CURTAIN OR LOUVER TYPE AND SHALL BE UL LABELED AND INSTALLED IN ACCORDANCE WITH UL STANDARD 555 AND NFPA 90A.

E PROVIDE TYPE C FRAMES IN ALL SUPPLY DUCTS. PROVIDE TYPE B OR C FRAMES IN ALL EXHAUST OR RETURN DUCTWORK AND IN ALL TRANSFER OR UNDUCTED OPENINGS.

F FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

G PROVIDE ACCESS DOOR OF MINIMUM 21"X14" TO ALLOW HEAD AND SHOULDER ACCESS, OR REMOVABLE DUCT SECTION WITH MINIMUM 8" X 5" ACCESS DOOR IN SHEET METAL DUCT ADJACENT TO FIRE DAMPER TO ENABLE MAINTENANCE.

END OF SECTION

SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 GENERAL

1.01 SUMMARY

A SECTION INCLUDES:
1. SINGLE-DUCT AIR TERMINAL UNITS.

1.02 ACTION SUBMITTALS

A PRODUCT DATA: FOR EACH TYPE OF THE FOLLOWING PRODUCTS, INCLUDING RATED CAPACITIES, FURNISHED SPECIALTIES, SOUND-POWER RATINGS, AND ACCESSORIES.
1. AIR TERMINAL UNITS.
2. LINERS AND ADHESIVES.
3. SEALANTS AND GASKETS.

B SHOP DRAWINGS: FOR AIR TERMINAL UNITS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK.
1. DETAIL EQUIPMENT ASSEMBLIES AND INDICATE DIMENSIONS, WEIGHTS, LOADS, REQUIRED CLEARANCES, METHOD OF FIELD ASSEMBLY, COMPONENTS, AND LOCATION AND SIZE OF EACH FIELD CONNECTION.
2. WIRING DIAGRAMS: FOR POWER, SIGNAL, AND CONTROL WIRING.
3. HANGERS AND SUPPORTS, INCLUDING METHODS FOR DUCT AND BUILDING ATTACHMENT AND VIBRATION ISOLATION.

1.03 INFORMATIONAL SUBMITTALS

A FIELD QUALITY-CONTROL REPORTS.

1.04 CLOSEOUT SUBMITTALS

A OPERATION AND MAINTENANCE DATA: FOR AIR TERMINAL UNITS TO INCLUDE OPERATION, AND MAINTENANCE MANUALS. IN ADDITION TO ITEMS SPECIFIED IN DIVISION 01, INCLUDE THE FOLLOWING:
1. INSTRUCTIONS FOR RESETTING MINIMUM AND MAXIMUM AIR VOLUMES.
2. INSTRUCTIONS FOR ADJUSTING SOFTWARE SET POINTS.

1.05 QUALITY ASSURANCE

A ASHRAE COMPLIANCE: APPLICABLE REQUIREMENTS IN ASHRAE 62.1, SECTION 5 - "SYSTEMS AND EQUIPMENT" AND SECTION 7 - "CONSTRUCTION AND SYSTEM START-UP."

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

2.02 SINGLE-DUCT AIR TERMINAL UNITS

A MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
1. NAILOR INDUSTRIES INC.
2. PRICE INDUSTRIES.
3. TITUS.

B CONFIGURATION: VOLUME-DAMPER ASSEMBLY INSIDE UNIT CASING WITH CONTROL COMPONENTS INSIDE A PROTECTIVE METAL SHROUD.

C CASING: MINIMUM 22 GAUGE GALVANIZED STEEL, SINGLE WALL.
1. CASING LINING: ADHESIVE ATTACHED, 3/4-INCH- (19-MM-) THICK, COATED, FIBROUS-GLASS DUCT LINER COMPLYING WITH ASTM C 1071, AND HAVING A MAXIMUM FLAME-SPREAD INDEX OF 25 AND A MAXIMUM SMOKE-DEVELOPED INDEX OF 50, FOR BOTH INSULATION AND ADHESIVE, WHEN TESTED ACCORDING TO ASTM E 84.
2. AIR INLET: ROUND STUB CONNECTION OR S-SLIP AND DRIVE CONNECTIONS FOR DUCT ATTACHMENT.
3. AIR OUTLET: S-SLIP AND DRIVE CONNECTIONS.
4. ACCESS: REMOVABLE PANELS FOR ACCESS TO PARTS REQUIRING SERVICE, ADJUSTMENT, OR MAINTENANCE; WITH AIRTIGHT GASKET.

D VOLUME DAMPER: GALVANIZED STEEL WITH PERIPHERAL GASKET AND SELF-LUBRICATING BEARINGS.
1. MAXIMUM DAMPER LEAKAGE: ARI 880 RATED, 2 PERCENT OF NOMINAL AIRFLOW AT 3-INCH WG (750-PA) INLET STATIC PRESSURE.
2. DAMPER POSITION: NORMALLY OPEN

E CONTROL PANEL ENCLOSURE: NEMA 250, TYPE 1(IEC 60529 IP10 OR BETTER), WITH ACCESS PANEL DUST TIGHT, SEALED FROM AIRFLOW AND MOUNTED ON SIDE OF UNIT.

F DIRECT DIGITAL CONTROLS: SINGLE-PACKAGE UNITARY CONTROLLER AND ACTUATOR SPECIFIED IN SECTION 230900 "TEMPERATURE CONTROLS"

2.03 HANGERS AND SUPPORTS

A HANGER RODS FOR NONCORROSIVE ENVIRONMENTS: CADMIUM-PLATED STEEL RODS AND NUTS.

B AIR TERMINAL UNIT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH DUCT MATERIALS.

C TRAPEZE AND RISER SUPPORTS: STEEL SHAPES AND PLATES FOR UNITS WITH STEEL CASINGS; ALUMINUM FOR UNITS WITH ALUMINUM CASINGS.

PART 3 EXECUTION

3.01 INSTALLATION

A INSTALL AIR TERMINAL UNITS ACCORDING TO NFPA 90A, "STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS."

B INSTALL AIR TERMINAL UNITS LEVEL AND PLUMB. MAINTAIN AND COORDINATE WITH OTHER TRADES TO ENSURE SUFFICIENT CLEARANCE FOR NORMAL SERVICE AND MAINTENANCE OF THE FAN BLOWER AND OTHER ACCESSORIES.

C INSTALL AIR TERMINAL UNITS, SUPPORTED DIRECTLY FROM STRUCTURE. DO NOT SUPPORT AIR TERMINAL UNITS WITH DUCTWORK.

3.02 HANGER AND SUPPORT INSTALLATION

A COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," CHAPTER 5, "HANGERS AND SUPPORTS."

B BUILDING ATTACHMENTS: CONCRETE INSERTS, POWDER-ACTUATED FASTENERS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED.
1. WHERE PRACTICAL, INSTALL CONCRETE INSERTS BEFORE PLACING CONCRETE.
2. INSTALL POWDER-ACTUATED CONCRETE FASTENERS AFTER CONCRETE IS PLACED AND COMPLETELY CURED.
3. USE POWDER-ACTUATED CONCRETE FASTENERS FOR STANDARD-WEIGHT AGGREGATE CONCRETES AND FOR SLABS MORE THAN 4 INCHES (100 MM) THICK.
4. DO NOT USE POWDER-ACTUATED CONCRETE FASTENERS FOR LIGHTWEIGHT-AGGREGATE CONCRETES AND FOR SLABS LESS THAN 4 INCHES (100 MM) THICK.

C HANGERS EXPOSED TO VIEW: THREADED ROD AND ANGLE OR CHANNEL SUPPORTS.

D INSTALL UPPER ATTACHMENTS TO STRUCTURES. SELECT AND SIZE UPPER ATTACHMENTS WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.

3.03 CONNECTIONS

A INSTALL PIPING ADJACENT TO AIR TERMINAL UNIT TO ALLOW SERVICE AND MAINTENANCE.

B HOT-WATER PIPING: IN ADDITION TO REQUIREMENTS IN SECTION 232100 "HYDRONIC PIPING" , CONNECT HEATING COILS TO SUPPLY WITH SHUTOFF VALVE, STRAINER, AND UNION OR FLANGE; AND TO RETURN WITH CONTROL VALVE AND UNION OR FLANGE. SEE SECTION 230900 "TEMPERATURE CONTROLS" FOR CONTROL VALVE.

C CONNECT DUCTS TO AIR TERMINAL UNITS ACCORDING TO SECTION 233100 "HVAC DUCTS AND ACCESSORIES" AND DETAIL.

3.04 IDENTIFICATION

A LABEL EACH AIR TERMINAL UNIT WITH NOMINAL AIRFLOW, AND MAXIMUM AND MINIMUM FACTORY-SET AIRFLOWS.

3.05 FIELD QUALITY CONTROL

A PERFORM TESTS AND INSPECTIONS.

B TESTS AND INSPECTIONS:
1. AFTER INSTALLING AIR TERMINAL UNITS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST FOR COMPLIANCE WITH REQUIREMENTS.
2. LEAK TEST: AFTER INSTALLATION, FILL WATER COILS AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
3. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
4. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

C AIR TERMINAL UNIT WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.

D PREPARE TEST AND INSPECTION REPORTS.

3.06 STARTUP SERVICE

A PERFORM STARTUP SERVICE.
1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
2. VERIFY THAT INLET DUCT CONNECTIONS ARE AS RECOMMENDED BY AIR TERMINAL UNIT MANUFACTURER TO ACHIEVE PROPER PERFORMANCE.
3. VERIFY THAT CONTROLS AND CONTROL ENCLOSURE ARE ACCESSIBLE.
4. VERIFY THAT CONTROL CONNECTIONS ARE COMPLETE.
5. VERIFY THAT NAMEPLATE AND IDENTIFICATION TAG ARE VISIBLE.
6. VERIFY THAT CONTROLS RESPOND TO INPUTS AS SPECIFIED.

3.07 DEMONSTRATION

A TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN AIR TERMINAL UNITS.

END OF SECTION

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2ND FLOOR EXPANSION

OCC THE FOUNDATION FOR SECURE MARKETS

OPTIONS CLEARNING CORPORATION

KEY PLAN

ISSUE CHART

MARK	ISSUE	DATE
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Job Number 240100092

TITLE

MECHANICAL SPECIFICATIONS

SHEET NUMBER

M0.02

DIVISION 23 - TEMPERATURE CONTROLS
SECTION 23 09 00 - TEMPERATURE CONTROLS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A CONTRACTOR SHALL PROVIDE CONTROL WIRING FOR ALL MECHANICAL EQUIPMENT.

B THERMOSTATS AND SPACE TEMPERATURE SENSORS SHALL MATCH EXISTING.

C THERMOSTATS AND OTHER ENVIRONMENTAL CONTROLS ACCESSIBLE TO THE OCCUPANT, SHALL BE MOUNTED AT BUILDING STANDARD HEIGHT OR AS OTHERWISE INDICATED, AND IN ALL CASES BETWEEN 34 AND 44 INCHES ABOVE FINISHED FLOOR. DO NOT INSTALL SENSORS OR T-STATS ABOVE DIMMER SWITCHES.

D PROVIDE INSULATED BASES FOR THERMOSTATS AND SENSORS MOUNTED ON EXTERIOR WALLS AND COLUMNS.

E CONTRACTOR SHALL CONFIRM EXISTING BASE BUILDING AUTOMATION SYSTEM SIZE IS ADEQUATELY SIZED TO SUPPORT ALL NEW EQUIPMENT AND POINTS TO BE ADDED, INCLUDING NETWORK CAPACITY, SOFTWARE LICENSE CAPACITY, NETWORK CONTROLLER CAPACITY, AND SERVER / OWS CAPACITY. PROVIDE NEW CAPACITY AS REQUIRED.

1.02 CONTROL OF VAV AND FAN POWERED BOX TERMINAL UNITS

A CONTRACTOR SHALL PROVIDE (AS APPLICABLE) ALL TERMINAL UNIT CONTROLLERS (TUC), VELOCITY PRESSURE TRANSDUCERS, ELECTRONIC DAMPER ACTUATORS, STEP DOWN TRANSFORMERS, VALVE AND ELECTRONIC VALVE ACTUATORS, RELAYS, AND TEMPERATURE SENSORS FOR FIELD MOUNTING AND WIRING.

B TERMINAL UNIT MANUFACTURER SHALL PROVIDE (AS APPLICABLE) AIR FLOW CROSS PROBES, PRIMARY AIR DAMPERS, EC MOTOR CONTROL BOARDS, ELECTRIC HEAT SEQUENCING MODULES, CONTROLLER ENCLOSURE, AND TERMINAL STRIPS.

C TUC SHALL OPERATE IN A LOCAL STAND-ALONE CONTROL MODE IN THE EVENT OF A LOSS OF NETWORK COMMUNICATIONS.

D PROVIDE A SPACE TEMPERATURE SENSOR FOR EACH TERMINAL UNIT. SENSOR SHALL CONNECT DIRECTLY TO TUC FOR STANDALONE OPERATION.

E PROVIDE A SPACE CARBON DIOXIDE SENSOR FOR TERMINAL UNITS WHERE SHOWN ON DRAWINGS. SENSOR SHALL CONNECT DIRECTLY TO TUC FOR STANDALONE OPERATION. WHEN SHOWN ADJACENT TO A TEMPERATURE SENSOR ON DRAWINGS, PROVIDE SINGLE COMBINED SPACE TEMPERATURE / CO2 INSTEAD OF DISCRETE SENSORS.

F ALL TUC ENCLOSURES SHALL BE IDENTIFIED BY LABEL WITH EQUIPMENT ID SECURELY FASTENED TO THE OUTSIDE OF THE ENCLOSURE IN A LOCATION VISIBLE FROM THE GROUND. LABEL MAY BE MACHINE PRINTED OR NEATLY HAND WRITTEN WITH PERMANENT INK.

G INITIAL SPACE TEMPERATURE SETPOINT SHALL BE 70 F HEATING AND 75 F COOLING WITH A MINIMUM FIVE DEGREE (ADJ.) DEADBAND BETWEEN COOLING/HEATING SETPOINTS.

H ENERGY CODE COMPLIANCE REQUIREMENTS: SETPOINT RANGE 55-90 F, DEADBAND RANGE MINIMUM 5 F. SYSTEM MUST HAVE AUTOMATIC OFF-HOURS TEMPERATURE SETBACK CAPABILITY.

I CONTROL OF COOLING ONLY VAV BOX.

1. OPERATE THE VAV BOX PER THE BASE BUILDING AHU SYSTEM OCCUPIED TIMECLOCK.
2. RESET THE PRIMARY AIR CFM SETPOINT TO MAINTAIN THE SPACE TEMPERATURE AT OCCUPIED TEMPERATURE SETPOINT.
3. OCCUPIED MODE:
   a. MODULATE THE PRIMARY AIR DAMPER TO MAINTAIN THE PRIMARY AIR CFM SETPOINT.
   b. WHEN SPACE TEMPERATURE IS BELOW OCCUPIED COOLING SETPOINT, SET PRIMARY AIR CFM SETPOINT TO SCHEDULED MINIMUM PRIMARY AIR CFM SETPOINT.
   c. UPON A RISE IN SPACE TEMPERATURE ABOVE OCCUPIED COOLING SETPOINT, INCREASE PRIMARY AIR CFM SETPOINT TOWARD SCHEDULED MAXIMUM PRIMARY AIR CFM SETPOINT TO MAINTAIN OCCUPIED COOLING SETPOINT.
4. UNOCCUPIED MODE:
   a. NOT APPLICABLE
5. POINTS LIST:
   a. (AI) SPACE TEMPERATURE
   b. (AI) PRIMARY AIR CFM
   c. (AO) PRIMARY AIR DAMPER CONTROL

END OF SECTION

MECHANICAL SYMBOLS AND ABBREVIATIONS

HVAC SYMBOLS AND ABBREVIATIONS

	EXISTING DUCTWORK OR EQUIPMENT TO REMAIN
	DUCTWORK OR EQUIPMENT TO BE REMOVED
	NEW DUCTWORK OR EQUIPMENT
	FLEXIBLE DUCT
	CAPPED DUCTWORK
	NEW SQUARE SUPPLY AIR DIFFUSER
	EXISTING SQUARE SUPPLY AIR DIFFUSER
	SQUARE SUPPLY AIR DIFFUSER TO BE REMOVED
	NEW RETURN/EXHAUST AIR DIFFUSER
	EXISTING RETURN/EXHAUST AIR DIFFUSER
	SQUARE RETURN/EXHAUST AIR DIFFUSER TO BE REMOVED
	FIRE DAMPER
	SMOKE DAMPER
M	MOTOR OPERATED DAMPER
	MANUAL VOLUME DAMPER
BD	BACKDRAFT DAMPER
	1" ACOUSTICALLY LINED TRANSFER DUCTWORK
	EXISTING AIR CONDITIONING UNIT
	EXISTING VAV TERMINAL UNIT
	EXISTING EXHAUST FAN
	EXHAUST FAN TO BE REMOVED
XXX-Sx	SUPPLY DIFFUSER TAG : CFM-DIFFUSER ID
XXX-Ex	EXHAUST DIFFUSER TAG : CFM-DIFFUSER ID
XXX-Rx	RETURN DIFFUSER TAG : CFM-DIFFUSER ID
XXX-Tx	TRANSFER DIFFUSER TAG : CFM-DIFFUSER ID

GENERAL SYMBOLS AND ABBREVIATIONS

XXX / YYY	EQUIPMENT TAG - TYPE / ID
T	TEMPERATURE SENSOR
T R	RELOCATED TEMPERATURE SENSOR
	NEW CONNECTION
X	KEYNOTE
R	RELOCATE

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OCC THE FOUNDATION FOR SECURE MARKETS

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KEY PLAN

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MARK	ISSUE	DATE
1	ISSUE FOR BID/PERMIT	09/05/2025

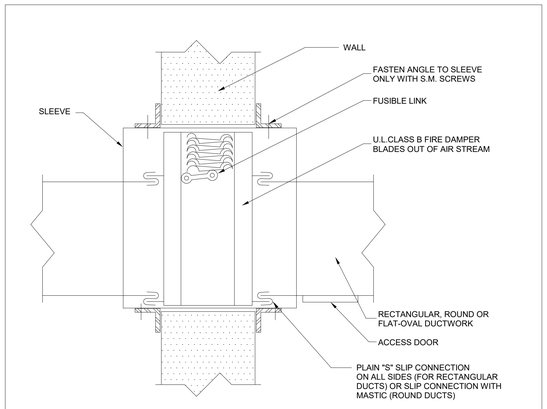
Job Number 240100092

TITLE

TEMPERATURE CONTROL SPECIFICATIONS AND SYMBOL LIST

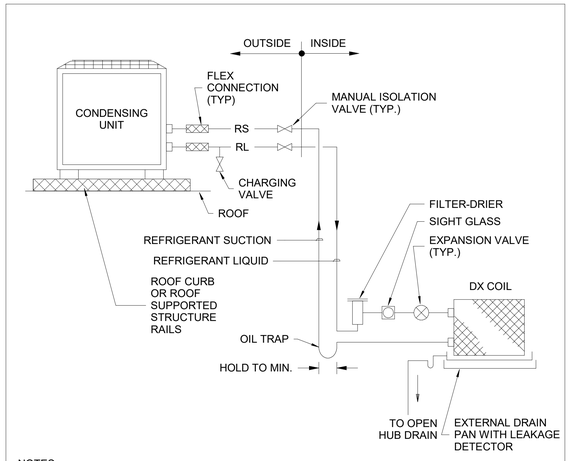
SHEET NUMBER

M0.03



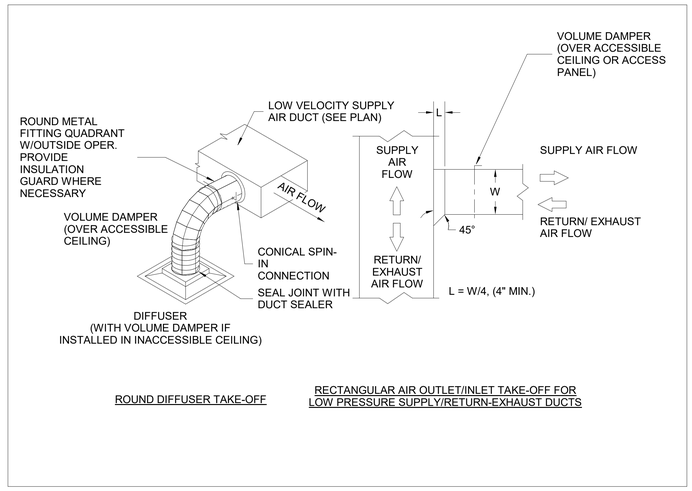
NOTE:
1. ACCESS DOORS IN DUCTWORK 24" WIDE AND SMALLER SHALL BE AS LARGE AS THE DUCTWORK SIDE DIMENSION ALLOWS. ACCESS DOORS IN DUCTWORK LARGER THAN 24" SHALL BE 24" WIDE MINIMUM AND LARGER IF REQUIRED TO PROPERLY ACCESS FIRE DAMPER LINKAGE.
2. CONTRACTOR SHALL INSTALL NM BARCODE TAGS AND SHALL PRODUCE AN IDPH MATRIX '4E'. COORDINATE WITH NMH FOR OBTAINING AND ASSIGNING BAR CODE IDENTIFICATION.

6 FIRE DAMPER DETAIL
NOT TO SCALE

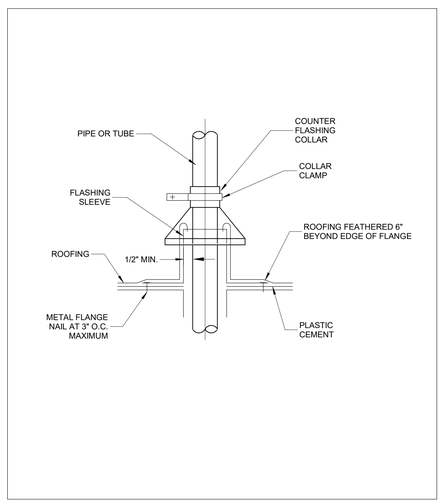


NOTES:
1. PROVIDE A HOT GAS BYPASS OR HEAD PRESSURE CONTROL OF CONDENSING UNIT FAN(S) TO PROVIDE LOW AMBIENT OPERATION OF THE CONDENSING UNIT.
2. INSTALL CONDENSING UNIT ON ROOF EQUIPMENT BASE.

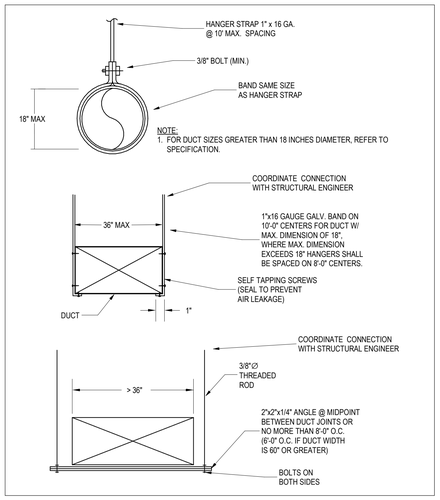
4 DX COOLING PIPING SCHEMATIC
NOT TO SCALE



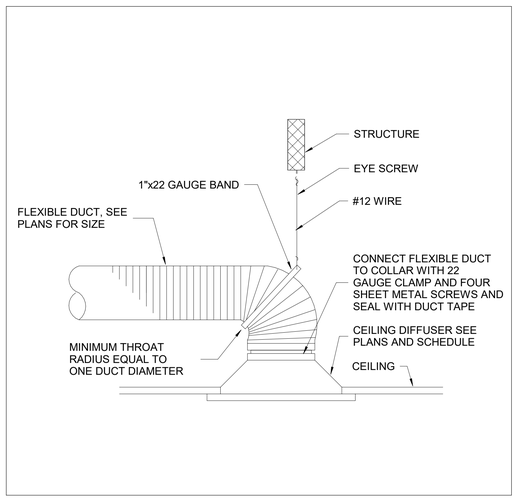
2 LOW PRESSURE TAKE-OFF DETAIL
NOT TO SCALE



5 PIPE ROOF PENETRATION COLLAR FLASHING
NOT TO SCALE



3 DUCT HANGING
NOT TO SCALE



1 CEILING DIFFUSER INSTALL
NOT TO SCALE

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Job Number 240100092

TITLE

MECHANICAL DETAILS AND SYMBOL LIST

SHEET NUMBER

M5.01

LEVEL 02 2018 IMC VENTILATION SCHEDULE

ROOM #	ROOM NAME	OCCUPANCY CLASSIFICATION	FLOOR AREA (SQFT.)	# OF PEOPLE	ORDINANCE REQUIREMENTS				ACTUAL		REMARKS
					CFM/PERSON	CFM/SQFT.	SUPPLY	EXHAUST	SUPPLY	EXHAUST	
-	-	-	-	-	-	-	-	-	-	-	-
02115	STORAGE	STORAGE ROOM	287	0	0	0.12	34	-	250	250	-
02116	IDF	STORAGE ROOM	98	0	0	0.12	12	-	50	50	-
02117	IT STORAGE	STORAGE ROOM	97	0	0	0.12	12	-	100	100	-
2100	CONFERNCE ROOM	CONFERENCE ROOM	179	9	5	0.06	56	-	275	275	-
TOTAL SYSTEM			661	0			58	0	675	675	

DIFFUSER SCHEDULE

DESIGNATION	TYPE	FACE SIZE	BOOT LENGTH	SLOT WIDTH	NUMBER OF SLOTS	NECK SIZE	MAX NOISE CRITERIA	INTEGRAL VOLUME DAMPER	MANUFACTURER	MODEL NO.	REMARKS
		INCH	INCH	INCH		INCH	NC				
S1/R1	24X24 LAY-IN PLAQUE	24X24	-	-	-	NECK SCHED	25	NO	TITUS	OMNI	NOTES 1-2

NOTES:
1. PROVIDE LIGHTSHIELD FOR ALL NON DUCTED RETURNS.
2. CONFIRM BORDER TYPE AND FINISH WITH ARCHITECT.

VAV TERMINAL UNIT SCHEDULE

DESIGNATION	LOCATION	TYPE	MAX AIR FLOW	MIN AIR FLOW	INLET SIZE	MAXIMUM DISCH NOISE	MAXIMUM RAD NOISE	CONTROL TYPE	CONTROLLER SUPPLIER	ROOM SENSOR TYPE	BASIS OF DESIGN	MODEL NO.	SIZE	REMARKS
			CFM	CFM	INCH	NC	NC							
VAV-5.01	OFFICE 02102	SUPPLY	400	80	6	35	35	DIGITAL	BAS	TEMP	TITUS	DESV	6	6-7
VAV-5.02	OFFICE 02102	SUPPLY	1075	215	10	35	35	DIGITAL	BAS	TEMP	TITUS	DESV	10	6-7
VAV-5.10	OFFICE 02102	SUPPLY	275	55	6	35	35	DIGITAL	BAS	TEMP	TITUS	DESV	6	1-5

NOTES:
1 COORDINATE WITH CONTRACTOR FOR RIGHT OR LEFT HAND CONFIGURATION TO PROVIDE REQUIRED CODE AND MAINTENANCE CLEARANCES.
3 REFER TO MECHANICAL DETAILS FOR TERMINAL UNIT INSTALLATION REQUIREMENTS.
4 CONTROL PROVISIONS: PROVIDE CONTROL ENCLOSURE, AIRFLOW CROSS WITH POLY TUBES INTO ENCLOSURE AND STEP-DOWN TRANSFORMER TO 24VAC AT TERMINAL STRIP WITHIN ENCLOSURE. COORDINATE OPTION FOR FACTORY INSTALLATION OF CONTROLLERS WITH BAS CONTRACTOR
5 NOISE CRITERIA LEVELS BASED ON AHRI-885-2008 APPENDIX E WITH 20LB/CU.FT. MINERAL FIBER TILE CEILING, USING 1.5" INLET SP AND 1" FIBERGLASS LINER
6 TERMINAL UNIT INLET SIZE BASED ON AS-BUILT DOCUMENTATION, CONTRACTOR SHALL FIELD CONFIRM INLET SIZES OF EXISTING TERMINAL UNITS AND REPORT ANY DISCREPANCIES TO ENGINEER.
7 EXISTING VAV TERMINAL UNIT. REBALANCE AS NECESSARY. REFER TO FLOOR PLAN FOR MORE INFORMATION. BMS CONTRACTOR SHALL REPROGRAM/RECONFIGURE EXISTING TERMINAL UNIT DDC CONTROLLERS WITH NEW FLOW SETTINGS WHERE APPLICABLE AND AS NOTED ON PLANS.

NECK SIZING SCHEDULE

DESIGNATION	TYPE	AIR QUANTITY RANGE	NECK SIZE	REMARKS
		CFM	INCH	-
S1/R1	24X24 LAY-IN PLAQUE	0-120	6	-
		121-300	8	-
		301-390	10	-
		391-490	12	-
		491-570	14	-
		0-600	15	RETURN APPLICATION

NOTES:
1. ALL NECK SIZES TO BE SELECTED FOR MAX NC-25.
2. ALL NECK SIZES TO BE SELECTED FOR MAX PRESSURE DROP OF 0.1 INCH WG.

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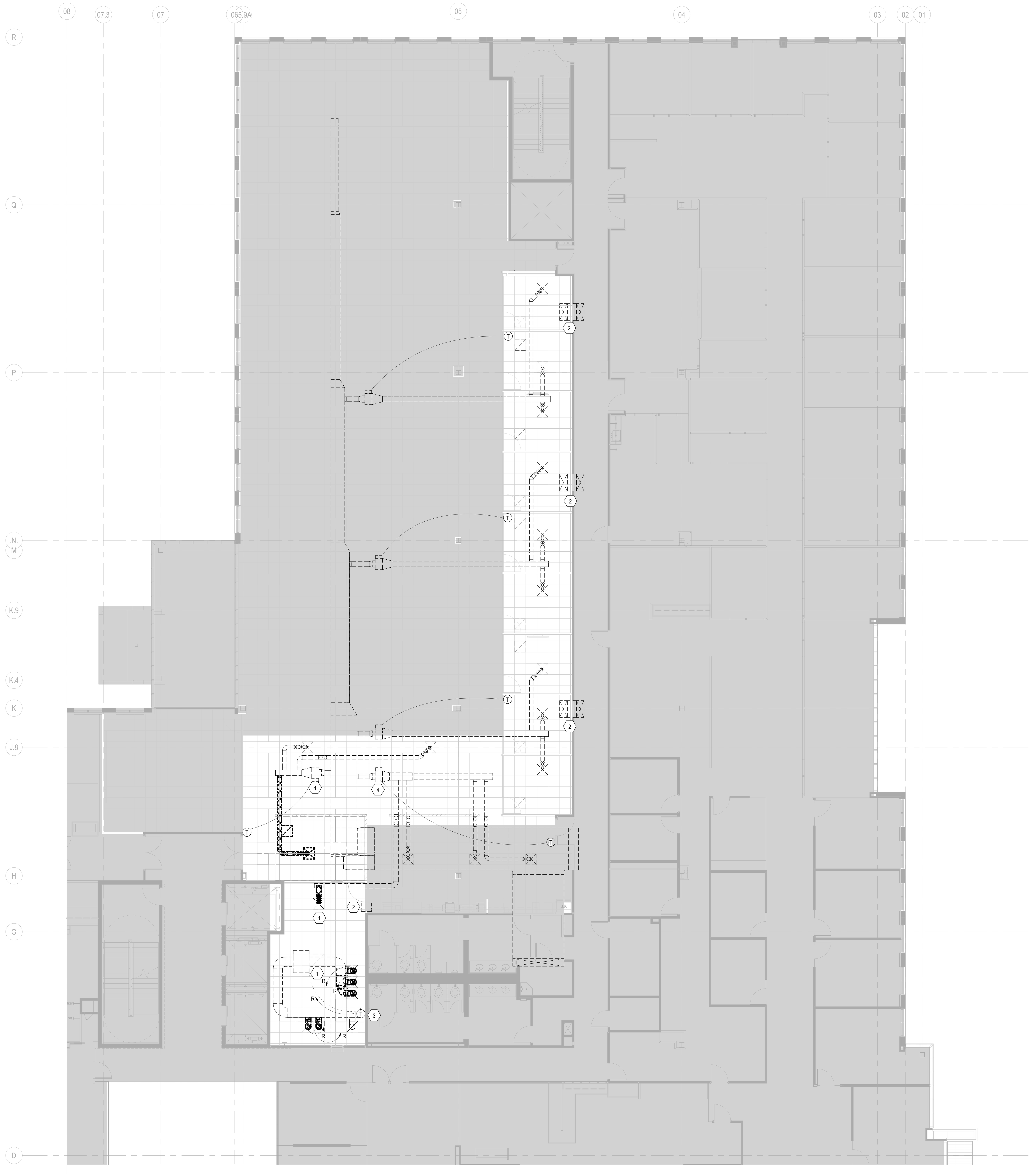
MECHANICAL SCHEDULES

SHEET NUMBER

M6.01



1 LEVEL 02 - MECHANICAL DEMOLITION PLAN
1/8" = 1'-0"

0' 4' 8' 16' 32'

GENERAL DEMOLITION NOTES:

1. COORDINATE ALL DEMOLITION SCOPE, DISPOSAL REQUIREMENTS, AND SCHEDULING WITH BUILDING PRIOR TO PERFORMING WORK.
2. DEMOLISH ALL DUCTWORK AND DIFFUSERS AS INDICATED.
3. PATCH AND SEAL ANY OPENINGS CREATED IN REMAINING WALLS DURING DEMOLITION. FIRE RATING OF WALLS THAT ARE EXISTING TO REMAIN SHALL BE MAINTAINED.
4. SERVICES TO ADJACENT SPACES THAT ARE OUTSIDE OF THE DEMOLITION SCOPE OF WORK SHALL REMAIN UNAFFECTED.
5. CONTRACTOR TO CONFIRM EXISTING EQUIPMENT TO BE REUSED IN GOOD WORKING ORDER, ELSE PROVIDE LINE ITEM PRICING TO REPAIR OR REPLACE AS REQUIRED.
6. DURING CONSTRUCTION, PROVIDE FILTER MEDIA ON RETURN AIR BRANCHES.
7. APPROXIMATE EXISTING CONDITIONS ARE IDENTIFIED ON THE PLANS BASED ON AVAILABLE DESIGN DRAWINGS. CONTRACTOR SHALL SURVEY THE ENTIRE AREA OF WORK INCLUDING TERMINAL UNIT, LOW PRESSURE BRANCH DUCTWORK, AND DIFFUSERS PRIOR TO WORK. CONTRACTOR SHALL IDENTIFY ANY DISCREPANCIES BETWEEN THE EXISTING CONDITIONS DRAWINGS AND THE FIELD CONDITIONS. CONTRACTOR SHALL NOTIFY THE ENGINEER OF SUCH DISCREPANCIES.
8. SHADED AREA IS NOT IN SCOPE.

MECHANICAL DEMOLITION KEY NOTES:

1 EXISTING SUPPLY AND RETURN GRILLE TO REMAIN.
2 EXISTING TRANSFER DUCT TO REMAIN.
3 RELOCATE EXISTING THERMOSTAT. FOR NEW LOCATION REFER TO MEHCHANICAL PLAN.
4 CONTRACTOR SHALL PROVIDE AIRFLOW PRE-BALANCE OF THE NOTED AREA OF WORK PRIOR TO BEGINNING WORK. DOCUMENT EXISTING VAV SIZE, MINIMUM AND MAXIMUM AIRFLOWS AT EACH VAV TERMINAL UNIT INCLUDING DIFFUSER CFM VALUES DOWNSTREAM OF EACH VAV TERMINAL UNIT. PROVIDE INFORMATION TO ENGINEER FOR REVIEW AND COMMENT PRIOR TO WORK.

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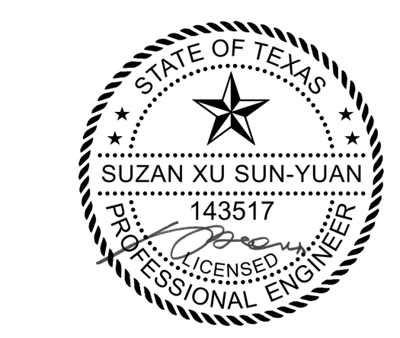


EXP: 12/31/2025

PROJECT

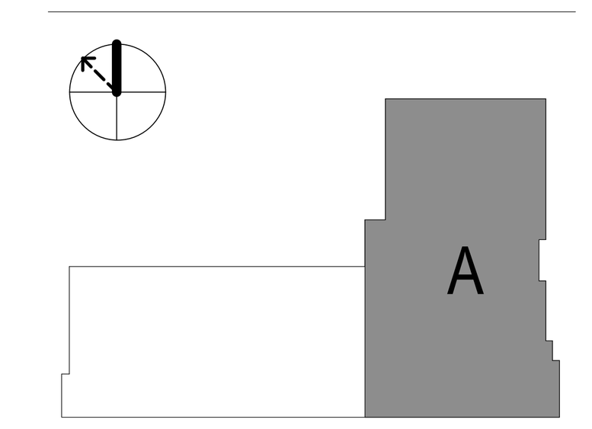
OCC DALLAS

2ND FLOOR EXPANSION

OCC THE FOUNDATION FOR SECURE MARKETS

OPTIONS CLEARNING CORPORATION

KEY PLAN



ISSUE CHART

MARK	ISSUE	DATE
1	ISSUE FOR BID/PERMIT	09/05/2025

Job Number 240100092

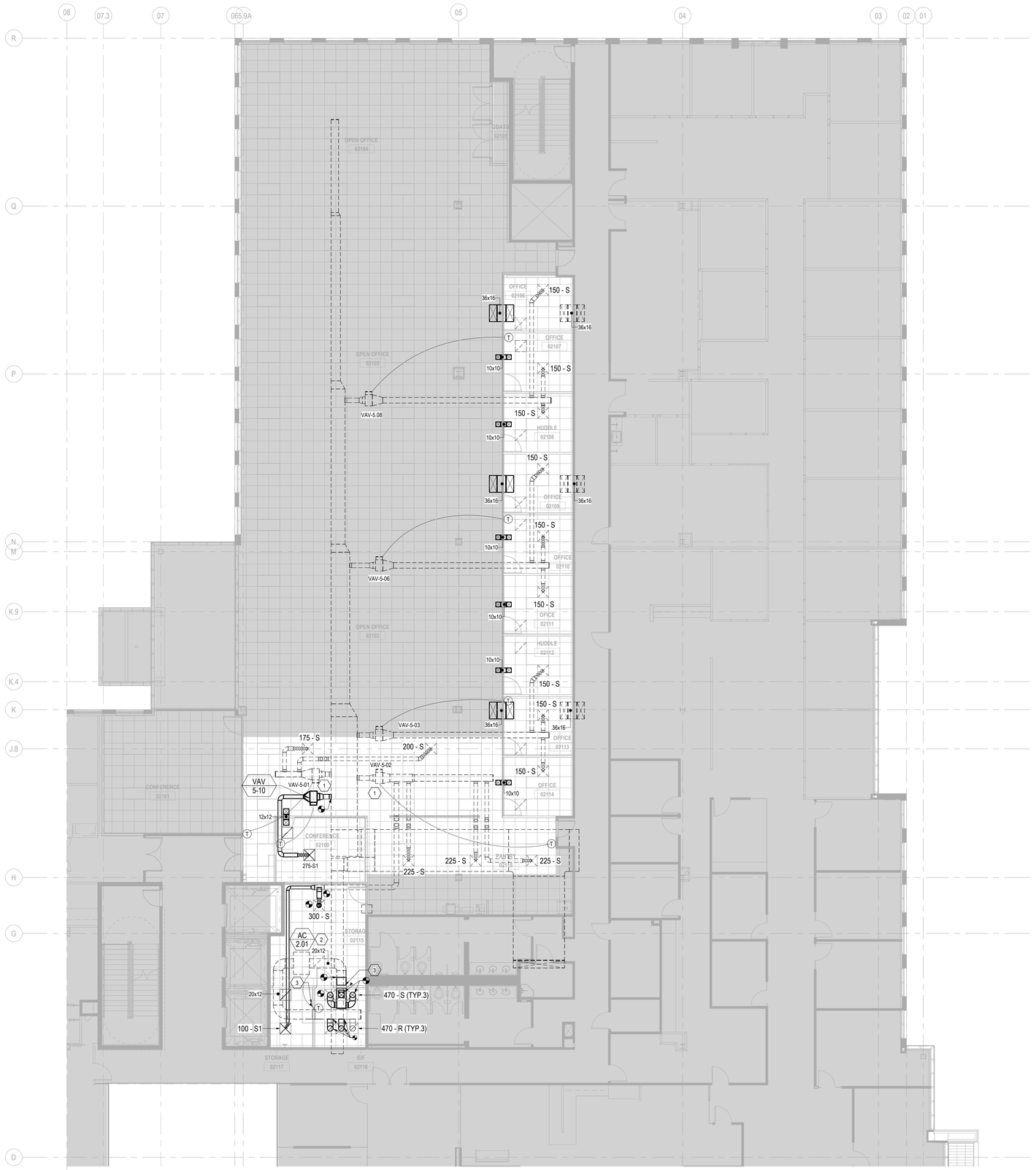
TITLE

LEVEL 02 - MECHANICAL DEMOLITION PLAN

SHEET NUMBER

MD1.02

9/3/2025 5:45:19 PM Autodesk Docs://OCC - DFW Metro Relocation/240100092_MECH_FP_R25.rvt



1 LEVEL 02 - MECHANICAL HVAC PLAN
1/8" = 1'-0"

0' 4' 8' 16' 32'

GENERAL NOTES:

1. CONTRACTOR TO COORDINATE ALL THERMOSTAT LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION WITH FINAL APPROVAL BY MECHANICAL ENGINEER.
2. CONTRACTOR SHALL COMPLY WITH THE LATEST VERSION OF THE BUILDING RULES AND REGULATIONS GUIDELINES.
3. CONTRACTOR TO CONFIRM ALL TERMINAL UNITS ARE LOCATED TO ENSURE MAINTENANCE ACCESS IS MAINTAINED. PROVIDE ACCESS PANELS IN HARD CEILING AS NEEDED. COORDINATE WITH ARCHITECT AND ENGINEER IF REQUIRED.
4. SHADED AREA IS NOT IN SCOPE.

MECHANICAL KEY NOTES:

1 REBALANCE EXISTING VAV BOX TO CFM ON PLAN.
2 REBALANCE EXISTING AC UNIT TO CFM ON PLAN.
3 PROVIDE 1-1/2 HR RATE FIRE DAMPER IN SUPPLY AND RETURN DUCT.

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STATE OF TEXAS
SUZAN XU SUN-YUAN
143517
LICENSED PROFESSIONAL ENGINEER

EXP: 12/31/2025

PROJECT

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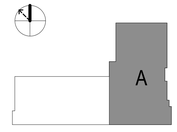

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MH1.02