DUCTWORK NOTES

1. ALL DUCTWORK SIZES SHOWN ON THE DRAWINGS ARE INSIDE DIMENSIONS.
2. ALL DUCTWORK CONNECTIONS TO AIR MOVING EQUIPMENT SHALL BE MADE WITH FLEXIBLE DUCT CONNECTIONS ON THE INLET AND DISCHARGE OF ALL SUPPLY, RETURN AND EXHAUST FANS (EXCEPT ROOF MOUNTED EXHAUST FANS).
3. INSTALL TURNING VANES IN ALL SQUARE DUCT ELBOWS. INSTALL MANUAL VOLUME DAMPERS IN EACH BRANCH DUCT AT CONNECTION TO MAIN DUCT AND IN EACH DUCT AFTER A BRANCH DUCT SPLIT.
4. THE LOCATIONS SHOWN FOR ALL DIFFUSERS, REGISTERS AND GRILLES, ETC. ARE DIAGRAMMATIC. EXACT LOCATION SHALL BE DETERMINED FROM THE REFLECTED CEILING PLANS AND/OR ON THE JOB SITE BY THE CONSTRUCTION MANAGER REPRESENTATIVES.
5. INSTALL A MINIMUM 12"x12" ACCESS DOOR (INLET SIDE) AT EACH MOTORIZED DAMPER, FIRE DAMPER, SMOKE DAMPER, INTAKE AND EXHAUST PLENUMS AND AN ACCESS DOOR AT AIR SUPPLY UNIT FILTER SECTION.
6. INSTALL AMCA APPROVED FUSIBLE LINK FIRE DAMPERS IN ALL DUCTS WHICH PASS THROUGH FIRE RATED WALLS AND FLOORS AND AS INDICATED ON DRAWINGS. WHERE FIRE DAMPERS CANNOT BE CHECKED FROM A REGISTER OR GRILLE, INSTALL AN ACCESS DOOR IN THE DUCT NEXT TO THE DAMPER AND ACCESS PANEL IN ALL NEW ACCESSIBLE CEILINGS.
7. ALL DUCTS JOINTS SEALED WITH DUCT MASTIC OR APPROVED TAPE.
8. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA SEAL CLASS "A" STANDARDS.

CITY OF CHICAGO NOTES

1. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 15'-0" AWAY FROM ANY EXHAUST, FLUES, VENTS AND ETC. AND A MINIMUM OF 10'-0" ABOVE PUBLIC WAY.
2. SEE REFRIGERANT SCHEDULE FOR PROJECT REFRIGERATION SCOPE AND NOTES.
3. ALL REFRIGERANT PIPING SHALL BE TYPE K COPPER. ALL JOINTS SHALL BE BRAZED.
4. COMBUSTION AIR, GAS PIPING, AND FLUES SHALL BE IN FULL COMPLIANCE WITH ARTICLES 7, 8, & 14 OF THE CITY OF CHICAGO MECHANICAL CODE (APPROVED 2015) AND THE LATEST VERSION OF THE INTERNATIONAL FUEL GAS CODE (IFGC) AS REFERENCED BY THE CITY OF CHICAGO CODE.
5. AIR PLENUMS: NO FLOOR DRAINS, SANITARY WASTE, AND VENT PIPING OR OTHER MATERIAL WITH POTENTIAL OF CONTAMINATING THE VENTILATION AIR SUPPLY SHALL BE LOCATED IN THE AIR PLENUMS.
6. DUCT SMOKE DETECTORS SHALL BE ACCESSIBLE FOR SERVICE.
7. ALL WORK PERFORMED AND EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CITY OF CHICAGO CODES.
8. ALL NEW DUCTWORK SHALL BE FABRICATED FROM PRIME FIRST QUALITY GALVANIZED SHEET METAL, UNLESS OTHERWISE NOTED. GAUGES OF METAL, HANGER SPACING, ETC. SHALL CONFORM TO THE LATEST EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR DUCT CONSTRUCTION (18-28-603.3). SEE SPECIFICATIONS FOR MORE DETAILS.
9. ALL FLEXIBLE LOW-PRESSURE DUCTWORK SHALL BE INSULATED, CHICAGO APPROVED AND NOT EXCEED 5'-0" IN LENGTH. MANUFACTURER TO BE WIREMOLD, TYPE WK UL-181, CLASS 1.
10. THE CONTRACTOR SHALL GURANTEE 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, DOWN SPOUTS, VENTS, EXHAUST DISCHARGES AND OTHER SOURCES WILL BE ENCLOSED SO THAT NO CONTAMINATED AIR WILL BE RECIRCULATED.
11. ALL EXPANSION VALVES, DEVICES AND CONNECTIONS SHALL BE REMOVED FROM THE AIRSTREAM OF ALL MECHANICAL EQUIPMENT AS PER CITY OF CHICAGO CODE. (13-192-380)

PIPING NOTES

1. ALL PIPING SHALL BE SUSPENDED WITH CLEVIS AND/OR TRAPEZE PIPE HANGERS. INSULATED PIPING SHALL REST ON STEEL OR WOOD PIPE COVERING PROTECTION SADDLES OR SHEET METAL INSULATION SHIELDS AS CALLED FOR IN THE SPECIFICATIONS AND/OR DETAILED ON THE DRAWINGS.
2. ALL PIPING PASSING THRU FLOOR CONSTRUCTION SHALL HAVE A SCHEDULE 40 STEEL PIPE SLEEVE INSTALLED AROUND PIPE ONLY. ALL PIPE PASSING THRU WALLS SHALL HAVE A GALVANIZED SHEET METAL OR SCHEDULE 40 STEEL PIPE SLEEVE INSTALLED AROUND THE PIPE AND PIPE INSULATION. SEE SLEEVE DETAILS THESE DRAWINGS.
3. SEE LARGE SCALE DRAWINGS (DETAILS) FOR ALL REQUIRED VALVES, FITTINGS, GAUGES, VENTS, THERMOMETERS WHICH ARE CONNECTED TO MECHANICAL EQUIPMENT. ALL WORK SHOWN ON DETAILS SHALL BE BY INSTALLING CONTRACTOR UNLESS OTHERWISE NOTED.
4. INSTALL A MANUAL SHUT OFF COCK AND DIRT LEG ON EACH BRANCH GAS LINE CONNECTED TO GAS FIRED EQUIPMENT.
5. MECHANICAL CONTRACTOR TO FURNISH AND INSTALL ALL GAS REGULATORS ON THE LEAVING SIDE OF THE GAS METER. ALL GAS REGULATORS WILL HAVE A VENT PIPE RUNNING TO A COMMON VENT HEADER WHICH TERMINATES 18" ABOVE THE ROOF WITH A GOOSENECK.
6. GAS PIPES MUST BE SLOPED AT 1/4 INCH IN EVERY 15 FEET. FUEL GAS PIPING CONTROLS MUST CONFORM TO THE IFGC, CHAPTER 4 (WITH MODIFICATIONS AS NOTED IN CHAPTER 14). GAS PIPING MATERIALS MUST CONFORM TO THE GAS PIPING & TUBING MATERIAL MATRIX (IFGC 403 REQUIREMENTS). PIPING IN CONCEALED LOCATIONS MUST CONFORM TO THIS IFGC 404.3. [IFGC 404.3].
7. MECHANICAL CONTRACTOR SHALL RUN INSULATED DRAIN PIPES FROM ALL HEATING/COOLING FAN COIL UNITS. SEE DRAWINGS AND DETAILS FOR LOCATION OF TERMINATION OF DRAIN PIPING. ALL CONDENSATE DRAIN PIPES MUST BE PITCHED AWAY FROM THE DRAIN PAN. ALL CONDENSATE DRAIN PIPES WILL BE INSULATED FROM UNIT TO TERMINATION POINT.

GENERAL NOTES

1. DRAWINGS ARE GENERALLY DIAGRAMMATIC. ROUTING OF PIPING AND DUCTWORK AS SHOWN DOES NOT INTEND TO SHOW EVERY RISE, DROP, OFFSET, FITTING NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. EACH CONTRACTOR SHALL MAKE ANY REQUIRED CHANGES FROM THE GENERAL ROUTING SHOWN ON THESE DRAWINGS, SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ALL CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.
2. IT IS INTENDED THAT EQUIPMENT SHALL BE LOCATED SYMMETRICALLY WITH THE ARCHITECTURAL ELEMENTS OF THE BUILDING, NOTWITHSTANDING THE FACT THAT LOCATIONS INDICATED BY THESE DRAWINGS MAY BE DISTORTED FOR CLEARNESS OF PRESENTATION.
3. CONTRACTOR SHALL CHECK DRAWINGS OF OTHER TRADES TO VERIFY THAT SPACES IN WHICH THEIR WORK WILL BE INSTALLED ARE CLEAR OF OBSTRUCTIONS. WORK SHALL BE INSTALLED TO MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITION AT ALL POINTS IN THE BUILDING. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION OF THEIR WORK. DUCT TO BE INSTALLED AS TIGHT TO THE UNDERSIDE OF THE DECK AS CLEARANCES ALLOW TO MAXIMIZE CEILING HEIGHT.
4. CONTRACTOR SHALL FURNISH OTHER TRADES ADVANCE INFORMATION AND/OR SHOP DRAWINGS ON LOCATIONS AND SIZES OF PIPING, DUCTWORK, CONDUIT, RACEWAYS, EQUIPMENT, FRAMES, BOXES, SLEEVES AND OPENINGS, ETC. NEEDED FOR THEIR WORK TO PERMIT OTHER TRADES AFFECTED TO INSTALL THEIR WORK PROPERLY AND WITHOUT DELAY.
5. WHERE THERE IS EVIDENCE THAT WORK OF ONE TRADE WILL INTERFERE WITH WORK OF OTHER TRADES, ALL TRADES SHALL MEET ON JOB SITE TO WORK OUT SPACE CONDITIONS AND MAKE SATISFACTORY ADJUSTMENTS TO INSTALLATION OF THE NEW WORK. CONTRACTORS SHALL VERIFY EXACT LOCATIONS OF ALL DEVICES AND EQUIPMENT WITH FIELD CONDITIONS, SHOP DRAWINGS, AND WORK OF OTHER TRADES PRIOR TO ROUGH-IN. CONTRACTOR SHALL BE RESPONSIBLE, AT THEIR OWN EXPENSE, FOR THE REMOVAL AND REINSTALLATION OF ANY PART OF THEIR WORK IF SAME WAS INSTALLED WITHOUT CONSULTING WITH OTHER TRADES BEFORE INSTALLING THEIR WORK.
6. CONTRACTOR SHALL PROVIDE SLEEVES IN BEAMS, FLOORS, COLUMNS AND WALLS AS SHOWN ON THE DRAWINGS, AS REQUIRED BY JOB SITE CONDITIONS, AND/OR AS SPECIFIED, WHEN INSTALLING THEIR WORK. ALL BEAMS AND COLUMNS WHICH ARE REQUIRED TO BE SLEEVED SHALL BE CUT AND REINFORCED AS REQUIRED BY FIELD CONDITIONS AND LOCATIONS AND SIZES SHALL BE CHECKED AND APPROVED BY STRUCTURAL ENGINEERS BEFORE CONTRACTOR CUTS ANY STRUCTURAL BUILDING MEMBER.
7. THE SEQUENCE FOR THE INSTALLATION OF ALL WORK SHALL BE COORDINATED BETWEEN ALL CONTRACTORS ON THE PROJECT AND IN STRICT ACCORDANCE WITH CONSTRUCTION MANAGER AND OWNERS STIPULATION AS CALLED FOR IN THE SPECIFICATION AND/OR AS DIRECTED.
8. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL CONTRACT DRAWINGS (BEFORE SUBMITTING THEIR BIDS) TO FAMILIARIZE THEMSELVES WITH THE EXTENT OF THE OTHER TRADES CONTRACTORS WORK, CEILING HEIGHTS AND CLEARANCE FOR INSTALLING THEIR WORK.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR OWN CLEAN-UP DURING CONSTRUCTION. IF CONTRACTOR FAILS TO PROVIDE SUCH CLEAN-UP, THE ARCHITECT/ENGINEER WILL DIRECT ANOTHER CONTRACTOR TO PERFORM THE CLEAN-UP AND THE NEGLIGENT CONTRACTOR SHALL PAY THE ASSOCIATED BACK-CHARGES AS DEEMED APPROPRIATE BY THE CONSTRUCTION MANAGER.
10. CONTRACTOR SHALL STORE ALL MATERIALS AND EQUIPMENT SHIPPED TO THE SITE IN A PROTECTED AREA. IF MATERIAL IS STORED OUTSIDE OF THE BUILDING, IT MUST BE STORED OFF THE GROUND A MINIMUM OF SIX INCHES (6") SET ON 6 X 6 PLANKS AND/OR WOOD PALLETS. ALL MATERIAL AND EQUIPMENT MUST BE COMPLETELY COVERED WITH WATERPROOF TARPS OR VISQUIN. ALL PIPING AND DUCTWORK WILL HAVE THE ENDS CLOSED TO KEEP OUT DIRT AND OTHER DEBRIS. NO EQUIPMENT WILL BE ALLOWED TO BE STORED ON THE SITE UNLESS IT IS SITTING ON WOOD PLANKS AND COMPLETELY PROTECTED WITH WEATHERPROOF COVERS.
11. THE DRAWINGS, SCHEDULES AND SPECIFICATIONS HAVE BEEN PREPARED USING ONE MANUFACTURER FOR EACH PIECE OF EQUIPMENT AS THE BASIS FOR DIMENSIONAL DESIGN. IF THE CONTRACTOR PURCHASES EQUIPMENT LISTED AS A SPECIFIED ACCEPTABLE MANUFACTURER BUT IS NOT THE SCHEDULED MANUFACTURER USED FOR THE BASE DESIGN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING ALL THE DIMENSIONS OF THE EQUIPMENT TO VERIFY THAT IT WILL FIT IN THE SPACE SHOWN ON THE DRAWINGS. MINOR DEVIATIONS IN DIMENSIONS WILL BE PERMITTED, PROVIDED THE RATINGS MEET THOSE SHOWN ON THE DRAWINGS AND EQUIPMENT WILL PHYSICALLY FIT INTO THE SPACE ALLOCATED WITH SUITABLE ACCESS AROUND EQUIPMENT FOR OPERATION AND MAINTENANCE ON THE EQUIPMENT.
12. CONTRACTOR AND/OR MANUFACTURER SHALL VERIFY THAT THE CHARACTERISTICS OF THE EQUIPMENT THEY SUBMIT FOR REVIEW MEETS THE CAPACITY AND DUTY SPECIFIED. WHEN EQUIPMENT IS SUBMITTED FOR REVIEW AND DOES NOT MEET THE PHYSICAL SIZE OR ARRANGEMENT OF THAT SCHEDULED AND SPECIFIED, CONTRACTOR SHALL PAY FOR ALL ALTERATIONS REQUIRED TO ACCOMMODATE SUCH EQUIPMENT AT NO ADDITIONAL COST TO OWNER. CONTRACTOR WILL ALSO PAY ALL COSTS FOR ADDITIONAL WORK REQUIRED BY OTHER CONTRACTORS, OWNER, ARCHITECT OR ENGINEER TO MAKE CHANGES WHICH WOULD ALLOW THE EQUIPMENT TO FIT IN THE SPACE AND FUNCTION AS INTENDED.
13. MECHANICAL CONTRACTOR SHALL PROVIDE ON SITE TRAINING OF OWNERS OPERATING PERSONNEL FOR ALL SYSTEMS AND EQUIPMENT INSTALLED UNDER THEIR CONTRACT.
14. BEFORE STARTING ANY SYSTEMS INSTALLING CONTRACTOR SHALL CONTACT EQUIPMENT MANUFACTURER TO VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE OR OTHER CONDITIONS WHICH MAY CAUSE DAMAGE TO THE EQUIPMENT.
15. CONTRACTOR AND/OR MANUFACTURER SHALL VERIFY THAT THE CHARACTERISTICS OF THE EQUIPMENT THEY SUBMIT FOR REVIEW MEETS THE CAPACITY AND DUTY SPECIFIED.
16. THE MECHANICAL CONTRACTOR TO PROVIDE 1/4 INCH SCALE PIPING AND DUCTWORK DRAWINGS FOR COORDINATION WITH OTHER TRADES. DRAWINGS TO INDICATE DIMENSIONS AND ELEVATIONS OF ALL PIPING AND DUCTWORK. DRAWINGS TO ALSO INCLUDE ALL WALL/FLOOR/ROOF OPENINGS.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL ABIDE BY CONDITIONS OF CONTRACT AGREEMENT AND DIVISION 01 SPECIFICATIONS
2. ALL WORK SHALL BE IN ACCORDANCE WITH DIVISION 23 SPECIFICATIONS.
3. ALL AIR MOVING EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATORS AND PROVIDED WITH FLEXIBLE DUCT CONNECTIONS.
4. ALL EQUIPMENT SHALL HAVE TOTALLY ENCLOSED MOTORS AND BE RATED TO OPERATE IN PLENUM CEILINGS, INCLUDING ALL SUPPLY AIR AND RETURN AIR FAN MOTORS EXPOSED TO THE AIR STREAM.
5. ALL DUCT SIZES INDICATED ON PLANS AND RISERS ARE CLEAR INTERNAL DIMENSIONS. DUCT SIZES NOT SHOWN SHALL BE SIZED TO VELOCITIES NO GREATER THAN UPSTREAM SECTIONS USING SIMILAR ASPECT RATIOS.
6. ALL SUPPLY AIR TAKEOFFS FROM MAIN TRUNK DUCTS ARE TO BE INSTALLED WITH BELLMOUTH FITTINGS OR 45 DEGREE ENTRY TO PROVIDE THE SMOOTHEST AIR FLOW POSSIBLE.
7. PROVIDE GUIDES, HANGERS, EXPANSION LOOPS AND SUPPLEMENTARY STEEL SUPPORT WHERE REQUIRED FOR ALL PIPING.

MECHANICAL SYMBOLS LEGEND

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB
EAT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
FOB	FLAT ON BOTTOM
HZ	FREQUENCY
NC	NOISE CRITERIA
PSI	POUNDS PER SQUARE INCH
RTU	ROOFTOP UNIT
TYP	TYPICAL
WC	WATER COLUMN
WB	WET BULB

GRILLES/DIFFUSERS:

- SUPPLY DIFFUSER
- SUPPLY DIFFUSER WITH 3-WAY THROW
- SUPPLY DIFFUSER WITH 2-WAY THROW
- SIDEWALL MOUNTED SUPPLY REGISTER
- RETURN GRILLE
- EXHAUST GRILLE
- LINEAR DIFFUSER

EQUIPMENT:

- ROOF MOUNTED EXHAUST FAN
- CEILING MOUNTED EXHAUST FAN
- FAN COIL UNIT
- MAKE-UP AIR UNIT
- TS — TEMPERATURE SENSOR - ELECTRIC
- T — THERMOSTAT
- CO2 — CARBON DIOXIDE SENSOR
- SD — DUCT SMOKE DETECTOR
- A — AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR
- H — HUMIDITY SENSOR

DOUBLE LINE DUCT SYMBOLS:

- NEW SHEET METAL DUCTWORK
- SUPPLY OR OUTSIDE AIR DUCT
- RETURN AIR DUCT
- EXHAUST AIR DUCT
- DUCTWORK TRANSITION
- DUCTWORK TRANSITION - RECTANGULAR TO ROUND
- SUPPLY DUCT ELBOW UP OR DOWN
- RETURN DUCT ELBOW UP OR DOWN
- EXHAUST DUCT ELBOW UP OR DOWN
- DUCT ELBOW WITH FIXED TURNING VANES
- DUCT BRANCH TAKE-OFF
- ROUND SPIN-IN WITH DAMPER
- SQUARE TO ROUND TAP WITH DAMPER
- FLEXIBLE DUCT CONNECTION
- VOLUME DAMPER
- BD — BACKDRAFT DAMPER
- FLEXIBLE DUCTWORK

GENERAL REFERENCES/NOTATIONS:

- CONNECT TO EXISTING
- # — NOTE DESIGNATION
- # — REVISION DESIGNATION
- TYPE / # — MECHANICAL EQUIPMENT DESIGNATION
- TAG / CFM — DIFFUSER DESIGNATION AND CFM

SYMBOLS LEGEND NOTES:

1. REFER TO SPECIFICATIONS AND PLAN NOTES FOR DETAILED DESCRIPTION OF ALL DEVICES SHOWN IN THIS SCHEDULE.
2. PROJECT MAY NOT USE EVERY SYMBOL OR DEVICE INDICATED ON THIS LEGEND.

MECHANICAL GENERAL NOTES (CONTINUED)

8. ANY DISCREPANCY BETWEEN DRAWINGS, SPECIFICATIONS AND NOTES SHALL BE CLEARED WITH ENGINEER BEFORE THE BIDDING. NO EXTRAS SHALL BE ALLOWED FOR CLARIFICATIONS DURING CONSTRUCTION.
9. MECHANICAL CONTRACTOR SHALL SEAL ALL MECHANICAL PENETRATIONS THRU FIRE RATED FLOORS AND PARTITIONS WITH FIRE RATED MATERIAL INSTALLED PER MANUFACTURERS GUIDELINES AND U.L. REQUIREMENTS. MATERIAL SELECTION SHALL BE BASED ON RATING OF PARTITION PENETRATED. SEE ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF WALLS AND FLOORS
10. ALL GAS FIRED APPLIANCES SHALL BE VENTED IN ACCORDANCE WITH CHICAGO BUILDING CODE ARTICLE 8 - CHIMNEYS AND VENTS, THE 2012 INTERNATIONAL FUEL GAS CODE AND NFPA 31.
11. NOISE LEVEL AT LOT LINE SHALL NOT EXCEED 55 DBA.
12. ALL NATURAL GAS PIPEWORK SHALL BE SCHEDULE 40 STEEL PIPE WITH THREADED FITTINGS BELOW 2" AND WELDED FITTINGS ABOVE 2".

DEMOLITION NOTES

1. ALL DEMOLITION WORK SHALL BE PERFORMED WITH DUE CARE AND DILIGENCE SO AS TO PREVENT THE UNNECESSARY DESTRUCTION AND / OR DAMAGE TO SYSTEMS THAT SHALL REMAIN IN OPERATION AT THE CONCLUSION OF THIS WORK. DETERMINE THE EXACT LOCATION OF ALL EXISTING EQUIPMENT, DEVICES AND WIRING BEFORE COMMENCING WORK.
2. LOCATE AND PRESERVE ALL PORTIONS OF THE EXISTING HVAC SYSTEMS WHICH SHALL REMAIN.
3. CONTROLS DEVICES AND WIRING ARE NOT SHOWN ON THE DEMOLITION PLAN AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING HVAC DEVICES, EQUIPMENT, AND WIRING BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGED THAT MIGHT OCCUR BECAUSE OF THE CONTRACTORS FAILURE TO ACCURATELY DISCOVER, LOCATE, AND PROTECT ANY AND ALL PORTION OF THE EXISTING HVAC SYSTEM.
5. REMOVE AND REINSTALL (OR PROTECT IN PLACE) ALL EXISTING EQUIPMENT AND DEVICES TO REMAIN ON OR IN WALLS, CEILINGS AND FLOORS WHICH SHALL BE EXPOSED TO DEMOLITION AND CONSTRUCTION ACTIVITIES AND WHICH MAY BE DAMAGED BY DUST, DEBRIS, ETC.
6. WHERE EXISTING EQUIPMENT AND DEVICES SHALL BE REMOVED, THE CONTRACTOR SHALL REMOVE ALL THE ASSOCIATED DUCTWORK, PIPING, AND CONTROLS THAT SHALL NOT REMAIN IN OPERATION BACK TO THEIR RESPECTIVE SOURCE OR TO THE POINT ON A SHARED SYSTEM FROM WHERE THE EQUIPMENT OR DEVICE IS SERVED.
7. RELOCATE AS NECESSARY ALL EXISTING DUCTWORK, PIPING AND CONTROLS FOUND PASSING THROUGH THE AREA OF CONSTRUCTION, AND WHICH ARE PRESENTLY IN USE TO THE OTHER PORTIONS OF THE BUILDING UNAFFECTED BY THIS PROJECT PHASE. MAINTAIN THE CONTINUITY OF SERVICES AND GROUNDING, AND CONCEAL THEM ABOVE NEW CEILINGS.
8. ALL EXISTING DAMAGED DUCTWORK, GRILLES AND DEVICES WITHIN THE AREA OF CONSTRUCTION AND SHOWN TO REMAIN IN OPERATION SHALL BE REPLACED WITH NEW MATERIALS CONFORMING TO THESE CONTRACT DOCUMENTS.
9. ALL EQUIPMENT, DEVICES AND MATERIALS REMOVED DURING DEMOLITION WORK AND NOT INDICATED TO BE REUSED OR TURNED OVER TO THE USING AGENCY SHALL BECOME THE RESPONSIBILITY OF THE CONTRACTOR FOR DISPOSAL.
10. THE CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING NECESSARY TO REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES PERFORMED BY THE CONTRACTOR. THIS WORK INCLUDES AREAS OUTSIDE ANY LIMITS OF CONSTRUCTION LINES SHOWN ON THE DRAWINGS.

ENERGY NOTES

1. MOTORIZED DAMPERS SHALL BE INSTALLED ON ALL INTAKES AND EXHAUST OPENINGS UNLESS NOTED OTHERWISE.
2. MAXIMUM FAN NAMEPLATE HORSEPOWER SHALL NOT EXCEED 1.1 HP/1000CFM.
3. LOAD CALCULATIONS WERE BASED ON ASHRAE 2021 FUNDAMENTALS
4. ALL PROGRAMMABLE THERMOSTATS SHALL HAVE 5 DEGREE DEADBAND AND SHALL HAVE 7-DAY CLOCK, 2-HOUR MANUAL OVERRIDE, 10 HOUR BACKUP AND SETBACK CAPABLE OF 55 DEGREES HEATING AND 85 DEGREES COOLING. (EXCEPT CONTINUOUS OPERATING ZONES)
6. ALL DUCTWORK SHALL BE SEALED PRESSURE SENSITIVE TAPE IS NOT USED AS THE PRIMARY SEALANT. LONGITUDINAL AND TRANSVERSE SEAMS FOR DUCTS IN UNCONDITIONED SPACES AND WALL PENETRATIONS. TRANSVERSE SEAMS ON BURIED DUCTS.
7. ALL MOTORS SHALL MEET THE REQUIREMENTS OF 2021 IECC.
8. PROVIDE COMMISSIONING PER 2021 IECC.

OWNER'S REQUIREMENTS

1. ALL CONTROL WORK SHALL BE CONTRACTED WITH JOHNSON CONTROLS.
2. CONTRACTOR SHALL BE REQUIRED TO REVIEW ANY NEW OR DEMOLISHED FIRE DAMPERS WITH NM FACILITIES TEAM. DEMOLISHED FIRE DAMPERS SHALL BE REMOVED FROM THE MASTER BUILDING LOG AND NEW DAMPERS ADDED. CONTRACTOR SHALL INSTALL NM PROVIDED BAR CODES ON ALL NEW FIRE DAMPERS.
3. CONTRACTOR SHALL BE REQUIRED TO TEST THE FIRE DAMPER AND CERTIFY ON IDPH MATRIX 4E THAT THE DAMPER OPERATES PROPERLY AND IS ACCESSIBLE. CONTRACTOR SHALL ALSO TEST AND INCLUDE IN IDPH MATRIX 4E ANY EXISTING FIRE DAMPERS IN THE AREA OF WORK THAT ARE EXISTING TO REMAIN.
4. CONTRACTOR SHALL CONTRACT THE TEST AND BALANCING SERVICES TO NM APPROVED VENDOR ONLY.
5. ALL TEST AND BALANCING ACTIVITIES SHALL BE COORDINATED WITH NM FACILITIES PRIOR TO THE START OF WORK.

DESIGN CRITERIA

BASED ON ASHRAE HANDBOOK - 2021 FUNDAMENTALS

CHICAGO, IL

OUTDOOR DESIGN CONDITION (WITH AMENDMENTS)

0.4% COOLING: 95°/75°F DB/WB

99.6% HEATING: -10°F DB

INDOOR DESIGN CONDITION (ADJUSTABLE)

SUMMER: 75°F DB/50% RH

WINTER: 70°F DB

RENOVATION LEGEND

<E>	EXISTING TO REMAIN
<ED>	EXISTING LOCATION (NEW DEVICE OR EQUIPMENT TO BE INSTALLED IN PLACE)
<ER>	EXISTING TO BE RELOCATED
<X>	EXISTING TO BE REMOVED
<EN>	EXISTING IN NEW LOCATION
<N>	NEW

APPLICABLE CODES / STANDARDS

1. CITY OF CHICAGO MECHANICAL CODE
2. 2021 INTERNATIONAL ENERGY CONSERVATION CODE
3. SMACNA DUCT CONSTRUCTION STANDARDS

ferris+sloane
100 N. Howard Street, Suite 4503 Spokane, WA 99201

CAVA

CAVA #010564
233 S WACKER DRIVE
CHICAGO, IL 60606

PROJECT NUMBER: CAV070

ISSUANCE

SELF-CERT	02/19/25
COMMENTS	
PERMIT	03/12/2025
ISSUANCE	
IFC SET	03/31/2025

rtm engineering consultants
2800 156th Ave SE | Suite 115 Bellevue, WA 98007
T: 847.713.1006 | www.rtmec.com

MECHANICAL GENERAL NOTES, SYMBOLS & LEGEND

M000

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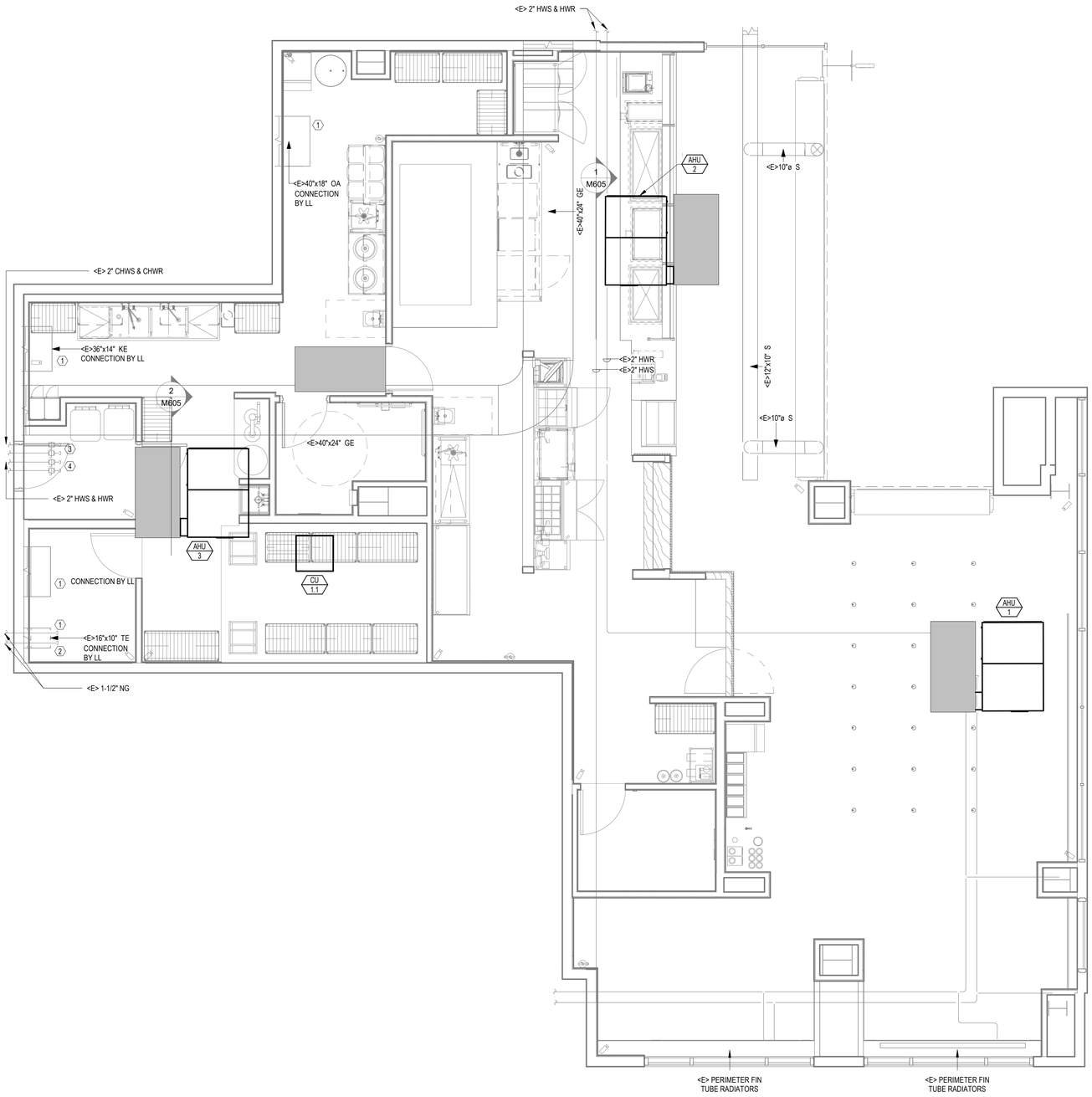

KEYED NOTES (#)

1. LANDLORD PROVIDED EXISTING KITCHEN GREASE EXHAUST, GENERAL EXHAUST, TOILET EXHAUST, AND OUTSIDE AIR DUCT CONNECTIONS STUBBED INTO SPACE.
2. LANDLORD PROVIDED 1-1/2"Ø NATURAL GAS STUBOUTS WITH SHUTOFF VALVES. COORDINATE LOCATION OF METER AND DELIVERY PRESSURE WITH LANDLORD AND UTILITY. LANDLORD SHALL PROVIDE REGULATOR AS REQUIRED TO PROVIDE LOW PRESSURE (7" WC) FOR TENANT EQUIPMENT. LANDLORD SHALL PROVIDE ALL FITTINGS AND ACCESSORIES REQUIRED FOR CONNECTION PER UTILITY STANDARDS.
3. LANDLORD PROVIDED 2" CHILLED WATER SUPPLY, 2" CHILLED WATER RETURN, 2" HWS, AND 2" HWR STUBOUTS WITH SHUTOFF VALVES.
4. TENANT TO PROVIDE BTU METERS ON CHW AND HW MAIN CONNECTION POINTS: ONICON F-3500 / F-4600 SERIES.

N

1 M101 **MECHANICAL LANDLORD PLAN**

SCALE: 1/4" = 1'-0"

0 1 2 4 8

1/4"=1'-0"

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ferris+sloane
100 N. Howard Street, Suite 4503 Spokane, WA 99201

CAVA

CAVA #010564
233 S WACKER DRIVE
CHICAGO, IL 60606

PROJECT NUMBER:
CAV070

ISSUANCE

PERMIT ISSUANCE	03/12/2025
IFC SET	03/31/2025

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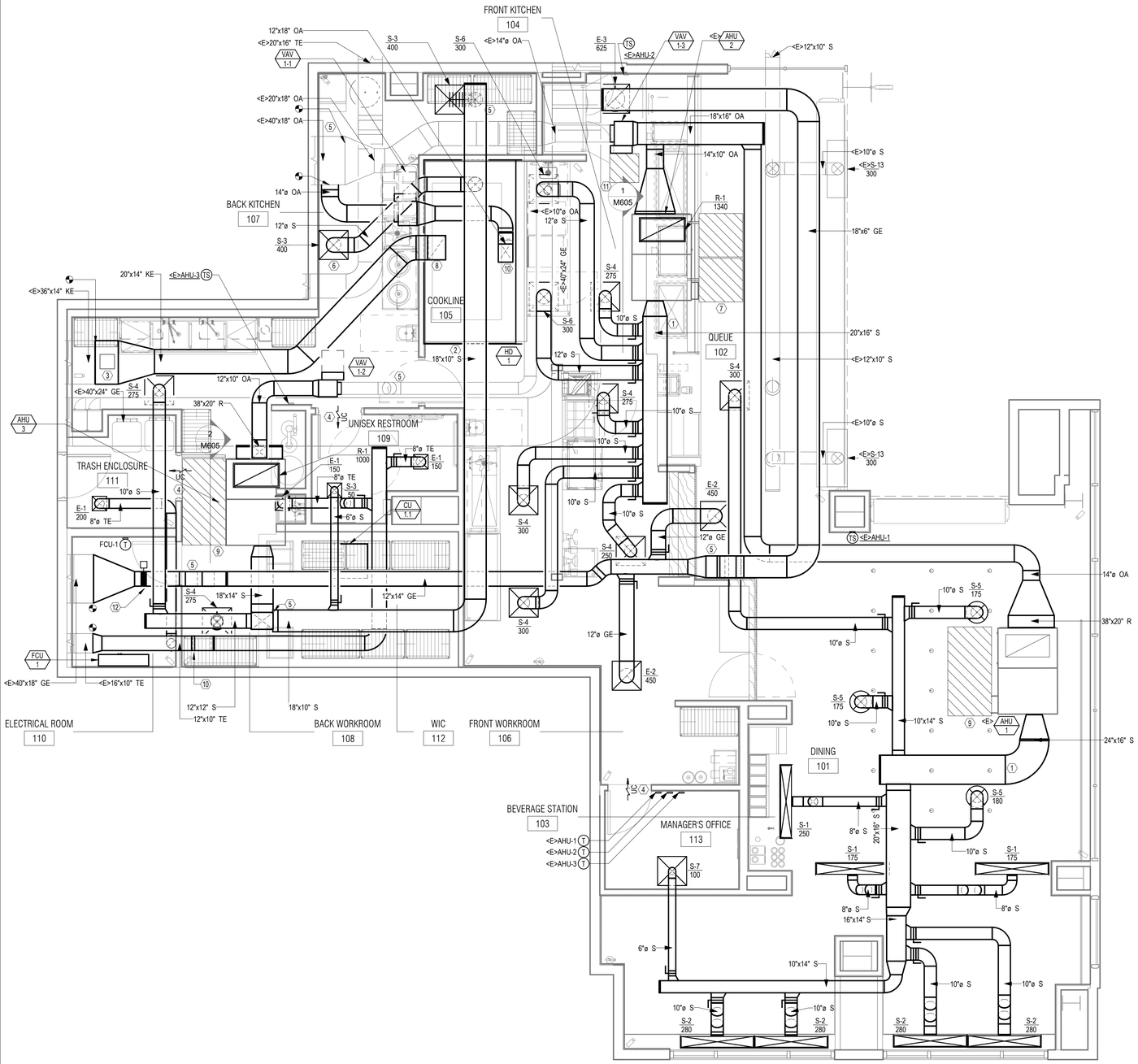
MECHANICAL LANDLORD PLAN

M101



KEYED NOTES

1. DUCT MOUNTED SMOKE DETECTOR FURNISHED BY FIRE ALARM CONTRACTOR AND INSTALLED IN DUCT BY MECHANICAL CONTRACTOR. INTERLOCK WIRING BETWEEN FIRE ALARM SYSTEM RELAY AND ROOFTOP UNIT SHUTDOWN. CONTACT SHALL BE PROVIDED BY MECHANICAL CONTRACTOR. ALL OTHER WIRING BY FIRE ALARM CONTRACTOR. UPON DETECTION OF SMOKE, ROOFTOP UNIT SHALL SHUT DOWN UPON SIGNAL FROM FIRE ALARM SYSTEM. COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENTS. PROVIDE 18"X18" ACCESS PANEL AS REQUIRED. COORDINATE ACCESS PANEL'S FINISH WITH ARCHITECT.
2. INSTALL TENANT FURNISHED TYPE I GREASE EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS AND MOUNTING BRACKETS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. REFER TO HOOD DRAWINGS IN FOOD SERVICE SET FOR HOOD SPECIFICATION AND ADDITIONAL INFORMATION INCLUDING BALANCE OF MAKEUP AND CONDITIONED SUPPLY AIR TO HOOD.
3. CONTRACTOR SHALL INSTALL AN ACCESS PANEL INTO THE BOTTOM OF THE GREASE EXHAUST DUCT.
4. PROVIDE 1" DOOR UNDERCUT FOR TRANSFER AIR.
5. DUCT UP.
6. DIFFUSER SHALL ONLY HAVE UP, DOWN, AND RIGHT THROWS.
7. ACCESS SPACE FOR AHU COILS. PROVIDE (2) 36" X 36" ACCESS PANELS TO ACCESS COILS AS REQUIRED.
8. 20" X 14" KE DN TO KITCHEN HOOD.
9. ENSURE THAT AHU HAS 36" WIDE CLEARANCE FOR ACCESS
10. DUCT DN.
11. PROVIDE 24" X 24" ACCESS PANELS TO ACCESS VAV UNIT.
12. EXHAUST DAMPER SHALL TIE BACK TO BAS AND OPERATE WITH THREE VAVS TO MAINTAIN 10% NEGATIVE PRESSURIZATION

MECHANICAL GENERAL NOTES:

1. REFER TO SHEET M000 FOR LEGEND AND NOTES
2. REFER TO SHEET M500 FOR SCHEDULES
3. REFER TO SHEET M600 FOR DETAILS

RENOVATION LEGEND:

<E>	EXISTING TO REMAIN
<ED>	EXISTING LOCATION, NEW DEVICE OR EQUIPMENT TO BE INSTALLED IN PLACE
<ER>	EXISTING TO BE RELOCATED
<EO>	EXISTING TO BE REMOVED
<EN>	EXISTING IN NEW LOCATION
<N>	NEW
<RAI>	REMAIN AS IS

GENERAL NOTES

1. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR AS REQUIRED TO INSTALL A COMPLETE AND OPERABLE HVAC SYSTEM PER THE NEW ARCHITECTURAL LAYOUT AND AS TO COMPLY WITH THE SPECIFICATIONS, DETAILS, THIS SCOPE OF WORK AND ALL APPLICABLE CODES.
2. ALL WORK PERFORMED SHALL CONFORM TO ALL APPLICABLE STATE AND LOCAL CODES.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND COORDINATE ALL NEW WORK WITH ALL TRADES PRIOR TO ANY WORK BEING DONE TO ENSURE CONFLICTS DO NOT OCCUR.
4. DISRUPTION OF ANY EXISTING SERVICE SHALL BE CLEARED WITH THE OWNER AND SHALL BE PERFORMED AT A TIME AND IN A MANNER SO AS TO CAUSE THE OWNER A MINIMUM OF INCONVENIENCE.
5. ALL DUCT SIZES INDICATED ON PLANS AND RISERS ARE CLEAR INSIDE DIMENSIONS. DUCT SIZES NOT SHOWN SHALL BE SIZED TO VELOCITIES NO GREATER THAN UPSTREAM SECTION USING SIMILAR ASPECT RATIOS.
6. ALL SUPPLY AIR TAKEOFFS FROM MAIN TRUNK DUCTS ARE TO BE INSTALLED WITH BELL MOUTH FITTINGS OR 45 DEGREE ENTRY TO PROVIDE THE SMOOTHEST AIR FLOW POSSIBLE.
7. PROVIDE TURNING VANES IN ALL LOW-PRESSURE 90-DEGREE DUCT TURNS.
8. ALL THERMOSTAT SENSORS AND THERMOSTATS LOCATIONS SHALL BE APPROVED BY THE ARCHITECT AND LANDLORD.
9. ALL DUCTS LOCATED ABOVE INACCESSIBLE CEILINGS ARE TO BE BALANCED PRIOR TO CEILING INSTALLATIONS.
10. CONTRACTOR SHALL PROVIDE ACCESS DOORS FOR SERVICE AND MAINTENANCE OF ALL EQUIPMENT LOCATED ABOVE INACCESSIBLE CEILINGS.
11. PROVIDE GUIDES, HANGERS, EXPANSION LOOPS AND SUPPLEMENTARY STEEL SUPPORT WHERE REQUIRED FOR ALL PIPING.
12. DO NOT PENETRATE KITCHEN EXHAUST HOODS OR DUCTWORK WITH ANY TYPE OF FASTENING ASSEMBLY (I.E. SCREWS, RIVETS).
13. IF NOT PAINTED, ALL DUCTWORK SHALL HAVE GASKET A SEAL.
14. EXPOSED DUCTWORK IN THE DINING AREA SHALL BE MADE OF ELECTRO -GALVANIZED STEEL (PAINTLOCK). SEE MECHANICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION.
15. COORDINATE ACCESS PANEL LOCATIONS WITH ARCHITECTURAL SHEETS.

HVAC COMMISSIONING

GENERAL CONTRACTOR SHALL HIRE A THIRD PARTY REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY TO DEVELOP A COMMISSIONING PLAN THAT SHALL INCLUDE THE FOLLOWING ITEMS:

1. NARRATIVE DESCRIPTION OF ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING PERSONNEL INTENDED TO ACCOMPLISH EACH PHASE OF ACTIVITY.
2. LISTING OF SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND DESCRIPTION OF TESTS TO BE PERFORMED.
3. FUNCTIONS TO BE TESTED, INCLUDING, BUT NOW LIMITED TO CALIBRATIONS AND ECONOMIZER CONTROLS.
4. CONDITIONS UNDER WHICH TEST WILL BE PERFORMED. AT MINIMUM, TESTING SHALL AFFIRM WINTER AND SUMMER DESIGN CONDITIONS AND FULL OUTSIDE AIR CONDITIONS.
5. MEASURABLE CRITERIA FOR PERFORMANCE.

A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY IN ACCORDANCE WITH REQUIREMENTS OF SECTION C408.2 OF THE ENERGY CONSERVATION CODE AND PROVIDED TO PROJECT OWNER. A COPY OF THE REPORT SHALL BE MADE AVAILABLE TO CODE OFFICIAL IF REQUESTED.

FINAL COMMISSIONING REPORT SHALL BE DUE TO PROJECT OWNER WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.

REMODEL NOTES

THIS DRAWING IS BASED ON BEST AVAILABLE INFORMATION AT TIME OF DESIGN AND MAY NOT REFLECT AS-BUILT CONDITIONS. ALL MECHANICAL INSTALLATIONS INDICATED ON THIS SHEET SHALL BE FIELD VERIFIED PRIOR TO BID AND DEMOLITION.

EQUIPMENT CLEARANCE NOTES

VERIFY ALL EXISTING EXHAUST OUTLETS WITHIN 10'-0" OF OUTDOOR AIR INTAKES ARE MINIMUM 3'-0" HIGHER THAN OUTDOOR AIR INTAKES. CONTACT THE ARCHITECT AND ENGINEER IMMEDIATELY IF ANY EXISTING EXHAUST OUTLETS WITHIN 10'-0" OF OUTDOOR AIR INTAKES ARE OBSERVED TO BE LESS THAN 3'-0" HIGHER THAN OUTDOOR AIR INTAKES.

N

2 / M201 **MECHANICAL TENANT PLAN**

SCALE: 1/4" = 1'-0"

0 1 2 4 8

1/4"=1'-0"

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100 N. Howard Street, Suite 4503 Spokane, WA 99201

CAVA

CAVA #010564
233 S WACKER DRIVE
CHICAGO, IL 60606

PROJECT NUMBER:
CAV070

ISSUANCE	
SELF-CERT	02/19/25
COMMENTS	
PERMIT	03/12/2025
ISSUANCE	
IFC SET	03/31/2025

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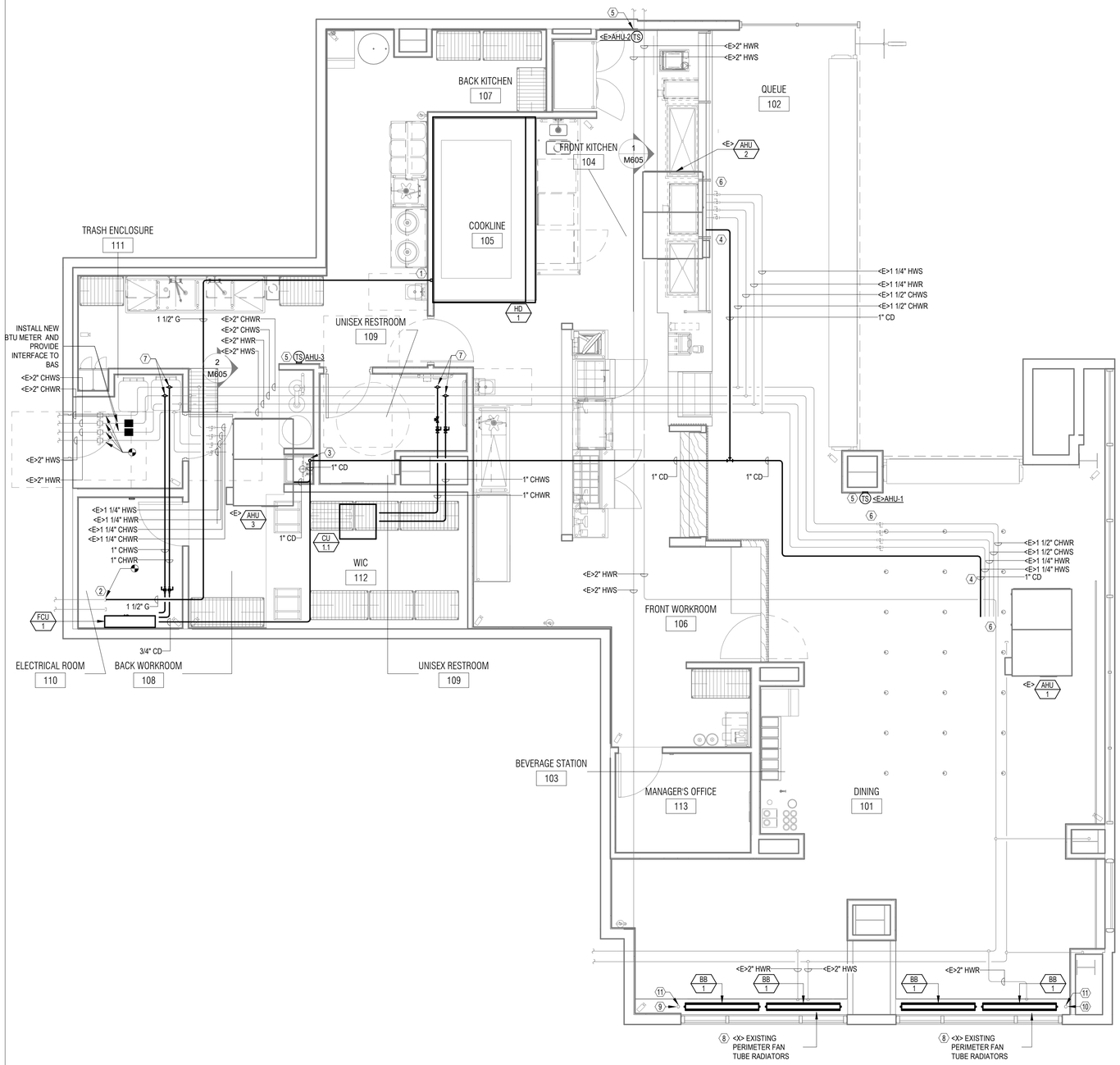
MECHANICAL PLAN

M201



KEYED NOTES

1. 1-1/2" NATURAL GAS LINE DOWN TO COOKLINE. REFER TO RISER DIAGRAM FOR MORE INFORMATION. LOCATE EMERGENCY SOLENOID SHUT-OFF VALVE ON VERTICAL PIPING. PROVIDE INTERFACE FROM SOLONOID VALVE TO KITCHEN HOODS.
2. EXISTING 1-1/2" [7"] WC NATURAL GAS LINE FOR TENANT SPACE AND CAPPED.
3. 1-1/4" CONDENSATE DRAIN DOWN TO MOP SINK.
4. PROVIDE MIN. 36"X36" ACCESS FOR VALVES ON CHWS/R PIPING. THEY SHALL BE AS LOW AS A POSSIBLE AND ACCESSIBLE THROUGH FINISHED CEILING.
5. PROVIDE REMOTE TEMPERATURE SENSOR COMPATIBLE WITH THERMOSTAT.
6. LOCATE VALVES WITHIN ACCESS PANELS
7. CHILLED WATER LINE IS REQUIRED TO BE OPERATING 24/7.
8. CONTRACTOR SHALL DEMO THE EXISTING HOT WATER BASEBOARD RADIATOR AND REPLACE WITH NEW USING THE HOT WATER BASEBOARD RADIATION SCHEDULE ON SHEET M502.
9. CONNECT THE NEW 3/4" PIPING FOR THE NEW BASEBOARD HEATERS TO THE EXISTING HOT WATER SUPPLY PIPING UP FROM LOWER LEVEL 01.
10. CONNECT THE NEW 3/4" PIPING FOR THE NEW BASEBOARD HEATERS TO THE EXISTING HOT WATER RETURN PIPING DOWN TO LOWER LEVEL 01.
11. PROVIDE NEW BTU METER ON THE EXISTING HHWS/R PIPING FOR THE RADIATOR.

RENOVATION LEGEND:

<E>	EXISTING TO REMAIN
<ED>	EXISTING LOCATION, NEW DEVICE OR EQUIPMENT TO BE INSTALLED IN PLACE
<ER>	EXISTING TO BE RELOCATED
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<EN>	EXISTING IN NEW LOCATION
<N>	NEW
<RAI>	REMAIN AS IS

MECHANICAL GENERAL NOTES:

1. REFER TO SHEET M000 FOR LEGEND AND NOTES
2. REFER TO SHEET M500 FOR SCHEDULES
3. REFER TO SHEET M600 FOR DETAILS

MECHANICAL PIPING TENANT PLAN

SCALE: 1/4" = 1'-0"

1/4"=1'-0"

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MECHANICAL PIPING PLAN

M301

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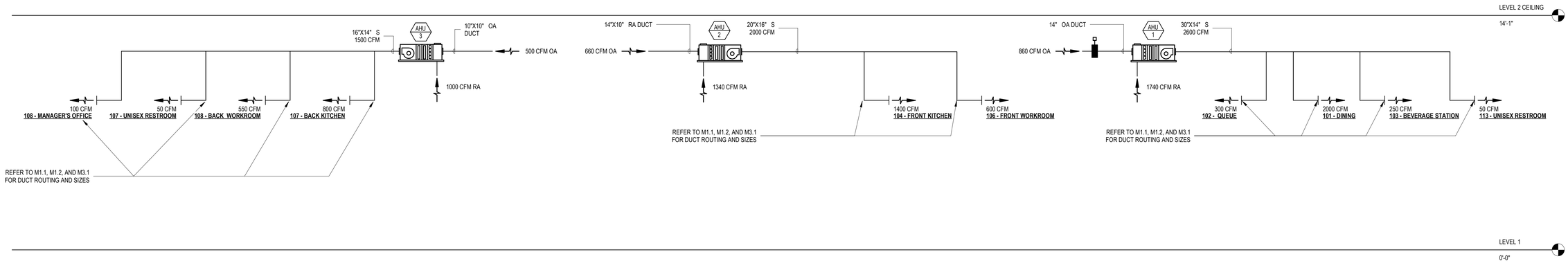
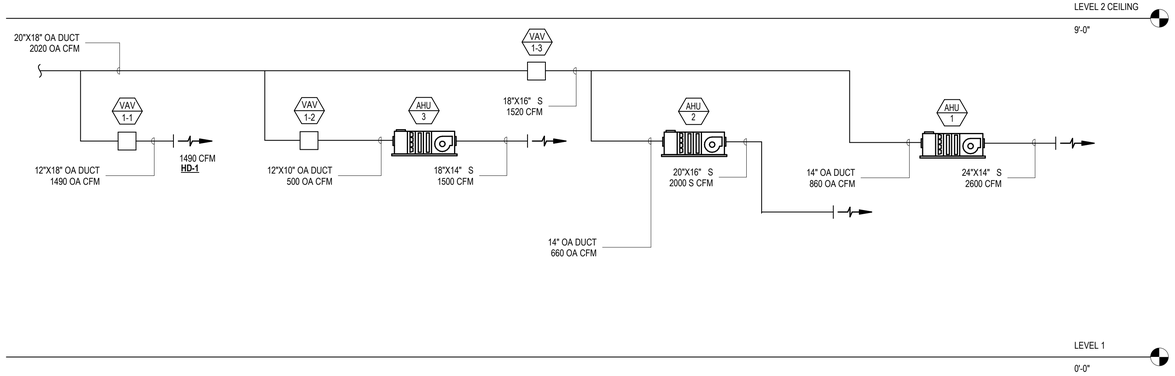
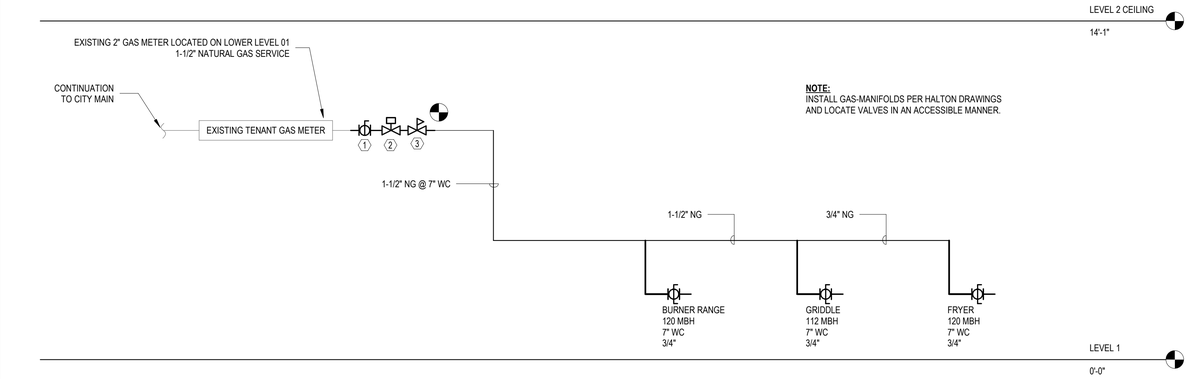


1 MECHANICAL RISERS - AIR SIDE
SCALE: N.T.S.

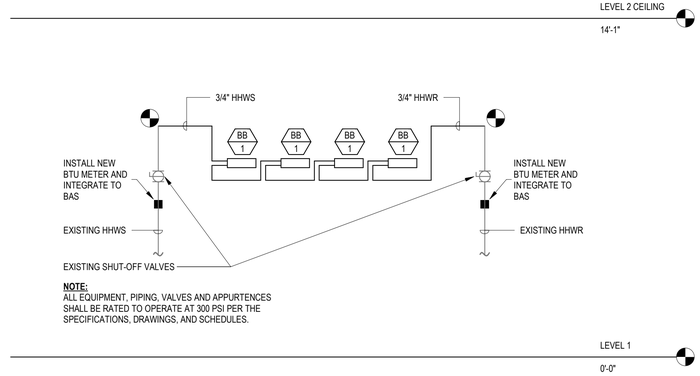


2 MECHANICAL RISERS - DOAS UNIT
SCALE: N.T.S.



NOTE:
INSTALL GAS-MANIFOLDS PER HALTON DRAWINGS AND LOCATE VALVES IN AN ACCESSIBLE MANNER.

3 MECHANICAL RISERS - GAS RISER DIAGRAM
SCALE: N.T.S.



NOTE:
ALL EQUIPMENT, PIPING, VALVES AND APPURTENCES SHALL BE RATED TO OPERATE AT 300 PSI PER THE SPECIFICATIONS, DRAWINGS, AND SCHEDULES.

4 MECHANICAL RISERS - HOT WATER RISER DIAGRAM
SCALE: N.T.S.

NATURAL GAS LOADS

EQUIPMENT / TAG	INDIVIDUAL LOAD (CFH)	QTY.	PRESSURE	PIPE SIZE
FRYER	120 MBH	1	7" WC	3/4"
GRIDDLE	112 MBH	1	7" WC	3/4"
BURNER RANGE	120 MBH	1	7" WC	3/4"
TOTAL GAS LOAD = 352 CFH @ 2 PSI				

KEYED NOTES

1. 1-1/2" NG DN TO MANIFOLD BOX. SHUT-OFF VALVE TO ISOLATE GAS EQUIPMENT TO BE INSTALLED IN MANIFOLD BOX AND SHALL BE LOCARED IN AN ACCESSIBLE MANNER.
2. INSTALL EMERGENCY SOLENOID VALVE FOR EMERGENCY CUTOFF.
3. INSTALL VENT-LESS PRESSURE REDUCING VALVE. TURN DOWN 2 PSI NG TO 7" W.C. INSTALL BALL VALVE UPSTREAM OF PRV TO ISOLATE GAS EQUIPMENT.

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MECHANICAL RISERS

M401

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AIRFLOW PRESSURIZATION MATRIX

KITCHEN EXHAUST (CFM)	1862
GENERAL EXHAUST (CFM)	1500
TOILET EXHAUST (CFM)	450
KITCHEN MAKEUP AIRFLOW (CFM)	1490
AHU OUTDOOR AIRFLOW (CFM)	1995
TOTAL OUTDOOR AIRFLOW (CFM)	3485
NET AIRFLOW (CFM)	-350
OUTSIDE AIR : DOAS-4.1 EXHAUST AIR : PCU-4.1, EF-3.1, EF-5	

PIPE SPECIFICATIONS

CONDITION / LOCATION	TYPE	JOINTS	INSULATION
CONDENSATE DRAIN	TYPE L COPPER	SOLDERED	1-1/2" FIBERGLASS WITH A FOIL SCRIM JACKET
HOT AND CHILLED WATER (2" AND SMALLER)	TYPE L COPPER	SOLDERED JOINTS	2" RIGID FIBERGLASS INSULATION, W/ FULL PVC JACKET

DUCT SPECIFICATIONS

CONDITION / LOCATION	TYPE	INSULATION
LOW PRESSURE SUPPLY	3" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	1-1/2" FLEXIBLE FIBERGLASS INSULATION W/ ALUMINUM FOIL JACKET
MEDIUM PRESSURE SUPPLY	4" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	1-1/2" FLEXIBLE FIBERGLASS INSULATION W/ ALUMINUM FOIL JACKET
EXHAUST AIR	2" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	N/A
RETURN AIR	2" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	N/A

EXISTING POLUTION CONTROL UNIT SCHEDULE - FOR REFERENCE ONLY

ITEM TAG	TYPE	LOCATION	SERVICE	AIR FLOW (CFM)	EXTERNAL STATIC (IN W.C)	FILTRATION			FAN MOTOR DATA				CONTROL TYPE	MANUFACTURER	MODEL NUMBER
						FIRST STAGE	SECOND STAGE	THIRD STAGE	MOTOR BHP	MOTOR HP	MOTOR SPEED (RPM)	V/PH			
PCU-4.1	DWDI	LEVEL 4	L1 SOUTHWEST TENANTS	18000	5	MERV 14 (ELF)	MERV 16	CARBON	39.3	50	2065	480/3/60	VFD	HALTON	ECOLOAIR 18000

NOTES/OPTIONS/ACCESSORIES:
1. INFORMATION SHOWN HERE IS FOR REFERENCE ONLY. AIRFLOWS AND CAPACITIES ARE NOMINAL.

CHICAGO VENTILATION SCHEDULE

ROOM NUMBER	ROOM NAME	ROOM TYPE	FLOOR AREA (SF)	CODE REQUIRED MECHANICAL VENTILATION					ACTUAL			EQUIPMENT	
				SUPPLY (CFM/SF)	EXHAUST (CFM/SF)	SUPPLY (CFM)	OA (CFM)	EXHAUST (CFM)	SUPPLY (CFM)	OA (CFM)	EXHAUST (CFM)	SUPPLY FAN	EXHAUST FAN
Level 0													
101	DINING	PUBLIC DINING ROOMS - NO COOKING EQUIPMENT	973	1.50	1.50	1459	486	1459	2000	660	2700	<E>DOAS-4.1, AHU-1	<E>EF-3.1
102	QUEUE	CORRIDORS	258	0.00	0.00	0	0	0	300	99	300	<E>DOAS-4.1, AHU-1	<E>EF-3.1
103	BEVERAGE STATION	PUBLIC DINING ROOMS - NO COOKING EQUIPMENT	29	1.50	1.50	43	14	43	250	83	0	<E>DOAS-4.1, AHU-1	N/A
104	FRONT KITCHEN	PUBLIC KITCHEN	341	1.20	4.00	410	136	1365	1400	462	2025	<E>DOAS-4.1, AHU-2	<E>EF-3.1
105	COOKLINE	PUBLIC KITCHEN	148	1.20	4.00	178	59	593	1490	1490	1862	<E>DOAS-4.1	<E>PCU-4.1
106	BACK WORKROOM	WORKSHOPS NOT OTHERWISE CLASSIFIED	231	1.20	1.20	277	92	277	550	182	700	<E>DOAS-4.1, AHU-3	<E>EF-3.1
107	UNISEX RESTROOM	TOILET ROOMS	64	0.00	2.00	0	0	128	50	17	150	<E>DOAS-4.1, AHU-3	<E>EF-5
108	ELEC ROOM	STORAGE INACTIVE	64	0.00	0.00	0	0	0	600	0	600	FCU-1	FCU-1
109	TRASH ENCLOSURE	STORAGE INACTIVE	51	0.00	0.00	0	0	0	0	0	200	N/A	<E>EF-5
110	MANAGER'S OFFICE	OFFICES AND COMPUTER ROOMS	62	0.60	0.30	37	12	19	100	33	0	<E>DOAS-4.1, AHU-1	N/A
111	COOLER	STORAGE INACTIVE	108	0.00	0.00	0	0	0	0	0	0	N/A	N/A
112	BACK KITCHEN	PUBLIC KITCHEN	200	1.20	4.00	240	80	799	800	264	800	<E>DOAS-4.1, AHU-3	<E>EF-3.1
113	FRONT WORKROOM	WORKSHOPS NOT OTHERWISE CLASSIFIED	283	1.20	1.20	340	113	340	600	198	1050	<E>DOAS-4.1, AHU-2	<E>EF-3.1
			2812			2984	994	5022	8140	3488	10387		

REMARKS:
1. PCU-4.1 POLUTION CONTROL UNIT - TYPE I EXHAUST
   A. SERVES HOOD H-1
   B. TOTAL EXHAUST AIRFLOW - 1862 CFM
   C. TOTAL KITCHEN MAKEUP AIRFLOW - 1490 CFM
2. E-5 EXHAUST FAN - TOILET EXHAUST
   A. TOTAL EXHAUST AIRFLOW - 500 CFM
3. EF-3.1 - GENERAL EXHAUST FAN
   A. TOTAL EXHAUST AIRFLOW - 1525 CFM

HEATING TABLE

BUILDING LOAD (MBH)	67
VENTILATION LOAD (MBH)	74
TOTAL HEATING LOAD (MBH)	141
HEATING SYSTEM OUTPUT CAPACITY (MBH)	261
HEATING SYSTEM EQUIPMENT INCLUDED IN THIS TABLE:	
AHU-1, AHU-2, AHU-3	

HEATING CERTIFICATION STATEMENT

I HEREBY CERTIFY THAT THE HEATING SYSTEM WILL HEAT ALL ROOMS REGULARLY OCCUPIED BY HUMANS TO AN NISIDE TEMPERATURE OF 68° WHEN THE OUTSIDE TEMPERATURE IS MINUS 10°F (AS REQUIRED BY THE SECTIONS 34(13-196-410) AND 4(5-4-270) OF THE 2018 CHICAGO BUILDING CODE AND BY PARAGRAPH 1204.1 OF CHAPTER 18-12 (INTERIOR ENVIRONMENT) OF THE PROPOSED BUILDING PLANNING AND LIFE SAFETY PORTION OF THE CODE).

SIGNED:

OWNER, CONTRACTOR OR OWNER'S LICENSED ENGINEER REPRESENTATIVE	1.10.2025

VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE

TAG	NECK SIZE (IN)	DESIGN AIRFLOW		CONTROL TYPE	MODEL NO.	REMARKS
		MAX (CFM)	MIN (CFM)			
VAV 1-1	14	1490	745	DDC	DESV	ALL
VAV 1-2	10	495	248	DDC	DESV	ALL
VAV 1-3	14	1518	760	DDC	DESV	ALL

REMARKS:
1. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND PROVIDE ACCESS AND STEEL ENCLOSURE FOR CONTROLS

EXISTING EXHAUST FAN SCHEDULE - FOR REFERENCE ONLY

TAG	SERVICE	LOCATION	MAX (CFM)	TOTAL STATIC PRESSURE (IN.WC)	MOTOR BHP
EF-3.1	FIRST FLOOR GENERAL EXHAUST	LEVEL 03 MEZZANINE	22,000	3.25	23
E-5	FIRST FLOOR TOILET EXHAUST	LOWER LEVEL 03 HI	5,000	2	3

NOTES/OPTIONS/ACCESSORIES:
1. INFORMATION SHOWN HERE IS FOR REFERENCE ONLY. AIRFLOWS AND CAPACITIES ARE NOMINAL.

KITCHEN HOOD SCHEDULE - FOR REFERENCE ONLY

ITEM TAG	MANUFACTURER	MODEL	HOOD LENGTH	TOTAL SUPPLY CFM	TOTAL EXHAUST CFM	LIGHTS		MISC.		REMARKS
						QTY.	TYPE	FIRE SUPP. SYSTEM	HANGING WEIGHT (LB)	
HD-1	HALTON	KVE	13'	1490	1862	4	HCL	YES	991	ALL

REMARKS:
1. REFER TO KES AND HALTON DRAWINGS FOR ACCESSORY INFORMATION.

EXISTING AIR HANDLER UNIT SCHEDULE - FOR REFERENCE ONLY

TAG	MANUFACTURER	MODEL #	AREA SERVED	FAN/MOTOR DATA					FILTERS				COOLING CAPACITY														HEATING CAPACITY										ELECTRICAL DATA					WEIGHT (LBS)
				AIRFLOW CFM	OA CFM	ESP (IN. W.C.)	RPM	HP	PRE		FINAL		GROSS (MBH)	SENSIBLE (MBH)	EAT (DB°F)	EAT (WB°F)	LAT (DB°F)	LAT (WB°F)	EWT (°F)	LWT (°F)	GPM	ROWS	WPD (FT)	FPI	FACE VELOCITY (FT/MIN)	CAPACITY (MBH)	EAT (DB°F)	LAT (DB°F)	EWT (°F)	LWT (°F)	GPM	ROWS	WPD (FT)	FPI	FACE VELOCITY (FT/MIN)	MCA	MOCP	V	PH	HZ	
									TYPE	WIDTH (IN.)	TYPE	WIDTH (IN.)																													
AHU-1	DAIKIN	BCHD0301	DINING AREA	2650	875	0.5	1265	2	MERV 8	2	MERV 8	2	104.9	72.7	80	67	54.4	53.9	45	55	21	4	7.51	16	430.8	147	40	91.8	180	155.1	12.1	1	14.43	12	430.8	7.2	15	208	3	60	635
AHU-2	DAIKIN	BCHD0301	FRONT KITCHEN	2000	660	0.5	1092	1.5	MERV 8	2	MERV 8	2	86.6	58.5	80	67	53.3	52.8	45	55	17.5	4	5.47	16	331.4	131.6	40	100.2	180	155.0	10.8	1	11.7	12	331.4	6	15	208	3	60	635
AHU-3	DAIKIN	BCHD0301	BACK KITCHEN	1400	460	0.5	957	1.5	MERV 8	2	MERV 8	2	67.5	45.0	80	67	52.6	52.1	45	55.1	13.4	4	3.39	16	248.6	114.8	40	110	180	155.0	9.4	1	9.09	12	248.6	6	15	208	3	60	635

REMARKS:
1. COORDINATE UNIT CONTROL AND ACCESS DOOR SIDE ON SITE PRIOR TO PROCUREMENT
2. COIL CONNECTIONS SHALL BE SAME END
3. BOTTOM RETURN, REAR OUTDOOR AND FRONT SUPPLY
4. 2" MERV 8 PLEATED PRE-FILTER
5. PROVIDE MIXING BOX WITH MODULATING DAMPERS TIED TO THE UNIT'S FACTORY INSTALLED CONTROLS
6. PROVIDE CONDENSATE OVERFLOW DRAIN PLAN WITH OVERFLOW SWITCH
7. COILS SHALL BE RATED FOR 350 PSI
8. FACTORY-PROVIDED NEMA 1 FUSED DISCONNECT
9. THERMOSTAT AND SENSOR AND ALL ASSOCIATED WIRING TO BE INCLUDED
10. PROVIDE CEILING SUSPENDED HANGING SUPPORTS AND VIBRATION ISOLATORS
11. PROVIDE WITH COMPANION FLANGES BOLTED TO FAN AND FLEXIBLE SLEEVE ON THE INLET AND OUTLET CONNECTIONS.
12. ALL COILS SHALL BE ARI CERTIFIED AND PRESSURE TESTED.
13. COIL TUBE SHALL BE COPPER AND HAVE 5/8" DIAMETER, 0.035" TUBE THICKNESS, AND 0.095" ALUMINIUM FINS.
14. FACE VELOCITY OF THE CHILLED WATER COILS SHALL NOT EXCEED 450 FPM.

STANDARD CITY OF CHICAGO REFRIGERATION SCHEDULE

ITEM TAG	MANUFACTURER / MODEL	TYPE OF REFRIGERANT	# OF COMPRESSORS	NOMINAL TONS	WEIGHT OF REFRIGERANT (LBS)	REMOTE / SELF CONTAINED
CU-1	AMERICOOLER	R-404A	1	3	15	REMOTE
25A	HOSHIZAKI / F801MAJ-C	R-404A	1	0.5	1	SELF-CONTAINED
28	EVEREST / ETBR1	R-290	1	0.14	0.2	SELF-CONTAINED
42	CONTINENTAL INDUSTRIES / SW32N12M	R-290	1	0.14	0.2	SELF-CONTAINED
59	EVEREST REFRIGERATION /EPBR2	R-290	1	0.14	0.2	SELF-CONTAINED

REMARKS:
1. COPPER TUBING MAY BE TYPE ACR OR TYPE 'K' REFRIGERANT LINES UNLESS PRESSURE EXCEEDS THE RATED CAPACITY OF ACR TUBING [18-28-1107.4.3]
2. ALL JOINTS SHALL BE BRAZED.
3. INSTALL SAFETY REFIEF VALVE ON HIGH SIDE, UPSTREAM OF ANY INTERVENING DEVICES. SET AT 450 PSI.
4. REFRIGERANT PIPING TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS.
5. LOCATE ALL REFRIGERATION EXPANSION VALVES, DEVICES AND CONNECTION OUT OF THE AIRSTREAM.
6. REFRIGERANT LINES MAY NOT BE LOCATED IN ANY ELEVATOR, DUMBWAITER OR SHAFT CONTAINING MOVING OBJECTS OR IN STAIRWELLS OR OTHER MEANS OF EXIT. NOT PERMITTED UNDER STAIRS, FIRE ESCAPES OR HALLWAYS. [18-28-11107.2.1 & 1101.11]

GRILLE, REGISTERS, AND DIFFUSER SCHEDULE

TAG	AIR STREAM	STYLE	MOUNTING TYPE	INLET SIZE (IN)			FRAME SIZE		MAX NC	MAX PD (IN WC)	MANUFACTURER	MODEL NO.	REMARKS
				DIA.	HEIGHT	WIDTH	HEIGHT	WIDTH					
S 1	SUPPLY	2-SLOT, 2" SLOT LINEAR SUPPLY DIFFUSER	CEILING LAY-IN	8"			0' - 10 3/8"	5' - 1"	25	0.09	TITUS	FL-20	ALL
S 2	SUPPLY	2-SLOT, 2" SLOT LINEAR SUPPLY DIFFUSER	CEILING LAY-IN	10"			0' - 10 3/8"	5' - 1"	25	0.09	TITUS	FL-20	ALL
S 3	SUPPLY	STEEL SQUARE PLAQUE ROUND NECK	CEILING LAY-IN	12"			2' - 0"	2' - 0"	25	0.09	TITUS	OMNI	ALL
S 4	SUPPLY	STEEL SQUARE PLAQUE ROUND NECK	CEILING LAY-IN	10"			2' - 0"	2' - 0"	25	0.09	TITUS	OMNI	ALL
S 5	SUPPLY	ROUND STEEL PLAQUE DIFFUSER	DUCT MOUNTED	10"			1' - 6"	1' - 6"	25	0.09	TITUS	R-OMNI	ALL
S 6	SUPPLY	STEEL PERFORATED STAR DIFFUSER HIGH INDUCTION AIR - FLUSH FACE	CEILING LAY-IN	12"			2' - 0"	2' - 0"	25	0.09	TITUS	PSS	ALL
S 7	SUPPLY	STEEL SQUARE PLAQUE ROUND NECK	CEILING LAY-IN	6"			2' - 0"	2' - 0"	25	0.09	TITUS	OMNI	ALL
R 1	RETURN	STEEL SQUARE PERFORATED FLUSH FACE	CEILING LAY-IN		18"	36"	1' - 8"	3' - 2"	25	0.09	TITUS	PAR	ALL
E 1	EXHAUST	STEEL SQUARE PERFORATED FLUSH FACE	CEILING LAY-IN	8"			1' - 0"	1' - 0"	25	0.09	TITUS	PAR	ALL
E 2	EXHAUST	STEEL SQUARE PERFORATED FLUSH FACE	CEILING LAY-IN	12"			2' - 0"	2' - 0"	25	0.09	TITUS	PAR	ALL
E 3	EXHAUST	STEEL SQUARE PERFORATED FLUSH FACE	CEILING LAY-IN	16"			2' - 0"	2' - 0"	25	0.09	TITUS	PAR	ALL

REMARKS:
1. PROVIDE WITH MANUAL VOLUME DAMPERS FOR ALL DIFFUSERS. OPPOSED BLADE DAMPERS SHALL NOT BE USED.
2. PROVIDE WITH SURFACE MOUNTING FRAME WHERE APPLICABLE.
3. COORDINATE FINISH AND LOCATION WITH ARCHITECT.

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PROJECT NUMBER:
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ISSUANCE
SELF-CERT 02/19/25
COMMENTS
PERMIT 03/12/2025
ISSUANCE
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FAN COIL UNIT (COOLING ONLY) SCHEDULE

TAG	LOCATION	COOLING CAPACITY									FAN/MOTOR DATA			ELECTRICAL DATA					WEIGHT (LBS)	MANUFACTURER	MODEL NO.	REMARKS
		GROSS (MBH)	SENSIBLE (MBH)	EAT (DB°F)	EAT (WB°F)	LAT (DB°F)	LAT (WB°F)	EWT (°F)	LWT (°F)	GPM	AIRFLOW CFM	HP	ESP (IN. W.C.)	MCA	MOCP	V	PH	HZ				
FCU-1	ELECTRICAL ROOM (110)	26.5	17.8	80	67	55	53	45	55	6	600	0.08	0.50	0.8	20	120	1	60	50.5	MULTIAQUA	MHQWW-24-H-3	ALL

REMARKS:

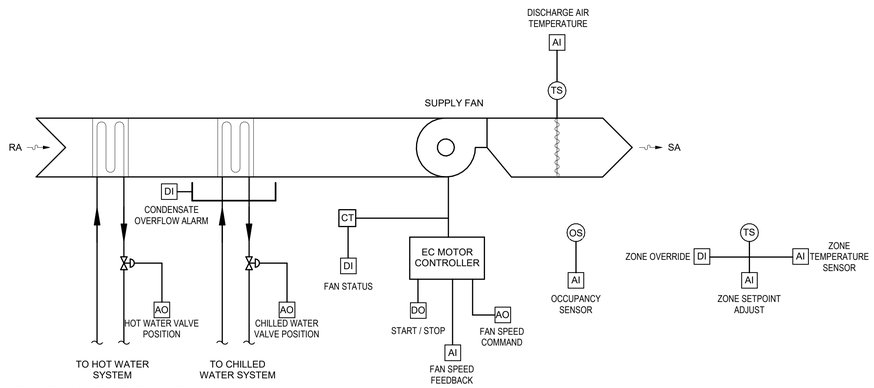
1. THIS IS A COOLING ONLY UNIT
2. NO GLYCOL IN SYSTEM
3. UNIT SHALL BE MOUNTED ON WALL WITH SIDE CONNECTIONS FOR PIPING. NO WALL PENETRATIONS ALLOWED.
4. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
5. UNIT SHALL BE PROVIDED WITH INTERNAL MOUNTED AND POWERED CONDENSATE PUMP (120/1/60)
6. FAN MOTORS SHALL BE THREE SPEED, DIRECT DRIVE AND PSC TYPE
7. COILS SHALL BE RATED FOR 150 PSI OPERATING PRESSURE
8. PROVIDE WITH 2 ADDITIONAL WASHABLE FILTERS
9. PROVIDE WITH FIXED WALL MOUNTED ADJUSTABLE TEMPERATURE SENSOR WITH BAS INTERFACE

HOT WATER BASEBOARD RADIATION SCHEDULE

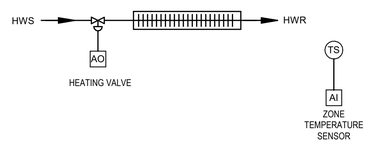
TAG	ELEMENT LENGTH (FT)	TUBE SIZE (IN)	FIN SIZE (IN X IN)	HEAT LOAD (MBH)	FPF	FIN THICKNESS	BTUH/FT	GPM	AWT (F)	WPD (FT)	FIN MATERIAL	MANUFACTURER	MODEL NO.	REMARKS
BB-1	5	0.75	2-3/4" X 3-3/4"	13.6	50	0.014	680	0.68	160	0.15	STEEL	VULCAN	VR04R	ALL

REMARKS:

1. PROVIDE PEDESTAL SUPPORT BRACKETS -6-3/4" HIGH SINGLE ROW. NO ENCLOSURE REQUIRED FROM MANUFACTURER. ARCHITECT TO PROVIDE ENCLOSURE
2. BARE ELEMENT STEEL FINNED TUBING. FINNED TUBING SHALL BE RATED TO 300 PSI MINIMUM WORKING PRESSURE.
3. 1-TIER ELEMENT ONLY. INSTALL ELEMENT AT 10" FROM CENTER OF ELEMENT TO FLOOR



2 AIR HANDLING UNIT - HEATING AND COOLING CONTROL DIAGRAM
N.T.S.



3 HOT WATER FIN TUBE CONTROL DIAGRAM
NOT TO SCALE

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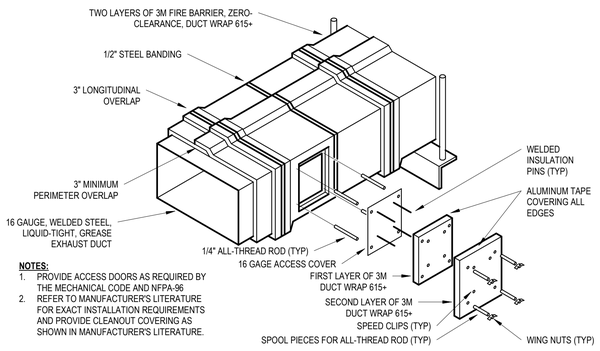
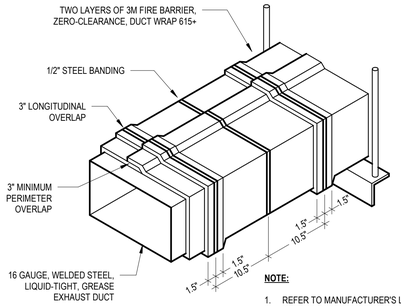
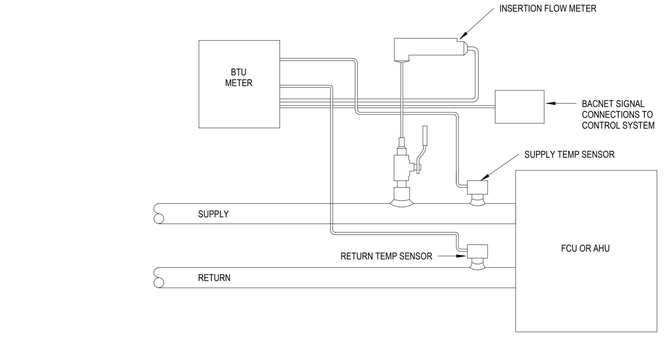


NOTES:
1. PROVIDE ACCESS DOORS AS REQUIRED BY THE MECHANICAL CODE AND NFPA-96
2. REFER TO MANUFACTURER'S LITERATURE FOR EXACT INSTALLATION REQUIREMENTS AND PROVIDE CLEANOUT COVERING AS SHOWN IN MANUFACTURER'S LITERATURE.

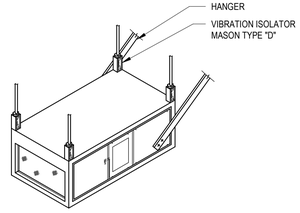


NOTE:
1. REFER TO MANUFACTURER'S LITERATURE FOR EXACT INSTALLATION REQUIREMENTS.
2. GREASE DUCTS MUST HAVE A MINIMUM AIR VELOCITY OF 1500 FT/MIN. [18-28-506.3.5]

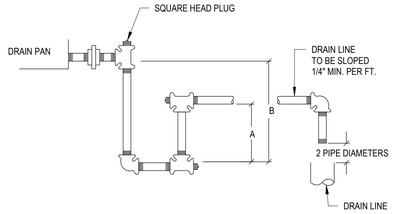
1 GREASE DUCT AND WRAP DETAILS
NOT TO SCALE



2 BTU METER DETAIL
SCALE: N.T.S.

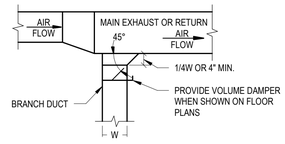


4 CEILING SUSPENDED EQUIPMENT DETAIL
SCALE: N.T.S.



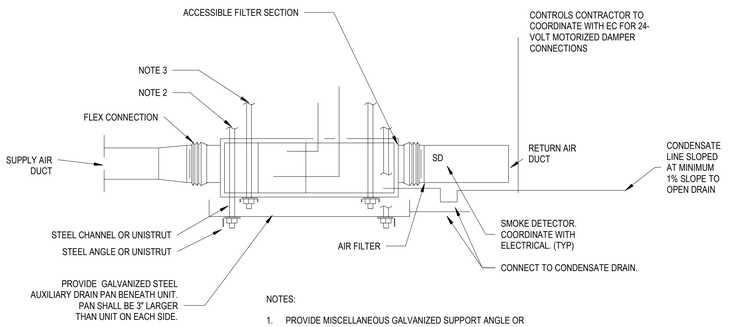
NOTES:
1. FILL TRAP MANUALLY ON INITIAL START-UP.
2. TRAP EACH COMPONENT DRAIN CONNECTION.
3. PIPE SIZE SHALL NOT BE LESS THAN DRAIN PAN CONNECTION SIZE.
4. A = NEGATIVE OR POSITIVE S.P. ON THE DRAIN PAN + 2" B = (2 NEGATIVE S.P.) + 4" FOR DRAW THRU UNITS B = A + 2" FOR BLOW THRU UNITS

3 CONDENSATE DRAIN TRAP PIPING DETAIL
NOT TO SCALE



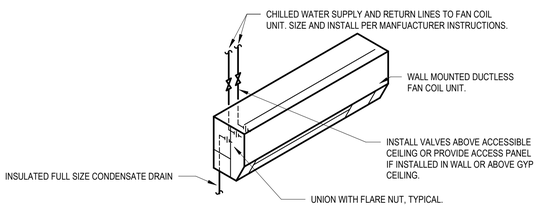
PLAN VIEW

5 EXHAUST OR RETURN BRANCH DUCTOWRK DETAIL
SCALE: N.T.S.



NOTES:
1. PROVIDE MISCELLANEOUS GALVANIZED SUPPORT ANGLE OR CHANNEL AS REQUIRED TO BRIDGE STRUCTURE.
2. SUSPEND DRAIN PAN WITH SUPPORT RODS WHEN ATTACHED TO BUILDING STRUCTURE.
3. ATTACH TO STRUCTURE WITH VIBRATION ISOLATION.

6 HORIZONTAL AHU INSTALLATION DETAIL
SCALE: N.T.S.

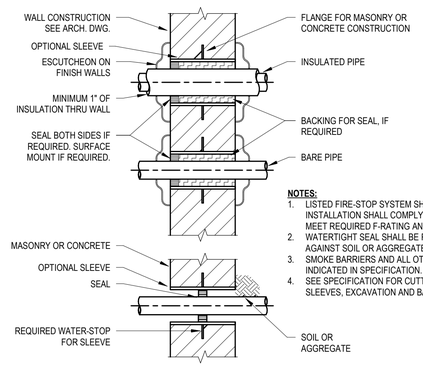


NOTE:
INSTALL CONDENSATE PIPING PER EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

MAINTAIN ALL MANUFACTURER REQUIRED CLEARANCES.

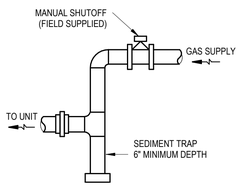
PROVIDE WALL MOUNTING BRACKETS AS REQUIRED. INSTALL PER MANUFACTURER INSTRUCTIONS.

7 WALL MOUNTED DUCTLESS FCU DETAIL
SCALE: N.T.S.



NOTES:
1. LISTED FIRE-STOP SYSTEM SHALL BE ON FIRE RESISTIVE CONSTRUCTION. INSTALLATION SHALL COMPLY WITHIN THE LIMITATIONS OF THE LISTING AND MEET REQUIRED F-RATING AND T-RATING.
2. WATERTIGHT SEAL SHALL BE REQUIRED FOR PENETRATION THRU WALL AGAINST SOIL OR AGGREGATE.
3. SMOKE BARRIERS AND ALL OTHER PENETRATIONS, PROVIDE SEAL AS INDICATED IN SPECIFICATION.
4. SEE SPECIFICATION FOR CUTTING, PATCHING, PENETRATION SEAL, SLEEVES, EXCAVATION AND BACKFILLING.

8 PIPING PENETRATION THRU WALL DETAIL
NOT TO SCALE



9 GAS PIPING DETAIL
SCALE: N.T.S.

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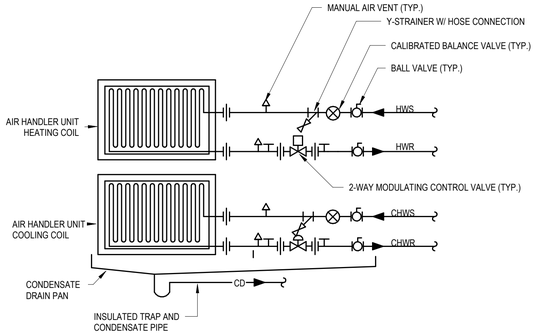
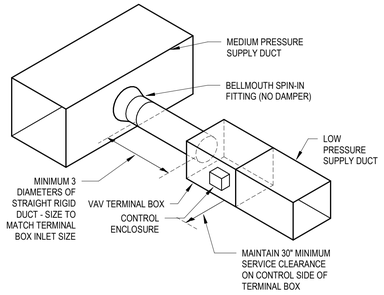
MECHANICAL DETAILS

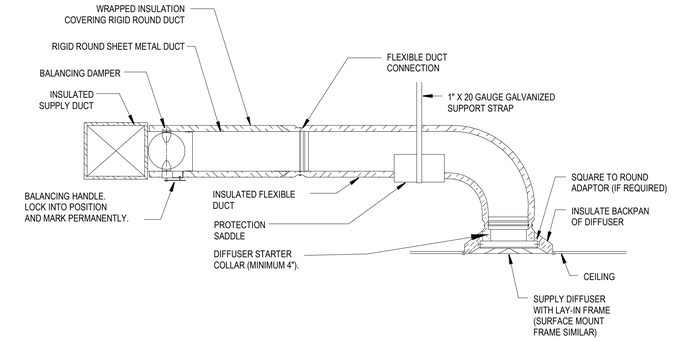
M601



1 4-PIPE AIR HANDLER UNIT PIPING DETAIL
NOT TO SCALE

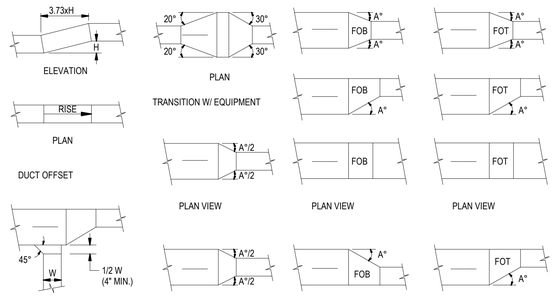


2 VAV TERMINAL BOX INSTALLATION
SCALE: N.T.S.



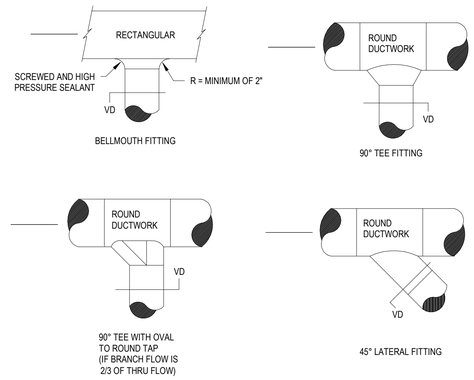
NOTES:
1) PROVIDE AT FLEXIBLE DUCT CONNECTION METAL OR "PANDUIT" DRAWBAND ON THE INTERIOR FLEXIBLE DUCT HELIX. SECURE THE INSULATION OVER THE DRAW BAND WITH AN ADDITIONAL DRAWBAND.
2) PROVIDE BEADING ON ROUND METAL DUCT 12" OR LARGER IN DIAMETER.
3) PROVIDE MINIMUM 4" COLLARS FOR ATTACHMENT OF THE FLEXIBLE DUCT TO ROUND DUCT, DAMPERS AND DIFFUSERS.
4) BAND RIGID ROUND DUCT INSULATION TO DUCT AND PROVIDE TAPE FOR INSULATION OVERLAP.

3 DIFFUSER CONNECTION DETAIL
NOT TO SCALE

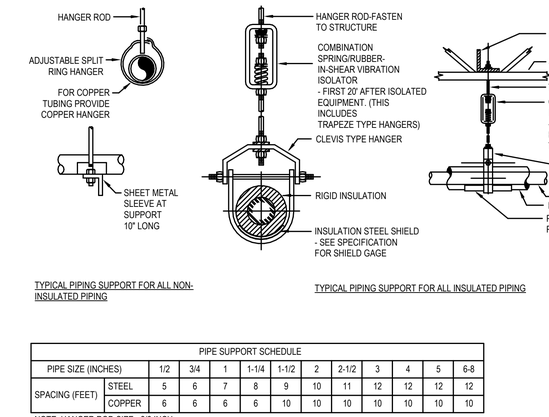


NOTES:
1) ANGLE A = 30° WHEN AIR FLOWS IN DIRECTION OF ARROW (SUPPLY AIR).
2) ANGLE A = 20° WHEN AIR FLOWS IN OPPOSITE DIRECTION OF ARROW (RETURN OR EXHAUST).

4 LOW VELOCITY DUCT FITTINGS DETAIL
NOT TO SCALE



5 ROUND DUCTWORK FITTINGS
NOT TO SCALE



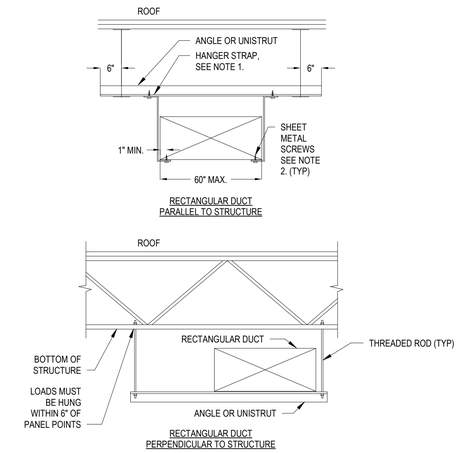
TYPICAL PIPING SUPPORT FOR ALL NON-INSULATED PIPING

TYPICAL PIPING SUPPORT FOR ALL INSULATED PIPING

PIPE SUPPORT SCHEDULE												
PIPE SIZE (INCHES)		1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6-8
SPACING (FEET)	STEEL	5	6	7	8	9	10	11	12	12	12	12
	COPPER	6	6	6	6	10	10	10	10	10	10	10

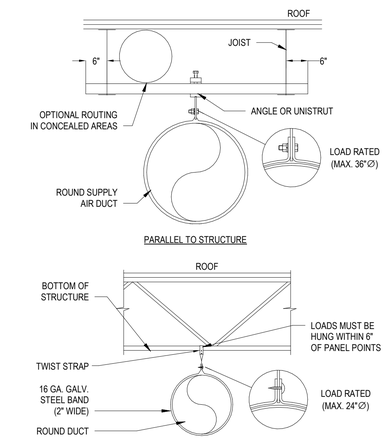
NOTE: HANGER ROD SIZE - 3/8 INCH

6 TYPICAL HVAC PIPING SUPPORT DETAIL1
NOT TO SCALE



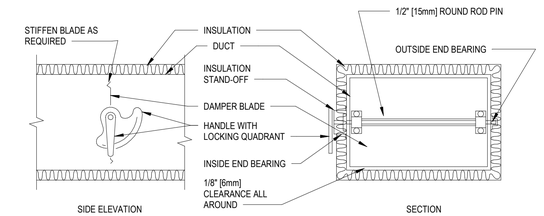
NOTE:
1. USE THREADED ROD FOR ALL DUCTS LARGER THAN 60" WIDE.
2. SHEET METAL SCREWS MAY BE OMITTED IF HANGER STRAP IS CONTINUOUS AND LOOPS UNDER ENTIRE DUCT.

7 RECTANGULAR DUCT SUPPORT FROM CEILING STRUCTURE/JOISTS DETAIL
NOT TO SCALE



NOTE:
1. FOR DUCTS LARGER THAN 36"Ø, USE TWO HANGER RODS, WIRES OR STRAPS TO SUPPORT DUCT FROM EACH SIDE.

8 ROUND DUCT SUPPORT DETAIL
NOT TO SCALE



NOTE:

1. REMOVE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

9 VOLUME DAMPER DETAIL
NOT TO SCALE

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MECHANICAL DETAILS

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RESERVED FOR DOCUMENT BINDING

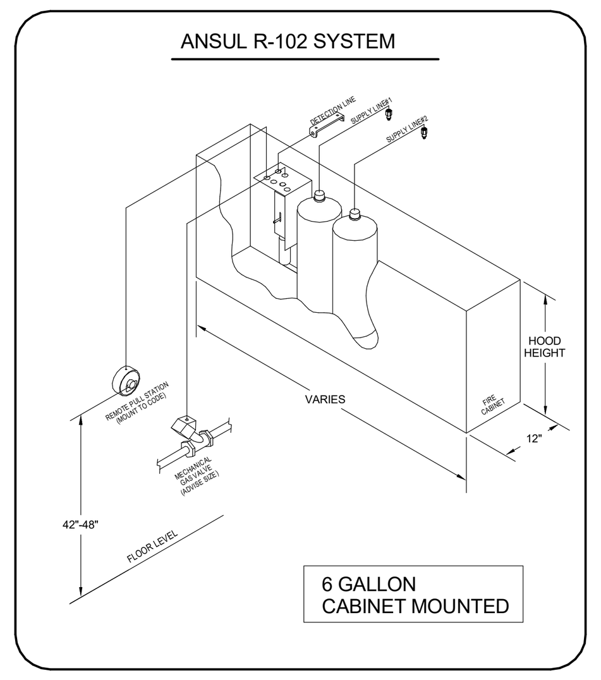
HOOD INFORMATION TABLE

HOOD NUMBER	HOOD MODEL	EXHAUST AIR FLOW REQUIREMENTS						GREASE EXTRACTOR				HOOD CONSTRUCTION	HOOD WEIGHT (LBS)	SUPPLY AIR REQUIREMENTS					PLENUM WEIGHT (LBS)
		EXHAUST CFM	TOTAL HOOD STATIC PRESSURE	T.A.B. PORT STATIC PRESSURE	EXHAUST COLLAR			QTY.	SIZE		TYPE			SUPPLY CFM	SUPPLY STATIC PRESSURE	SUPPLY COLLAR			
					QTY.	LENGTH	WIDTH		L	H						QTY.	LENGTH	WIDTH	
33	KVE	1862	.25"	.14"	1	13"	12"	7	20"	13"	KSA	ALL 18 GA. 304 S.S.	991	1490	.06"	1	18"	12"	233
								-	11"	13"									

TOTAL EXH. CFM = 1862

TOTAL SUPPLY CFM = 1490

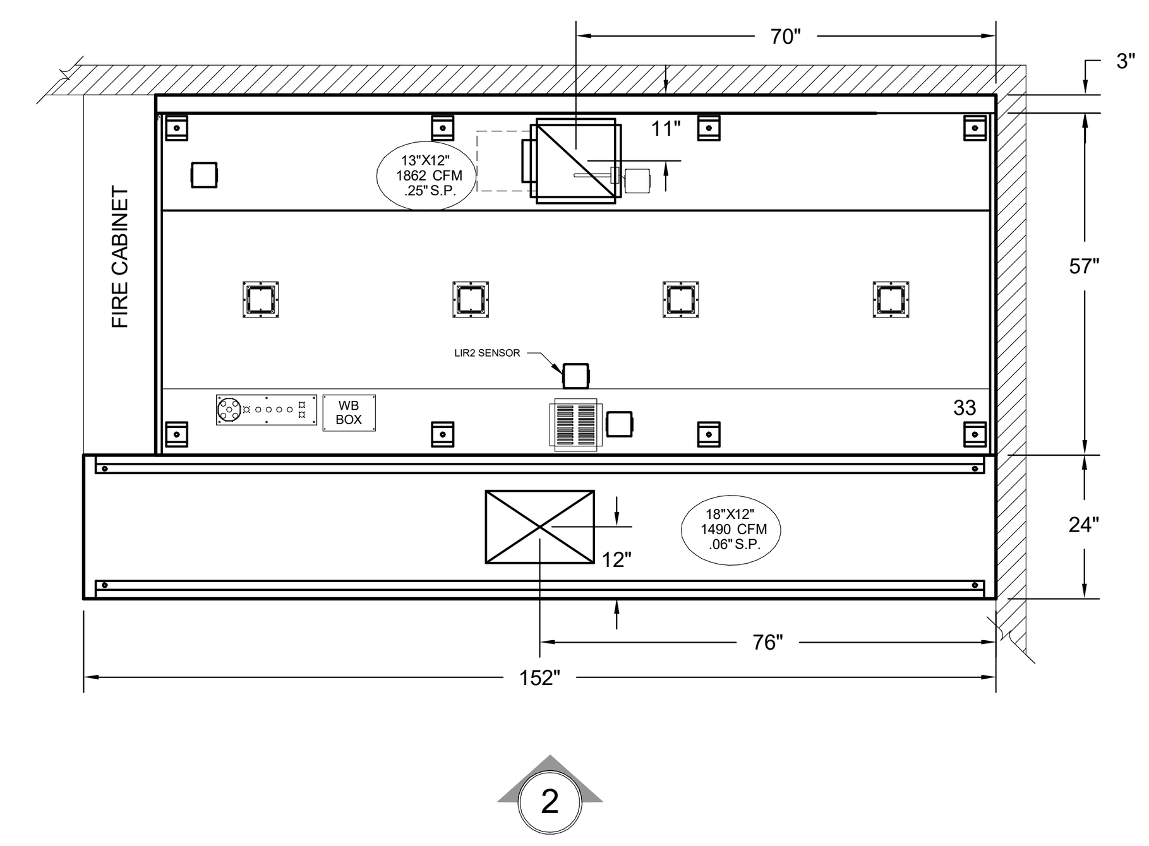
MAKE UP AIR GUIDELINES
- VELOCITY MEASURED AT THE LOWER FRONT LIP OF THE HOOD SHALL NOT EXCEED 75 FPM.
- TRANSFER AIR FROM PARTS OF THE BUILDING OTHER THAN THE KITCHEN SHALL NOT EXCEED 50 FPM VELOCITY.
- NO SLOT, 2-WAY, 3-WAY OR 4-WAY CEILING DIFFUSER SHALL PROVIDE AIRFLOW DIRECTED AT HOOD. MUST INSTALL DIFFUSERS MINIMUM OF 48" [1219 MM] AWAY FROM ALL OPEN SIDES OF HOODS*.
*EXCEPTION-HALTON KCDs MAY BE PLACED 24" [610 MM] AWAY FROM ALL OPEN SIDES OF HOODS.



ANSUL R-102 SYSTEM

MOUNTED IN FIRE CABINET:

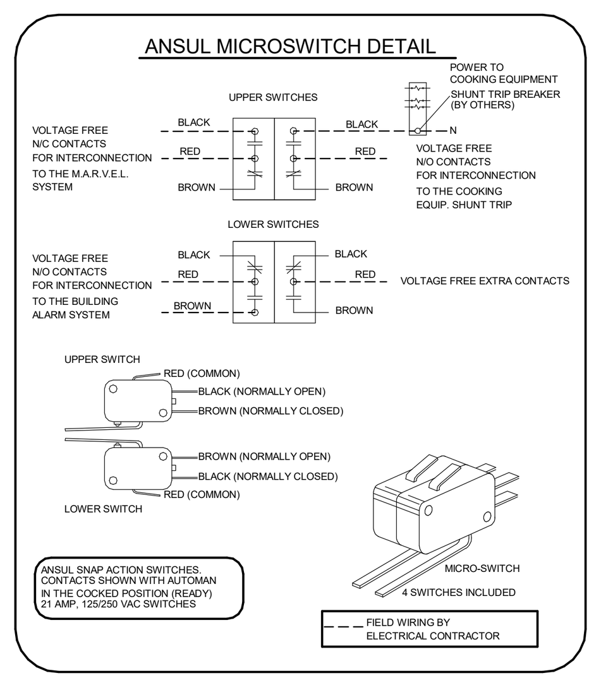
(1) OEM REGULATED RELEASE
(2) 3 GALLON TANKS

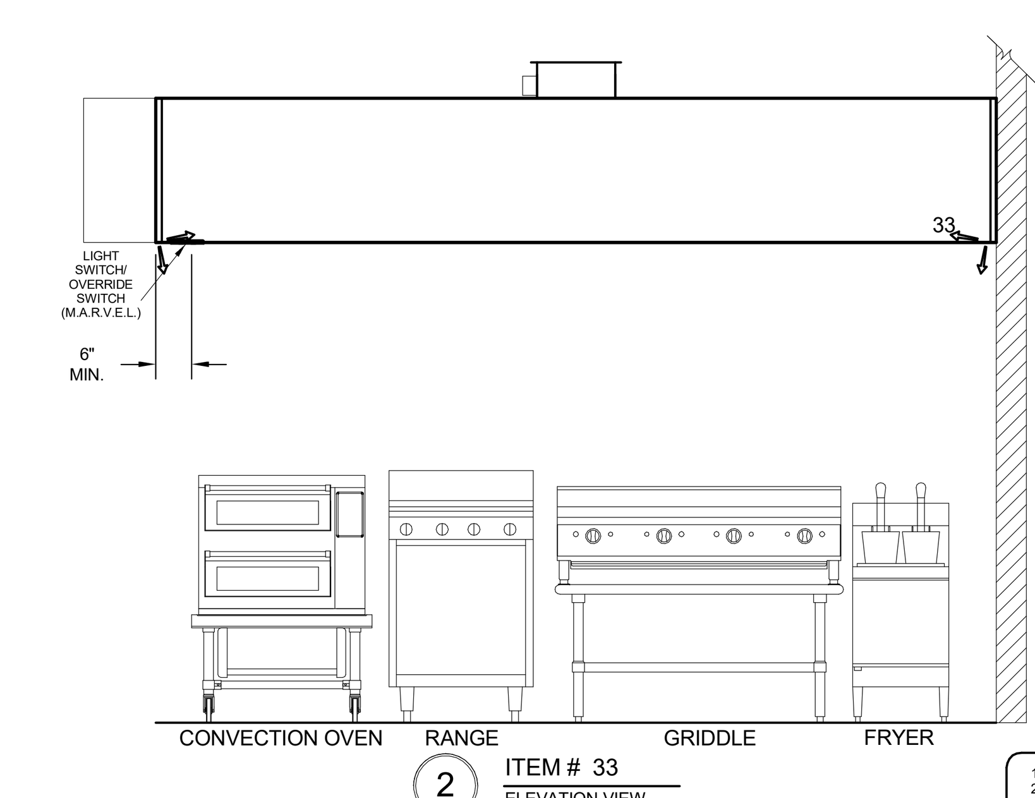


ITEM # 33
PLAN VIEW

NOTE

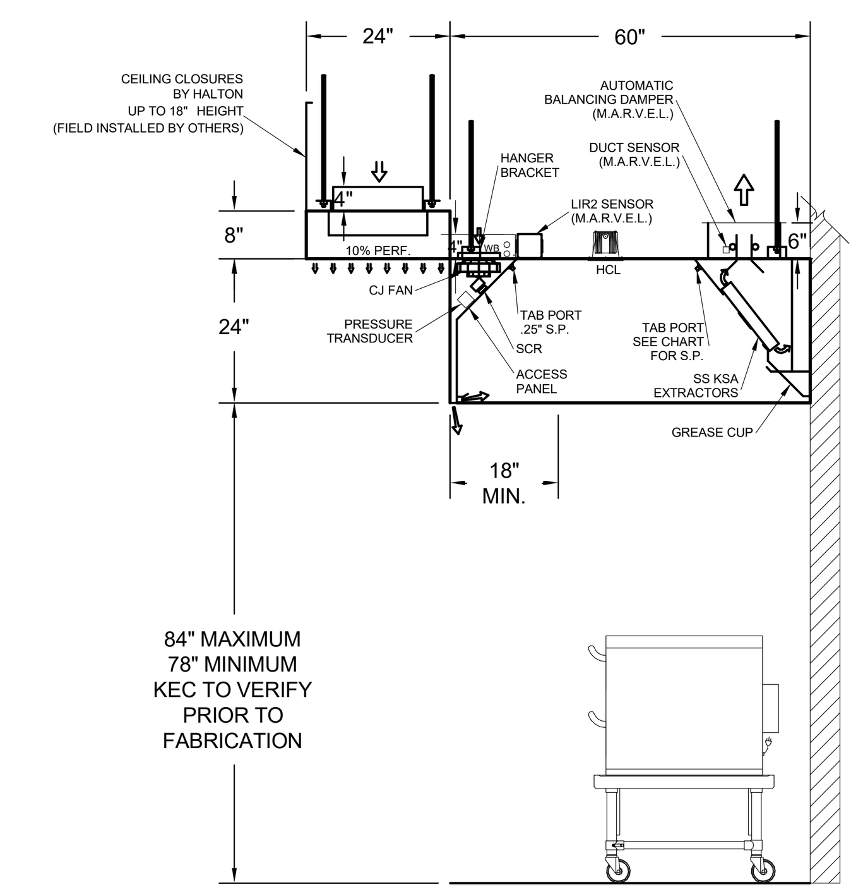
HOOD IS LISTED AND LABELED FOR 0" CLEARANCE.



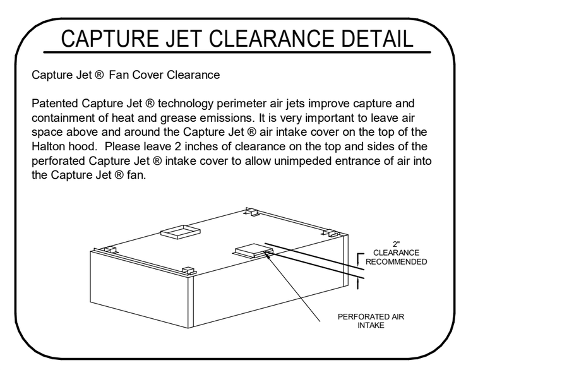


ITEM # 33
ELEVATION VIEW

1) ANSUL R-102 FIRE SYSTEM
2) TWO TANK SYSTEM (6 GALLON)
3) 3/8" BLACK IRON PIPING (CONCEALED)
3/8" S.S. APPLIANCE DROPS (EXPOSED)
4) MECHANICAL GAS VALVE + (ADVISE SIZE)



ITEM # 33
SECTION VIEW



GENERAL SPECIFICATIONS

1- HOOD CONSTRUCTION AND DESIGN MEETS NFPA 96, IMC SECTION 507 AND UL 710 STANDARD.

2- HOOD IS NSF AND ETL LISTED UNDER THE FOLLOWING FILE NUMBER: ETL #103143204PRT-001

3- ALL INSTALLATION WORK IS TO BE PERFORMED BY QUALIFIED PERSONS AND IN ACCORDANCE WITH STATE AND LOCAL BUILDING CODE REQUIREMENTS.

4- THE INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 96, REMOVAL OF SMOKE AND GREASE LADEN VAPORS FROM COMMERCIAL COOKING EQUIPMENT.

5- ALL EXHAUST DUCTWORK AND TRANSITIONS ARE TO BE PROVIDED BY THE HVAC CONTRACTOR.

6- CLEARANCE FROM HOOD AND DUCTS TO COMBUSTIBLE MATERIAL SHALL BE PER APPLICABLE BUILDING CODES.

7- FOR PROPER OPERATION OF THE HOOD SYSTEM, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO HAVE THE HOOD BALANCED AND TESTED TO ENSURE THAT THE EXHAUST AND SUPPLY REQUIREMENTS OF THE HOOD ARE MET.

INSTALLATION REQUIREMENTS

KITCHEN EQUIPMENT CONTRACTOR'S REQUIREMENTS

1- PROVIDE DRAWINGS TO APPROPRIATE TRADES REFERENCING UTILITY SERVICE AND COORDINATE FINAL CONNECTION.

2- DELIVER, ASSEMBLE AND INSTALL HALTON SYSTEM PER DRAWING.

3- FURNISH WIRING AND PLUMBING DIAGRAMS TO END USER.

4- THE K.E.C MUST INFORM HALTON OF ANY CHANGES IN EQUIPMENT OR BUILDING STRUCTURE. FIELD MODIFICATIONS ARE THE RESPONSIBILITY OF THE K.E.C.

5- IF HALTON MANUAL EXHAUST VOLUME DAMPERS ARE PROVIDED, THE K.E.C. IS RESPONSIBLE FOR THEIR INSTALLATION OR TO MAKE ARRANGEMENTS WITH OTHER TRADES FOR THEIR INSTALLATION.

6- IF HALTON MODEL KVL BACKSHELF STYLE HOODS ARE PROVIDED, THE K.E.C. IS RESPONSIBLE FOR THE INSTALLATION OF THE CAPTURE-JET FAN.

ELECTRICAL CONTRACTOR'S REQUIREMENTS

1- PROVIDE AND CONNECT ALL REQUIRED VOLTAGES, CONNECTORS, WIRING, CONDUIT, ETC., PER NEC AND ALL APPLICABLE LOCAL CODES.

ELECTRICAL EQUIPMENT REQUIREMENTS

FLUORESCENT LIGHT FIXTURE
40 WATT MAX BULB= .67 AMP EA.

RECESSED INCANDESCENT LIGHT FIXTURE
150 WATT MAX BULB= 1.25 AMP EA.

GLOBE INCANDESCENT LIGHT FIXTURE
100 WATT MAX BULB= .83 AMP EA.

HCL LIGHT FIXTURES= .12 AMP EA.

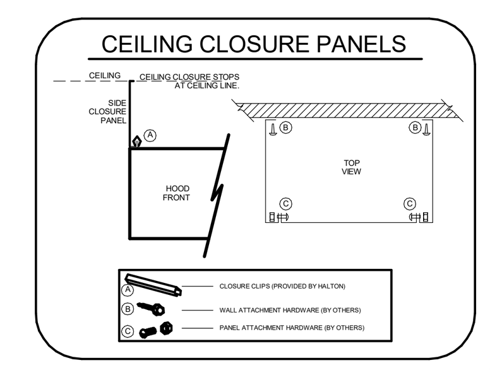
LED LIGHT FIXTURES= .30 AMP EA

CAPTURE JET FAN= .72 AMP EA

ALL HOOD CIRCUITS ARE NOT TO EXCEED 15 AMP

LIGHT BULBS, IF REQUIRED, ARE TO BE PROVIDED BY OTHERS

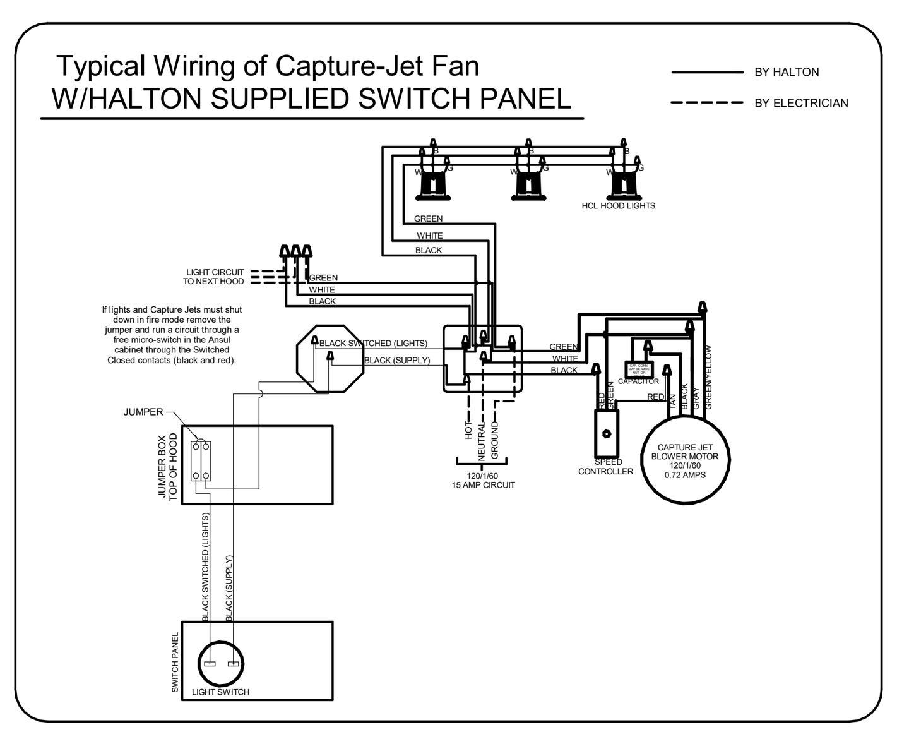
100W EQUIVALENT CFL OR LED BULBS ARE ACCEPTABLE FOR USE IN THE INCANDESCENT FIXTURE HOUSINGS.

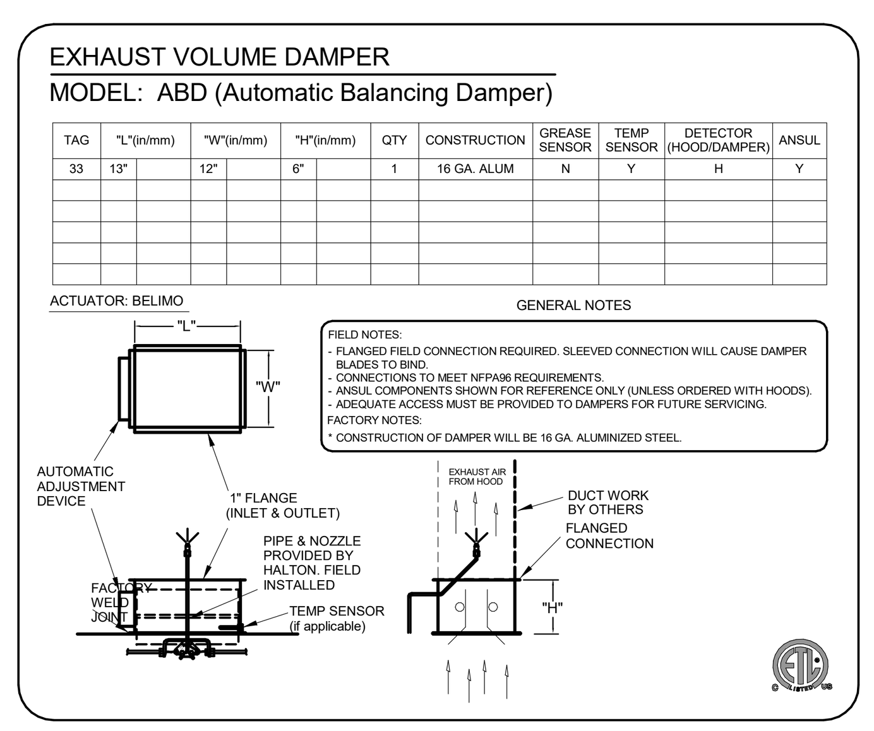


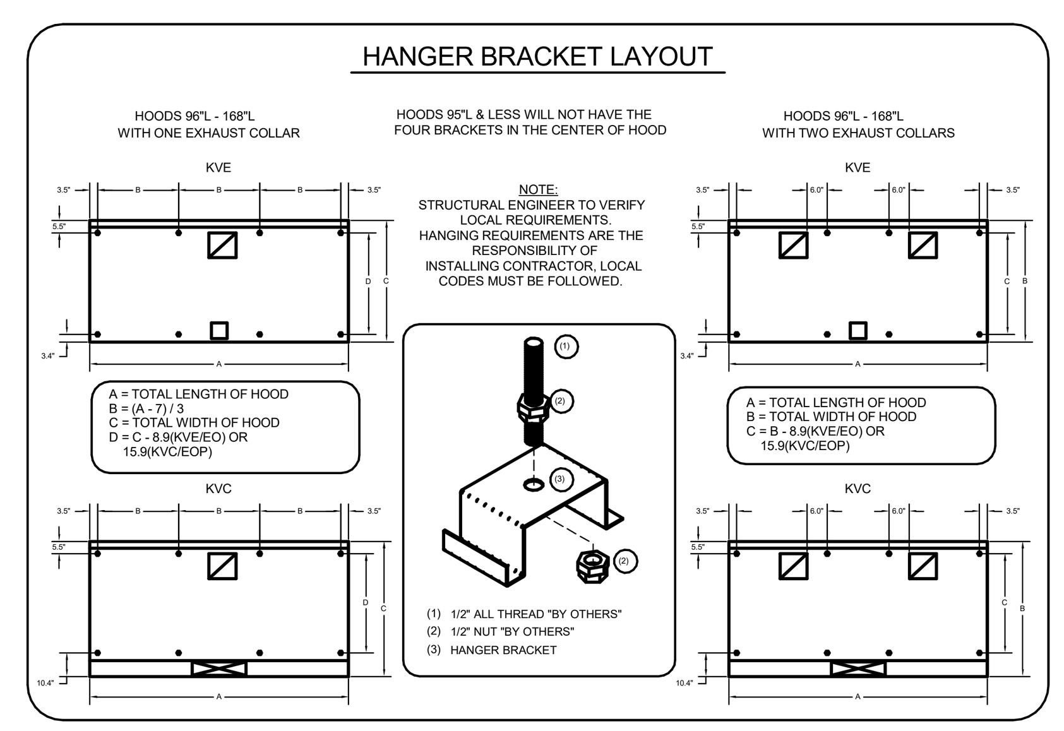
CEILING HEIGHT NOTE

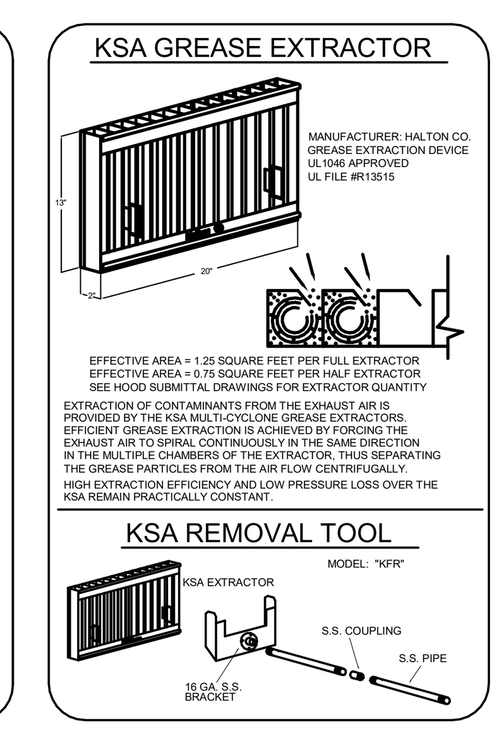
IF HALTON COMPANY IS TO PROVIDE CEILING CLOSURE PANELS, THE EXACT DIMENSION OF THE FINISHED CEILING HEIGHT MUST BE PROVIDED PRIOR TO RELEASE.

FINISHED CEILING HEIGHT A.F.F.: ____________









PERFORMANCE CRITERIA

OTHER MANUFACTURERS WISHING TO OFFER AN ALTERNATE TO THE SPECIFIED MANUFACTURER MUST APPLY FOR PERMISSION TO DO SO IN WRITING FROM THE OFFICE OF THE SPECIFYING CONSULTANT. APPLICATION MUST BE RECEIVED BY THE CONSULTANT AT LEAST TEN WORKING DAYS PRIOR TO THE BID DATE. ANY ALTERNATE SYSTEM MUST MEET CONSTRUCTION AND PERFORMANCE REQUIREMENTS AND EFFICIENCIES AS OUTLINED IN THIS SPECIFICATION.

REQUESTS FOR APPROVAL MUST INCLUDE GREASE FILTRATION PERFORMANCE DATA (MICRON SIZE VS. EXTRACTION EFFICIENCY) AND MANUFACTURERS OWN EXHAUST AIR FLOW CALCULATIONS BASED ON THE CONVECTIVE HEAT LOAD OF COOKING EQUIPMENT BENEATH THE HOOD.

EFFICIENCY COMPARISON DATA TO BE PERFORMED IN ACCORDANCE WITH THE MOST CURRENT ASTM STANDARD F1704 AND INCLUDE RESULTS FOR THE REQUIRED CAPTURE AND CONTAINMENT EXHAUST AIR FLOW IN ACCORDANCE WITH THE "TEST METHOD TO DETERMINE THE THRESHOLD OF CAPTURE AND CONTAINMENT." DATA MUST INCLUDE THERMAL IMAGING RESULTS VALIDATING CONFORMANCE TO ASTM F1704 AND SUPPLY AIR TEMPERATURE REQUIREMENT OF 74°F.

MAKE UP AIR WILL BE CALCULATED SO THAT THE SAME AMOUNT OF AIR WILL BE TAKEN FROM THE ZONE AS IS REQUIRED BY THE SPECIFIED SYSTEM. AN ADDITIONAL LOAD CANNOT BE PLACED ON THE KITCHEN HVAC SYSTEM.

MANUFACTURER MUST PROVIDE A WRITTEN GUARANTEE OF PERFORMANCE, ENSURING THE SPECIFYING ENGINEER THAT THE SYSTEM WILL PERFORM TO THE ENGINEER'S SATISFACTION WHEN INSTALLED AND BALANCED ACCORDING TO DESIGN AIR FLOWS AND RESULTS OF ASTM STANDARD F1704 TEST. (AS DETERMINED BY TAB PORTS AND PRESSURE VS. AIR FLOW CURVES.) CONSULTANT RESERVES THE RIGHT TO REJECT ANY SYSTEM WHICH, WHEN INSTALLED, DOES NOT PROVIDE CAPTURE AND CONTAINMENT AT THE THRESHOLD FLOW RATE DETERMINED IN ASTM F1704. REJECTED SYSTEM MUST BE REPLACED WITH SPECIFIED SYSTEM, WITH ALL REPLACEMENT COSTS PAID BY MANUFACTURER OF REJECTED SYSTEM.

ANY CHANGES IN THE SPECIFIED SIZING OF POWER WIRING, FAN SIZE, HORSEPOWER REQUIREMENTS, OR GAS LINES DUE TO THE USE OF ANY SYSTEM OTHER THAN THAT WHICH IS SPECIFIED IS THE RESPONSIBILITY OF THE ALTERNATE HOOD MANUFACTURER, AND MUST BE COORDINATED BY THE HOOD MANUFACTURER AND CONTRACTORS INVOLVED.

MAIL APPROVED DRAWINGS TO APPROPRIATE FACTORY BELOW:

HALTON CO. (CANADA)
1021 BREVIK PLACE
MISSISSAUGA, ON L4W 3R7
1-905-624-0301

HALTON CO. (USA)
101 INDUSTRIAL DRIVE
SCOTTSVILLE, KY 42164
1-270-237-5600

WEBSITE: www.halton.com

REV.	REVISION DESCRIPTION	BY	DATE

PROJECT: CAVA WILLIS TOWER
LOCATION: CHICAGO, IL
DRAWN BY: SC DATE: 01.13.25
SCALE: NOT TO SCALE
CONSULTANT:

Halton

DRAWING TITLE: HOOD DETAILS

DRAWING No.: U25-025

REV. NO.: 0 SHEET NO.: 1 of 2

DETAIL GENERAL NOTE

DETAILS PROVIDED ON THE PLAN ARE FOR REFERENCE ONLY. FINAL EQUIPMENT MOUNTING AND EQUIPMENT STANDS ARE TO BE PROVIDED BY THE EQUIPMENT VENDOR OR CONTRACTOR.

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233 S WACKER DRIVE
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PROJECT NUMBER: CAV070

ISSUANCE	
SELF-CERT COMMENTS	02/19/25
PERMIT ISSUANCE	03/12/2025
IFC SET	03/31/2025

MECHANICAL HOOD DETAILS AND SCHEDULES

M603

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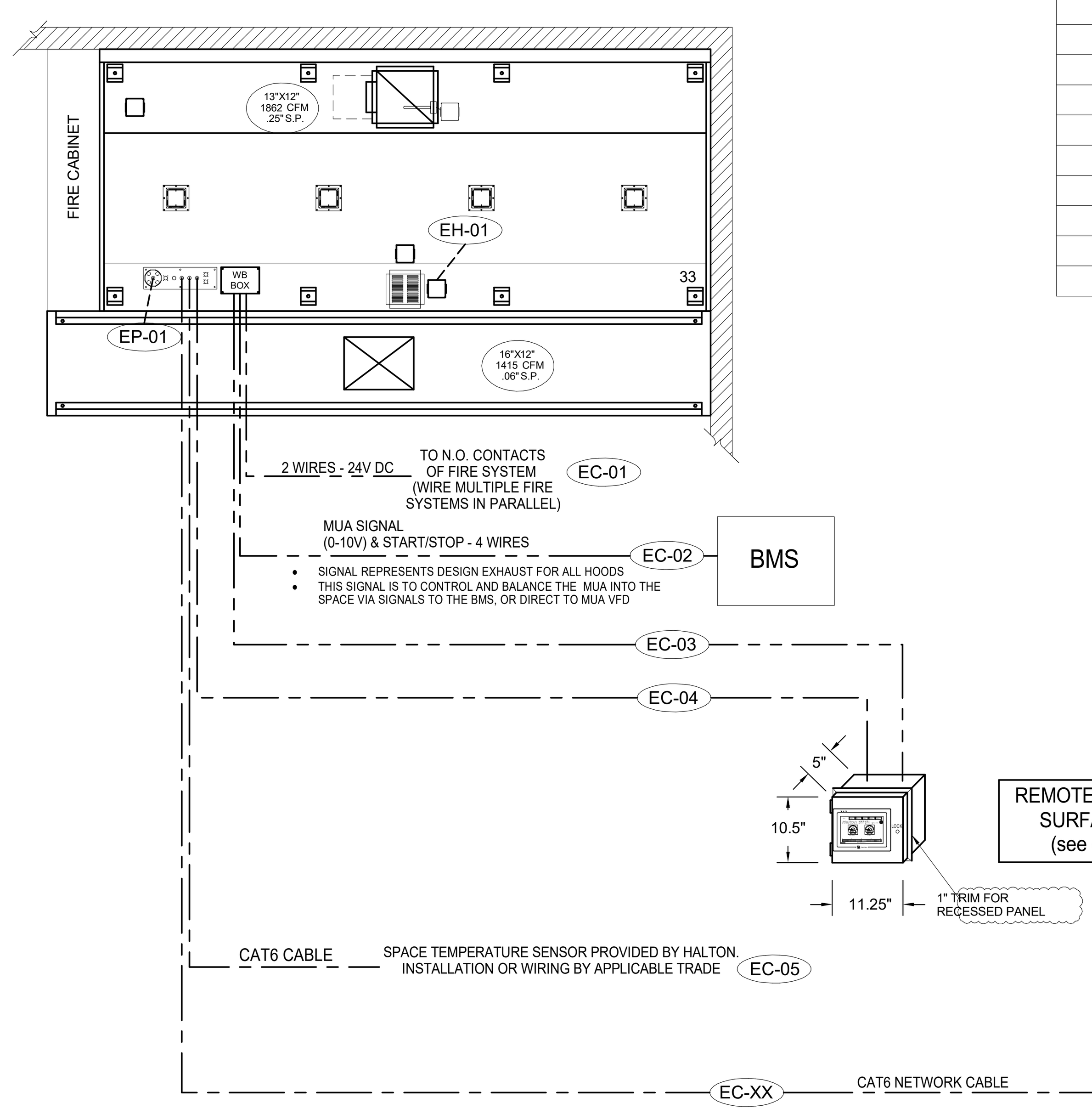
RESERVED FOR DOCUMENT BINDING



CONNECTION EC-XX TO CONNECT TO EXISTING HOOD DAISY CHAIN

ELECTRICAL CONNECTION SCHEDULE

CONNECTION #	CONNECTION DESCRIPTION	TYPE	FROM	TO
HOOD CONNECTIONS (EH)				
EH-01	HOOD LIGHT & CAPTURE JET POWER	3-WIRE, 120V, 15A	BUILDING SOURCE	HOOD #33
CONTROLS POWER CONNECTIONS (EP)				
EP-01	HOOD CONTROLLER POWER	3-WIRE, 120V, 15A	BUILDING SOURCE	HOOD #33
CONTROLS CONNECTIONS (EC)				
EC-01	FIRE MODE SIGNAL	2-WIRE, 24V	HOOD #33	FIRE SYSTEM
EC-02	MUA SIGNAL - START/STOP, DEMAND LEVEL (0-10V)	4-WIRE, 24V	HOOD #33	BMS
EC-03	TOUCH SCREEN POWER	2-WIRE, 24V	HOOD #33	TOUCH SCREEN
EC-04	NETWORK CABLE - FOR HOOD DATA TO TOUCH SCREEN	CAT6	HOOD #33	TOUCH SCREEN
EC-05	SPACE TEMP SENSOR - FIELD CONNECTION	CAT6	HOOD #33	TEMP SENSOR
EC-XX	NETWORK CABLE - PANEL TO HOODS	CAT6	HOOD #33	HOOD #??
GROUND CONNECTIONS (EG)				
EG-01	NOT USED	-	-	-

M.A.R.V.E.L. SCOPE OF WORK

RESPONSIBILITY TO BE SELECTED BY GENERAL CONTRACTOR

DEFINITIONS FOR REFERENCE:

M.A.R.V.E.L. I SYSTEMS = 1 EXHAUST FAN SERVING 1 KITCHEN HOOD

M.A.R.V.E.L. II SYSTEMS = 1 EXHAUST FAN SERVING MULTIPLE KITCHEN HOODS

VFD = VARIABLE FREQUENCY DRIVES

CONNECTION LOCATIONS WILL VARY PER SYSTEM, REFER TO HALTON M.A.R.V.E.L. DIAGRAMS FOR SPECIFICS

1. APPLICABLE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE M.A.R.V.E.L. CONTROL PANEL. LOCATION TO BE DETERMINED BY GC AND SHALL BE WITHIN SAME SPACE AS THE KITCHEN HOODS BEING SERVED BY PANEL. (M.A.R.V.E.L. I HOOD SYSTEMS WILL NOT HAVE SUCH PANEL)
2. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL 115V (15AMP) DEDICATED CIRCUIT AT M.A.R.V.E.L. CONTROL PANEL
3. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL RJ45 CAT6 CABLE CONNECTION AT M.A.R.V.E.L. CONTROL PANEL FOR M.A.R.V.E.L. II SYSTEMS OR AT KITCHEN HOOD FOR M.A.R.V.E.L. I SYSTEMS FOR I.P. ADDRESS.
4. APPLICABLE CONTRACTOR TO INSTALL SPACE TEMP SENSOR (SUPPLIED BY HALTON) IN SAME SPACE AS KITCHEN HOOD SYSTEM AND 48"-54" A.F.F. NEAREST MUA T-STAT.
5. APPLICABLE CONTRACTOR SHALL SUPPLY AND RUN RJ45 CAT6 CABLE CONNECTION FROM SPACE TEMP SENSOR TO M.A.R.V.E.L. CONTROL PANEL (M.A.R.V.E.L. II) OR TO KITCHEN HOOD (M.A.R.V.E.L. I)
6. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 2 WIRE 24V DC WIRING FROM ANSUL FIRE SYSTEM EITHER TO M.A.R.V.E.L. CONTROL PANEL (M.A.R.V.E.L. II) OR TO KITCHEN HOOD (M.A.R.V.E.L. I).
7. APPLICABLE CONTRACTOR TO SUPPLY AND RUN RJ45 CAT6 CABLE FROM HOOD TO HOOD AND TO PANEL AS SHOWN IN HALTON M.A.R.V.E.L. DIAGRAM.
8. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 4 WIRE MUA SIGNAL (0-10V & START/STOP) FROM M.A.R.V.E.L. CONTROL PANEL (M.A.R.V.E.L. II) OR FROM KITCHEN HOOD (M.A.R.V.E.L. I) TO BMS OR DDC.
9. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 7 WIRE STP PLENUM RATED CABLE (9 WIRE STP CABLE IF VFD IS PROVIDED WITH BYPASS) FROM M.A.R.V.E.L. CONTROL PANEL (M.A.R.V.E.L. II) OR FROM KITCHEN HOOD (M.A.R.V.E.L. I) TO EXHAUST FAN VFD(S) (VFD'S AND CABINET SUPPLIED BY HALTON UNLESS OTHERWISE NOTED)
10. APPLICABLE CONTRACTOR TO SUPPLY AND RUN RJ45 CAT6 CABLE FROM CONTROL PANEL TO VFD, FOR MODBUS COMMUNICATION.
11. APPLICABLE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE VFD(S). LOCATION TO BE DETERMINED BY GC AND SHALL BE WITHIN 150 FEET MAX DISTANCE FROM EXHAUST FAN(S).
12. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL THREE PHASE OR SINGLE PHASE POWER FEED FROM CIRCUIT BREAKER(S) TO VFD(S). APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL THREE PHASE OR SINGLE PHASE POWER FROM VFD(S) TO EXHAUST / MUA (IF APPLICABLE) MOTORS. ALL TO BE RAN IN SEPARATE CONDUIT.
13. APPLICABLE CONTRACTOR SHALL INSTALL GREASE SENSOR(S), IF PROVIDED, IN MAIN EXHAUST TRUNK, AND WIRE THE SENSOR BACK TO THE DESIGNATED LOCATION.
14. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL 115V (15AMP) DEDICATED CIRCUIT AT EACH KITCHEN HOOD. (IF HOODS ARE UV, A SECOND 115V DEDICATED CIRCUIT IS REQUIRED.)
15. INSTALLING CONTRACTOR TO BE RESPONSIBLE FOR PROVIDING ADEQUATE ACCESS TO ALL COMPONENTS LOCATED ABOVE HOOD.
16. HALTON REPRESENTATIVE TO PERFORM FINAL FIELD COMMISSIONING ONCE ALL RESPONSIBILITIES ARE COMPLETED ABOVE.

COMMUNICATION WIRING NOTE:

MAXIMUM LENGTH OF CABLES BETWEEN ANY THREE CONTROLLERS (CONTROL PANELS, HOODS, ETC) IN SERIES IS 328 FEET (100 METERS). THIS ALLOWS CONTINUED COMMUNICATION THROUGH A FAILED CONTROLLER. IF GREATER CABLE LENGTH IS NEEDED BETWEEN CONTROLLERS, AN INLINE ETHERNET BOOSTER MUST BE SPECIFIED AND USED.

NOTES:

ALL FIELD WIRING AND CONNECTION POINTS ARE SUBJECT TO CHANGE DUE TO ELECTRICAL COMPONENT(S) UPDATE OR OBSOLESCENCE. HALTON WILL NOT BE LIABLE FOR ANY CHANGE ORDERS BASED ON DRAWINGS CREATED ONE OR MORE YEARS PRIOR TO PRODUCTION. WHEN RELEASED AN UPDATED SET OF ELECTRICAL DIAGRAMS(S) WILL BE SUPPLIED.

NOTES:

ALL WIRING AND CABLING TO BE PROVIDED BY ELECTRICAL CONTRACTOR UNLESS STATED OTHERWISE

NOTES:

ALL FAN MOTORS MUST BE COMPATIBLE WITH VARIABLE FREQUENCY DRIVES (VFD'S). ALL MOTORS MUST BE CONNECTED TO THREE PHASE POWER. ELECTRONICALLY COMMUTATED MOTORS (ECM) ARE ALSO ACCEPTABLE IF SINGLE PHASE POWER IS TO BE USED. (24V POWER SUPPLY TO THE ECM IS BY OTHERS)

NOTES:

ALL VARIABLE FREQUENCY DRIVES (VFD'S) MUST BE INSTALLED WITHIN 150' OF THE EXHAUST FAN.

(FIG 1-1)

FAN CONFIGURATION DATA FOR M.A.R.V.E.L.

Exhaust Data:

EF Item #: ________ Voltage/Phase/Hertz:
EF HP: ________ ____ / __ / ____
Hood Item #'s connected to this fan: ____________________

EF Item #: ________ Voltage/Phase/Hertz:
EF HP: ________ ____ / __ / ____
Hood Item #'s connected to this fan: ____________________

EF Item #: ________ Voltage/Phase/Hertz:
EF HP: ________ ____ / __ / ____
Hood Item #'s connected to this fan: ____________________

EF Item #: ________ Voltage/Phase/Hertz:
EF HP: ________ ____ / __ / ____
Hood Item #'s connected to this fan: ____________________

Make Up Air Data:

Quantity of MUA "Zones": ________
Hood Item #'s located in Zone 1: ____________________
Hood Item #'s located in Zone 2: ____________________

NOTE: Above information must be completed in full prior to project being released for production. If more than four exhaust fans or two MUA zones are being used, please provide this data as well.

M.A.R.V.E.L. SEQUENCE OF OPERATIONS

☑ M.A.R.V.E.L.

START UP & SHUTDOWN
- OFF
- IDLE
- COOKING OR ACTIVE MODE

MAKE UP AIR
- START/STOP
- 0-10V OUTPUT TOTAL MUA DEMAND

FIRE MODE SEQUENCE

STANDARD OVERRIDE FEATURE
- ☐ M.A.R.V.E.L. 1
- ☑ M.A.R.V.E.L. 2
  SAME SEQUENCE AS M.A.R.V.E.L.
  - ADD ABD ADJUSTMENT FOR INDIVIDUAL HOOD CONTROL

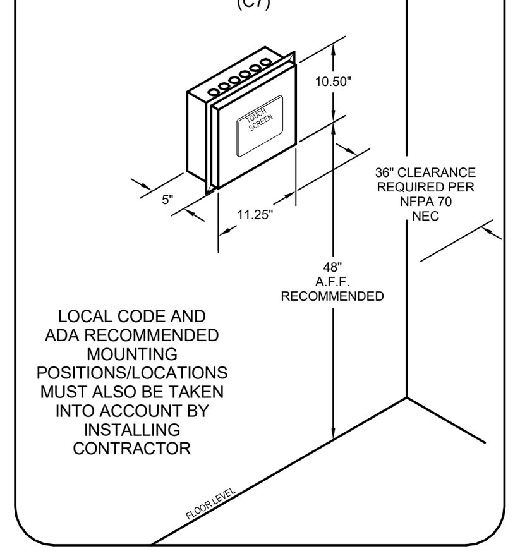
☐ M.A.R.V.E.L. PLUS

SAME SEQUENCE AS M.A.R.V.E.L.
- MUA OUTPUT TO BMS SPLIT OR WHOLE
- HALTON PROVIDED VAV BOXES
- OUTPUT TO CONTROL VAVS

☑ ROOM TEMP SENSOR
☐ HALTON CONNECT (EDGE)
☐ GREASE SENSORS

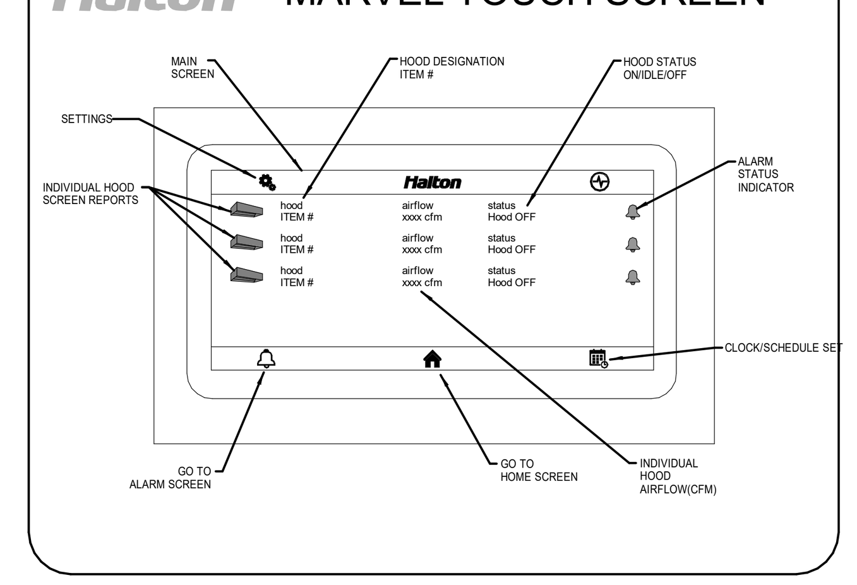
M.A.R.V.E.L. TOUCH SCREEN

(C7)



LOCAL CODE AND ADA RECOMMENDED MOUNTING POSITIONS/LOCATIONS MUST ALSO BE TAKEN INTO ACCOUNT BY INSTALLING CONTRACTOR

MARVEL TOUCH SCREEN



M.A.R.V.E.L. SYSTEM

M.A.R.V.E.L. EQUIPMENT CONNECTED LOADS

M.A.R.V.E.L. CONTROL PANEL= 10 AMPS EA.

M.A.R.V.E.L. PLC AT EACH HOOD SECTION= 4 AMPS EA.
(MAXIMUM 3 M.A.R.V.E.L. HOOD PLC'S PER 15A CIRCUIT)

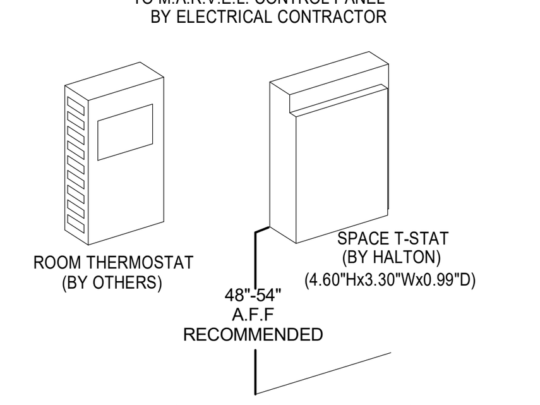
ALL CIRCUITS ARE NOT TO EXCEED 15 AMP

NOTES:

- — — — — — FIELD WIRING (BY E.C.) - 120V - 12AWG MIN.-10AWG MAX.
- ———— FIELD WIRING (BY E.C.) - 24V - 22AWG MIN.-16AWG MAX.
- —— – —— FIELD WIRING (BY E.C.) - 24V - CAT6

SPACE TEMPERATURE SENSOR

CAT6 COMMUNICATION CABLE TO M.A.R.V.E.L. CONTROL PANEL BY ELECTRICAL CONTRACTOR



TEMPERATURE SENSOR TO BE MOUNTED AWAY FROM VARYING SOURCES OF HEAT. USUALLY IN CLOSE PROXIMITY TO THE ROOM THERMOSTAT. SENSOR TO BE LOCATED IN SAME "ZONE" AS HOODS THEY SERVE, BY NO CLOSER THAN 10'-12' FROM THE EXHAUST HOOD OR ANY OTHER UNHOODED APPLIANCES.

THIS DRAWING MUST BE CHECKED, SIGNED AND RETURNED TO THE APPROPRIATE FACTORY. PLEASE VERIFY THE FOLLOWING:
1. ALL DIMENSIONAL INFORMATION, MOUNTING POSITIONS AND CLEARANCES.
2. THE LOCATION AND TYPE OF COOKING EQUIPMENT.

NOTE TO APPROVER

ANY CHANGES IN COOKING EQUIPMENT SUCH AS INCREASED ENERGY INPUTS OR EQUIPMENT POSITION MAY AFFECT EXHAUST AIRFLOW. HALTON MUST BE NOTIFIED IF ANY OF THESE CHANGES OCCUR, A RECALCULATION EXHAUST AIRFLOW MAY BE REQUIRED.

☐ REVISE AND RESUBMIT

APPROVED FOR FABRICATION

☐ WITH NO CHANGES ☐ WITH CHANGES AS NOTED

APPROVED BY / DATE

MAIL APPROVED DRAWINGS TO APPROPRIATE FACTORY BELOW: WEBSITE: www.halton.com

HALTON CO. (CANADA) 1021 BREVIK PLACE MISSISSAUGA, ON L4W 3R7 1-905-624-0301 ☐	HALTON CO. (USA) 101 INDUSTRIAL DRIVE SCOTTSVILLE, KY 42164 1-270-237-5600 ☒

REV.	REVISION DESCRIPTION	BY	DATE
1			
2			
3			
4			
5			
6			
7			

PROJECT: CAVA WILLIS TOWER
LOCATION: CHICAGO, IL
DRAWN BY: SC DATE: 01.13.25
SCALE: NOT TO SCALE
CONSULTANT:

Halton

DRAWING TITLE: DEMAND CONTROL DETAILS
DRAWING No.: U25-025
REV. NO.: 0 SHEET NO.: 2 of 2

ferris+sloane
100 N. Howard Street, Suite 4503 Spokane, WA 99201

CAVA

CAVA #010564
233 S WACKER DRIVE
CHICAGO, IL 60606

PROJECT NUMBER: CAV070

ISSUANCE	
SELF-CERT COMMENTS	02/19/25
PERMIT ISSUANCE	03/12/2025
IFC SET	03/31/2025

DETAIL GENERAL NOTE

DETAILS PROVIDED ON THE PLAN ARE FOR REFERENCE ONLY. FINAL EQUIPMENT MOUNTING AND EQUIPMENT STANDS ARE TO BE PROVIDED BY THE EQUIPMENT VENDOR OR CONTRACTOR.

rtm engineering consultants

MECHANICAL HOOD DETAILS AND SCHEDULES

M604

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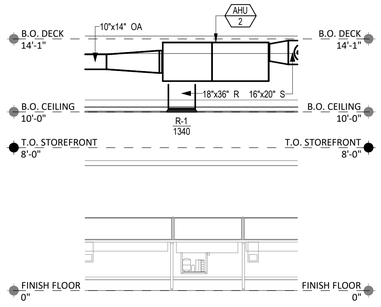
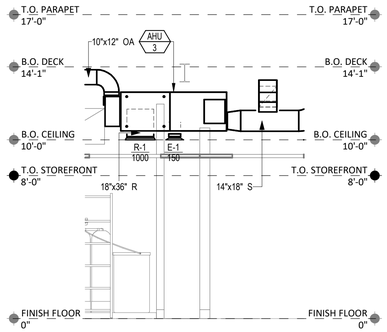


1 AHU-2 SECTION VIEW

SCALE: N.T.S.



2 AHU-3 SECTION VIEW

SCALE: N.T.S.

DETAIL GENERAL NOTE

DETAILS PROVIDED ON THE PLAN ARE FOR REFERENCE ONLY. FINAL EQUIPMENT MOUNTING AND EQUIPMENT STANDS ARE TO BE PROVIDED BY THE EQUIPMENT VENDOR OR CONTRACTOR.

ferris+sloane
100 N. Howard Street, Suite 4503 Spokane, WA 99201

CAVA

CAVA #010564
233 S WACKER DRIVE
CHICAGO, IL 60606

PROJECT NUMBER:
CAV070

ISSUANCE	
SELF-CERT COMMENTS	02/19/25
PERMIT ISSUANCE	03/12/2025
IFC SET	03/31/2025

rtm engineering consultants
2800 156th Ave SE | Suite 115 |Bellevue, WA 98007
T: 847.713.1006 : www.rtmec.com

MECHANICAL SECTIONS

M605

3/31/2025 2:23:25 PM

SPECIFICATIONS - DIVISION 23 - HVAC

SECTION 230500 - GENERAL MECHANICAL REQUIREMENTS:

HVAC SUBCONTRACTOR SHALL PROVIDE A BID OF PREVENTATIVE MAINTENANCE SERVICES FOR ONE YEAR AT TIME OF BID.

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR EMPLOYEE TRAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT.
PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS:
FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION.
INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE.
PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY:
PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT.

COORDINATION:
COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS:
UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

MAKE-UP AIR UNIT:
UNIT SHALL HAVE AN INTEGRAL DISCHARGE THERMOSTAT LINKED TO THE INTERNAL CONTROLS. THE HEATER SHALL BE SET TO MAINTAIN DUCT SUPPLY TEMPERATURE AT NO LESS THAN 65 DEG. F. (ADJ.).
HIGH LIMIT SWITCH SET TO 180 DEG. F.
INTAKE AIR SENSOR SET TO 10 DEG. F. (ADJ.) LOWER THAN DISCHARGE AIR SENSOR.

TEMPERATURE CONTROLS:
PROVIDE PROGRAMMABLE THERMOSTATS WITH REMOTE TEMPERATURE SENSORS AND REMOTE HUMIDISTATS COMPATIBLE WITH ROOFTOP UNIT. CONTROL WIRING SHALL BE INSTALLED IN CONDUIT. THERMOSTAT SHALL MEET SETPOINT ADJUSTMENT FOR UNOCCUPIED MODE: HEATING DOWN TO 55 DEGREES AND COOLING UP TO 85 DEGREES. PROVIDE INTERLOCK CONTROL WIRING BETWEEN HOOD EXHAUST FANS AND ROOFTOP UNITS.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. SUBMITTALS:

1. CERTIFIED TAB REPORTS.

B. TAB FIRM QUALIFICATIONS: NBC CERTIFIED.

C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION
A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.

B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.

C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.

D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.

E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.

F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.

G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:

1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.

2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER.

3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY OPEN POSITIONS. THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND VARIABLE-AIR-VOLUME TERMINALS.

4. AUTOMATIC MODULATING AND SHUTOFF VALVES, INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED.

5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.

6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.

7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.

8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.

9. INTERLOCKED SYSTEMS ARE OPERATING.

10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.

H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", NBC, ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION.

B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS. INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS. RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH.

C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.

D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

E. CHECK FOR AIRFLOW BLOCKAGES.

F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.

H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

3.4 TOLERANCES

A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:

1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 5 PERCENT.
2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

END OF SECTION

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. QUALITY ASSURANCE: LABELED WITH MAXIMUM FLAME-SPREAD INDEX OF 25 AND MAXIMUM SMOKE-DEVELOPED INDEX OF 50 ACCORDING TO ASTM E 84.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. SURFACE-BURNING CHARACTERISTICS:

1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTORY LABELED DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO ASTM E 84.

2.2 INSULATION MATERIALS

A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.

B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE I.

1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C 1136.

C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB; AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 LB/CU. FT. OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN./H X SQ. FT. X DEG F OR LESS.

1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.

2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.

D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.

E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.

F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES; COMPLY WITH MIL-PRF-19565C, TYPE II.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.

B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.

C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400.

D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION:

1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INSTALL MITERED SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

E. MINERAL-FIBER INSULATION INSTALLATION:

1. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.

2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.

3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.

4. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS.

5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER.

F. PLENUMS AND DUCTS REQUIRING INSULATION:

1. CONCEALED SUPPLY AIR.

2. CONCEALED AND EXPOSED OUTDOOR AIR.

3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.

3.2 DUCT AND PLENUM INSULATION SCHEDULE
RETAIN " ONE OF" OPTION IN PARAGRAPHS IN THIS ARTICLE TO ALLOW CONTRACTOR TO SELECT PIPING MATERIALS FROM THOSE RETAINED.

A. CONCEALED DUCT INSULATION SHALL BE 1-1/2" THICK MINERAL-FIBER BLANKET WITH A 1.5-LB/CU. FT. NOMINAL DENSITY.

3.3 HVAC PIPING INSULATION SCHEDULE

A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

END OF SECTION

SECTION 232300 - REFRIGERANT PIPING

PART 2 - PRODUCTS

2.1 TUBES AND FITTINGS

A. COPPER TUBE: ASTM B 88, TYPE K OR TYPE L, ANNEALED OR DRAWN-TEMPER TUBING AND WROUGHT-COPPER FITTINGS WITH BRAZED OR SOLDERED JOINTS.

B. WROUGHT-COPPER FITTINGS AND UNIONS: ASME B16.22.
C. SOLDER FILLER METALS: ASTM B 32. USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET FITTINGS ON COPPER PIPE.

D. BRAZING FILLER METALS: AWS A5.8.

2.2 VALVES AND SPECIALTIES

A. AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL REFRIGERANT PIPING AND CHARGE WITH REFRIGERANT ACCORDING TO ASHRAE 15.

B. INSTALL REFRIGERANT PIPING AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

END OF SECTION

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

B. STRUCTURAL PERFORMANCE: DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS DESCRIBED IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

C. COMPLY WITH NFPA 96 FOR DUCTS CONNECTED TO COMMERCIAL KITCHEN HOODS.

2.2 DUCTS

A. ELECTROGALVANIZED-STEEL SHEET: ASTM A 879

1. PAINTLOK/PAINTLOCK OR EQUAL.

B. GENERAL DUCTWORK SHALL BE GALVANIZED STEEL, ASTM A653/A635M, CONSTRUCTED TO THE GAUGE AND CORRESPONDING REINFORCING SCHEDULE AS INDICATED IN THE LATEST EDITION OF SMACNA.

C. TYPE 1 KITCHEN EXHAUST DUCTWORK

1. FACTORY-BUILT COMMERCIAL KITCHEN GREASE DUCT:

a. ALL REDUCED CLEARANCE, ROUND, DOUBLE-WALL GREASE DUCT AS SPECIFIED MEETING UL 1978 REQUIREMENTS. REFER TO KITCHEN EQUIPMENT SUPPLIER DRAWINGS FOR REQUIREMENTS.

b. DUCTWORKS AND FITTINGS FURNISHED BY OWNER FOR INSTALLATION BY THIS CONTRACTOR.

c. NO FIRE WRAP SHALL BE REQUIRED FOR THIS INSTALLATION.

D. TYPE 2 KITCHEN EXHAUST DUCTWORK: 18 GAUGE ALUMINUM OR STAINLESS STEEL. SEAMS SHALL BE CONTINUOUSLY WELDED LIQUID TIGHT.

E. JOINT AND SEAM TAPE, AND SEALANT: COMPLY WITH UL 181A. PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT. PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS.

F. METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

2.3 ACCESSORIES

A. VOLUME DAMPERS AND CONTROL DAMPERS: SINGLE-BLADE AND MULTIPLE OPPOSED-BLADE DAMPERS, STANDARD LEAKAGE RATING, HEAVY DUTY, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS; FACTORY FABRICATED AND COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES.

2. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE. MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

3. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM ½" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

B. FLEXIBLE DUCT CONNECTORS: FLAME-RETARDED OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1. CONNECTOR TO BE 30 OUNCE, NEOPRENE COATED, FIBERGLASS FABRIC.

C. FLEXIBLE DUCTS: FACTORY ASSEMBLED, UL 181, CLASS 1, WITH 1-1/2-INCH THICK (R-5 MIN.), 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2-INCH WG PRESSURE AND 0 TO 250°F TEMPERATURE. PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.

D. TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

E. BIRD SCREENS AND FRAMES: PROVIDE BIRD SCREENS THAT CONFORM TO ASTM E 2016, NO. 2 MESH, ALUMINUM OR STAINLESS STEEL. PROVIDE "MEDIUM-LIGHT" RATED ALUMINUM SCREENS. PROVIDE "LIGHT" RATES STAINLESS STEEL SCREENS.

F. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 2-10, "DUCT ACCESS DOORS AND PANELS," AND 2-11, "ACCESS PANELS - ROUND DUCT."

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DUCTWORK, ACCESSORIES, AND SUPPORTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.

B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL CLASS A.

C. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

D. CLEAN DUCT SYSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING.

3.2 DUCTWORK SCHEDULE

A. EXPOSED DUCTWORK IN ARCHITECTURALLY FINISHED SPACES- ELECTRO-GALVANIZED STEEL SHEET.

B. CONCEALED DUCTWORK AND DUCTWORK IN UNFINISHED ARCHITECTURAL SPACES- GALVANIZED STEEL.

END OF SECTION

SECTION 233423 - HVAC EXHAUST FANS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS SEAL.

B. EXHAUST FANS SHALL COMPLY WITH UL 705. TYPE 1 FANS SHALL ALSO COMPLY WITH UL 762.

C. TYPE 1 FANS TO BE DESIGNED FOR HIGH HEAT OPERATION AT 300°F.

D. 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.

2.2 CENTRIFUGAL VENTILATORS

A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFFLE; SQUARE, ONE-PIECE, ALUMINUM BASE WITH VENTURI INLET CONE.

1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISCHARGE AIR UPWARD, WITH RAIN AND SNOW DRAINS.

B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.

C. BELT-DRIVEN DRIVE ASSEMBLY: RESILIENTLY MOUNTED TO HOUSING.

1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL; KEYED TO WHEEL HUB.

2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTLY SEALED, SELF-ALIGNING BALL BEARINGS.

3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.

4. FAN AND MOTOR ISOLATED FROM EXHAUST AIRSTREAM.

D. ACCESSORIES:

1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT.

2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE.

3. DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS.

4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN CURB BASE WITH ELECTRIC ACTUATOR; WIRED TO CLOSE WHEN FAN STOPS.

E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.

1. CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.

2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS; 20 INCHES FOR KITCHEN EXHAUST FANS.

3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.

4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCESS PANEL.

5. TYPE 1 ROOF CURBS TO BE VENTED TYPE.

6. TYPE 1 AND TYPE 2 ROOF CURBS TO BE HINGED TYPE.

F. CAPACITIES AND CHARACTERISTICS:

1. SEE SCHEDULE.

G. MOTORS

1. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.

2. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.

3. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL UNITS WITH CLEARANCES FOR SERVICE AND MAINTENANCE.

B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON CURBS, AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

PART 2 - PRODUCTS

2.1 DIFFUSERS, REGISTERS, AND GRILLES:

A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUNTING.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS OTHERWISE INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.

END OF SECTION

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CAVA

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PROJECT NUMBER:
CAV070

ISSUANCE	
SELF-CERT	02/19/25
COMMENTS	
PERMIT	03/12/2025
ISSUANCE	
IFC SET	03/31/2025

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MECHANICAL SPECIFICATIONS

M701

SPECIFICATIONS - DIVISION 23 - HVAC (CONTINUED)

SECTION 237339 - DIRECT GAS-FIRED MAKE-UP AIR UNIT

PART 2 - PRODUCTS

2.1 PACKAGED UNITS

A. FACTORY-ASSEMBLED, PREWIRED, SELF-CONTAINED UNIT CONSISTING OF CABINET, SUPPLY FAN, CONTROLS, FILTERS, AND DIRECT-FIRED GAS FURNACE TO BE INSTALLED OUTSIDE THE BUILDING.

2.2 CABINET

A. CABINET: GALVANIZED-STEEL PANELS WITH LIFTING LUGS. CABINET SHALL BE FULLY WEATHERIZED FOR OUTDOOR INSTALLATION. HEAT-RESISTANT, BAKED-ENAMEL FINISH. VERTICAL-PATTERN, GALVANIZED-STEEL DISCHARGE PLENUM WITH DIFFUSERS INCORPORATING INDIVIDUALLY ADJUSTABLE VANES.

B. ROOF CURB: FULL-PERIMETER CURB OF SHEET METAL, MINIMUM 20 INCHES HIGH, WITH WOOD NAILER, NEOPRENE SEALING STRIP, AND WELDED Z-BAR FLASHING.

C. OUTDOOR-AIR INTAKE: GALVANIZED-STEEL HOOD WITH RAIN BAFFLES, BIRD SCREEN, AND FINISH TO MATCH CABINET; AND SIZED TO SUPPLY 100 PERCENT OUTDOOR AIR. GALVANIZED-STEEL, OPPOSED-BLADE MOTORIZED DAMPERS WITH VINYL BLADE SEALS AND STAINLESS-STEEL JAMB SEAL.

D. FILTERS: COMPLY WITH NFPA 90A; 1 INCH THICK.

2.3 SUPPLY-AIR FAN

A. FAN: CENTRIFUGAL, RATED ACCORDING TO AMCA 210; STATICALLY AND DYNAMICALLY BALANCED, GALVANIZED STEEL; MOUNTED ON SOLID-STEEL SHAFT.

B. MOTOR: TOTALLY ENCLOSED, SINGLE SPEED MOTOR.

C. DRIVE: V-BELT DRIVE WITH MATCHING FAN PULLEY AND ADJUSTABLE MOTOR SHEAVES AND BELT ASSEMBLY.

D. GAS PRESSURE GAUGE: 2-1/2 INCH DIAMETER AND 1/4 INCH THREAD SIZE.

2.4 DIRECT-FIRED GAS FURNACE

A. DESCRIPTION: FACTORY ASSEMBLED, PIPED, AND WIRED; AND COMPLYING WITH ANSI Z83.4, ANSI Z83.18, AND NFPA 54. CAST-IRON BURNER WITH STAINLESS-STEEL MIXING PLATES. SINGLE-STAGE CONTROL VALVE. FUEL: NATURAL GAS.

B. SAFETY CONTROLS: AIRFLOW PROVING SWITCH; HIGH-TEMPERATURE LIMIT; SAFETY LOCKOUT; REDUNDANT, AUTOMATIC, MAIN GAS VALVES; ELECTRIC PILOT VALVE; MODULATING TEMPERATURE CONTROL VALVE; MAIN AND PILOT GAS REGULATORS; MAIN AND PILOT MANUAL SHUTOFF VALVES; MAIN AND PILOT PRESSURE TAPS; AND HIGH-LOW GAS PRESSURE SWITCHES TO COMPLY WITH ANSI STANDARDS.

2.5 CONTROLS

A. FACTORY-WIRED, FUSE-PROTECTED CONTROL TRANSFORMER, CONNECTION FOR POWER SUPPLY AND FIELD-WIRED UNIT TO REMOTE CONTROL PANEL.

1. FAN CONTROL: INTERLOCK FAN TO START WITH EXHAUST FAN(S) AND WITH RTU COOLING CYCLE.
2. OUTDOOR-AIR DAMPER CONTROL: OUTDOOR-AIR DAMPER OPENS WHEN SUPPLY FAN STARTS, AND CLOSES WHEN FAN STOPS.
3. TEMPERATURE CONTROL: OPERATES GAS VALVE TO MAINTAIN SUPPLY-AIR TEMPERATURE.

2.6 INSTALLATION

A. INSTALL GAS-FIRED UNITS ACCORDING TO NFPA 54.

B. INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B OR NRCA'S "LOW-SLOPE MEMBRANE ROOFING CONSTRUCTION DETAILS MANUAL."

C. CONNECT GAS PIPING WITH SHUTOFF VALVE AND UNION AND WITH SUFFICIENT CLEARANCE FOR BURNER REMOVAL AND SERVICE.

D. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF DUCTS. CONNECT SUPPLY DUCTS TO DIRECT-FIRED MAU WITH FLEXIBLE DUCT CONNECTORS; FLEXIBLE DUCT CONNECTORS ARE SPECIFIED IN SECTION 233100 "HVAC DUCTS AND CASINGS."

END OF SECTION

SECTION 237413 - PACKAGED ROOFTOP UNITS

1.1 SUMMARY

A. THIS SECTION INCLUDES PACKAGED, ROOFTOP UNITS WITH THE FOLLOWING COMPONENTS AND ACCESSORIES:

1. DIRECT-EXPANSION COOLING.
2. HUMIDITY CONTROL WITH HOT-GAS REHEAT (OPTIONAL)
3. GAS FURNACE.
4. ECONOMIZER OUTDOOR-AND RETURN-AIR DAMPER SECTION.
5. INTEGRAL, SPACE TEMPERATURE CONTROLS.
6. ROOF CURBS.

1.2 SECTION REQUIREMENTS

A. SUBMITTALS:

1. PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL DATA FOR EACH RTU, INCLUDING RATED CAPACITIES, DIMENSIONS, REQUIRED CLEARANCES, CHARACTERISTICS, FURNISHED SPECIALTIES, AND ACCESSORIES.

PART 2 - PRODUCTS

2.1 CASING

A. GENERAL FABRICATION REQUIREMENTS FOR CASINGS: FORMED AND REINFORCED INSULATED PANELS, FABRICATED TO ALLOW REMOVAL FOR ACCESS TO INTERNAL PARTS AND COMPONENTS, WITH JOINTS BETWEEN SECTIONS SEALED.

B. EXTERIOR CASING MATERIAL: GALVANIZED STEEL WITH FACTORY-PAINTED FINISH, WITH PITCHED ROOF PANELS AND KNOCKOUTS WITH GROMMET SEALS FOR ELECTRICAL AND PIPING CONNECTIONS AND LIFTING LUGS.

1. CASING THICKNESS: 16 GAUGE THICK.

C. CASING INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A.

1. MATERIALS: ASTM C 1071, TYPE I.
2. THICKNESS: 1/2 INCH
3. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.
4. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

D. UNIT SHALL HAVE A THRU-THE-BASE GAS AND ELECTRICAL CONNECTIONS.

2.2 FANS

OPTION A OR B:

A. DIRECT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, BACKWARD INCLINED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, MOTOR RESILIENTLY MOUNTED IN THE FAN INLET. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

B. BELT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, FORWARD CURVED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, SINGLE-SPEED MOTOR INSTALLED ON AN ADJUSTABLE FAN BASE RESILIENTLY MOUNTED IN THE CASING. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

C. CONDENSER-COIL FAN: DIRECT DRIVE, PROPELLER, MOUNTED ON SHAFT OF PERMANENTLY LUBRICATED MOTOR WITH THERMAL OVERLOAD PROTECTION.

D. POWER EXHAUST: FORWARD CURVED, SHAFT MOUNTED ON PERMANENTLY LUBRICATED MOTOR.

2.3 COILS

A. SUPPLY-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.
4. CONDENSATE DRAIN PAN: GALVANIZED STEEL WITH CORROSION-RESISTANT COATING FORMED WITH PITCH AND DRAIN CONNECTIONS.

B. OUTDOOR-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING- TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.

C. HOT-GAS REHEAT REFRIGERANT COIL (OPTIONAL):

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.
2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.
3. CATHODIC EPOXY COATING.

2.4 REFRIGERANT CIRCUIT COMPONENTS

A. NUMBER OF REFRIGERANT CIRCUITS: TWO

B. COMPRESSOR: HERMETIC, SCROLL, MOUNTED ON VIBRATION ISOLATORS; WITH INTERNAL OVERCURRENT AND HIGH-TEMPERATURE PROTECTION, INTERNAL PRESSURE RELIEF AND CRANKCASE HEATER.

C. REFRIGERATION SPECIALTIES:

1. REFRIGERANT: R-410A
2. EXPANSION VALVE WITH REPLACEABLE THERMOSTATIC ELEMENT.
3. REFRIGERANT FILTER/DRYER.
4. MANUAL-RESET HIGH-PRESSURE SAFETY SWITCH.
5. AUTOMATIC-RESET LOW-PRESSURE SAFETY SWITCH.
6. MINIMUM OFF-TIME RELAY.
7. AUTOMATIC-RESET COMPRESSOR MOTOR THERMAL OVERLOAD.
8. BRASS SERVICE VALVES INSTALLED IN COMPRESSOR SUCTION AND LIQUID LINES.
9. LOW-AMBIENT KIT HIGH-PRESSURE SENSOR.
10. HOT-GAS REHEAT SOLENOID VALVE WITH A REPLACEABLE MAGNETIC COIL.

2.5 AIR FILTRATION

A. PROVIDE 2" THROW-AWAY FIBERGLASS FILTERS.

2.6 GAS FURNACE

A. BURNERS: IN-SHOT TYPE CONSTRUCTED OF ALUMINUM-COATED STEEL.

1. FUEL: NATURAL GAS.
2. IGNITION: DIRECT SPARK IGNITION (DSI).
   VERIFY AVAILABILITY OF HIGH-ALTITUDE FEATURE WITH MANUFACTURERS.
3. HIGH-ALTITUDE KIT: FOR PROJECT ELEVATIONS MORE THAN 2,000 FEET ABOVE SEA LEVEL.

B. HEAT-EXCHANGER AND DRAIN PAN: STAINLESS STEEL.

C. INDUCED DRAFT COMBUSTION BLOWER.

D. SAFETY CONTROLS:

1. GAS CONTROL VALVE: TWO STAGE.
2. GAS TRAIN: SINGLE-BODY, REGULATED, REDUNDANT, 24-V AC GAS VALVE ASSEMBLY CONTAINING PILOT SOLENOID VALVE, PILOT FILTER, PRESSURE REGULATOR, PILOT SHUTOFF, AND MANUAL SHUTOFF.

2.7 DAMPERS

A. OUTDOOR AND RETURN AIR MIXING DAMPERS: PARALLEL OR OPPOSED-BLADE GALVANIZED-STEEL DAMPERS MECHANICALLY FASTENED TO CADMIUM PLATED FOR GALVANIZED-STEEL OPERATING ROD IN REINFORCED CABINET. CONNECT OPERATING RODS WITH COMMON LINKAGE AND INTERCONNECT LINKAGES SO DAMPERS OPERATE SIMULTANEOUSLY.

1. DAMPER MOTOR: MODULATING WITH ADJUSTABLE MINIMUM POSITION.
2. RELIEF AIR DAMPER: GRAVITY ACTUATED, WITH BIRD SCREEN AND HOOD.

2.8 ELECTRICAL POWER CONNECTION

A. PROVIDE FOR SINGLE CONNECTION OF POWER TO UNIT WITH UNIT-MOUNTED DISCONNECT SWITCH ACCESSIBLE FROM OUTSIDE UNIT AND CONTROL-CIRCUIT TRANSFORMER WITH BUILT-IN OVERCURRENT PROTECTION.

2.9 CONTROLS

A. BASIC UNIT CONTROLS:

1. CONTROL-VOLTAGE TRANSFORMER.
2. WALL-MOUNTED THERMOSTAT OR SENSOR WITH THE FOLLOWING FEATURES:
   a. HEAT-COOL-OFF SWITCH.
   b. FAN ON-AUTO SWITCH.
   c. FAN-SPEED SWITCH.
   d. AUTOMATIC CHANGEOVER.
   e. ADJUSTABLE DEADBAND.
   f. EXPOSED SET POINT.
   g. EXPOSED INDICATION.
   h. DEGREE F INDICATION.
   i. UNOCCUPIED-PERIOD-OVERRIDE PUSH BUTTON.
   j. DATA ENTRY AND ACCESS PORT TO INPUT TEMPERATURE AND HUMIDITY SET POINTS, OCCUPIED AND UNOCCUPIED PERIODS, AND OUTPUT ROOM TEMPERATURE AND HUMIDITY, SUPPLY-AIR TEMPERATURE, OPERATING MODE, AND STATUS.
3. WALL-MOUNTED HUMIDISTAT OR SENSOR WITH THE FOLLOWING FEATURES:
   a. EXPOSED SET POINT.
   b. EXPOSED INDICATION.
4. REMOTE WALL-MOUNTED ANNUNCIATOR PANEL WITH KEYED ACCESS FOR EACH UNIT:
   a. LIGHTS TO INDICATE POWER ON, UNIT ALARM OR FAILURE, SMOKE DETECTION.

B. DDC CONTROLLER:

1. CONTROLLER SHALL HAVE VOLATILE-MEMORY BACKUP.
2. SAFETY CONTROL OPERATION:
   a. SMOKE DETECTORS: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SMOKE IS DETECTED. PROVIDE ADDITIONAL CONTACTS FOR ALARM INTERFACE TO FIRE ALARM CONTROL PANEL.
   b. FIRE ALARM CONTROL PANEL INTERFACE WHERE APPLICABLE.
   c. LOW-DISCHARGE TEMPERATURE: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SUPPLY AIR TEMPERATURE IS LESS THAN 40°F.
      RETAIN FIRST SUBPARAGRAPH BELOW FOR AIR-TO-AIR HEAT-PUMP FEATURE.
   d. DEFROST CONTROL FOR CONDENSER COIL: PRESSURE DIFFERENTIAL SWITCH TO INITIATE DEFROST SEQUENCE.
3. UNIT SHALL BE CAPABLE OF DIRECT COMMUNICATION WITH GENERIC OPEN PROTOCOL SUCH AS BACNET MS/TP, LONTALK, OR MODUS. THIS WILL ALLOW THE UNIT TO INTEGRATE WITH A FACILITY ENERGY MANAGEMENT SYSTEM.
4. SCHEDULED OPERATION: OCCUPIED AND UNOCCUPIED PERIODS ON SEVEN-DAY CLOCK WITH A MINIMUM OF FOUR PROGRAMMABLE PERIODS PER DAY.
5. UNOCCUPIED PERIOD:
   a. HEATING SETBACK: 10°F.
   b. COOLING SETBACK: SYSTEM OFF.
   c. OVERRIDE OPERATION: TWO HOURS.
6. SUPPLY FAN OPERATION:
   a. OCCUPIED PERIODS: RUN FAN CONTINUOUSLY.
   b. UNOCCUPIED PERIODS: CYCLE FAN TO MAINTAIN SETBACK TEMPERATURE.
7. REFRIGERANT CIRCUIT OPERATION:
   a. OCCUPIED PERIODS: CYCLE OR STAGE COMPRESSORS, AND OPERATE HOT-GAS BYPASS TO MATCH COMPRESSOR OUTPUT TO COOLING LOAD TO MAINTAIN ROOM TEMPERATURE AND HUMIDITY. CYCLE CONDENSER FANS TO MAINTAIN MAXIMUM HOT-GAS PRESSURE. OPERATE LOW-AMBIENT CONTROL KIT TO MAINTAIN MINIMUM HOT-GAS PRESSURE
   b. UNOCCUPIED PERIODS: CYCLE COMPRESSORS AND CONDENSER FANS FOR HEATING TO MAINTAIN SETBACK TEMPERATURE.
8. HOT-GAS REHEAT-COIL OPERATION (OPTIONAL):
   a. OCCUPIED PERIODS: HUMIDISTAT OPENS HOT-GAS VALVE TO PROVIDE HOT-GAS REHEAT, AND CYCLES COMPRESSOR.
   b. UNOCCUPIED PERIODS: REHEAT NOT REQUIRED.
9. GAS FURNACE OPERATION:
   a. OCCUPIED PERIODS: STAGE BURNER TO MAINTAIN ROOM TEMPERATURE.
   b. UNOCCUPIED PERIODS: CYCLE BURNER TO MAINTAIN SETBACK TEMPERATURE.
10. FIXED MINIMUM OUTDOOR-AIR DAMPER OPERATION:
    a. OCCUPIED PERIODS: OPEN TO 25 PERCENT.
    b. UNOCCUPIED PERIODS: CLOSE THE OUTDOOR-AIR DAMPER.
11. ECONOMIZER OUTDOOR-AIR DAMPER OPERATION:
    a. OCCUPIED PERIODS: OPEN TO 25 PERCENT FIXED MINIMUM INTAKE, AND MAXIMUM 100 PERCENT OF THE FAN CAPACITY TO COMPLY WITH ASHRAE CYCLE II. CONTROLLER SHALL PERMIT AIR-SIDE ECONOMIZER OPERATION WHEN OUTDOOR AIR IS LESS THAN 60 ° F. USE MIXED-AIR TEMPERATURE AND SELECT BETWEEN OUTDOOR-AIR AND RETURN-AIR ENTHALPY TO ADJUST MIXING DAMPERS DURING ECONOMIZER CYCLE OPERATION, LOCK OUT COOLING.
    b. UNOCCUPIED PERIODS: CLOSE OUTDOOR-AIR DAMPER AND OPEN RETURN-AIR DAMPER.

2.10 ACCESSORIES

A. DUPLEX, 115-V, GROUND-FAULT-INTERRUPTER OUTLET WITH 15-A OVERCURRENT PROTECTION. INCLUDE TRANSFORMER IF REQUIRED.

B. LOW-AMBIENT KIT STAGED DOWN TO 0°F.

C. FILTER DIFFERENTIAL PRESSURE SWITCH WITH SENSOR TUBING ON EITHER SIDE OF FILTER. SET FOR FINAL FILTER PRESSURE LOSS.

D. HAIL GUARDS OF GALVANIZED STEEL, PAINTED TO MATCH CASING.

E. DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR STREAM CAPABLE OF SHUTTING DOWN THE UNIT IN THE PRESENCE OF SMOKE DETECTION.

2.11 ROOF CURBS

A. MATERIALS: GALVANIZED STEEL WITH CORROSION-PROTECTION COATING, WATERTIGHT GASKETS, AND FACTORY-INSTALLED WOOD NAILER; COMPLYING WITH NRCA STANDARDS.

1. CURB INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B.
   a. MATERIALS: ASTM C 1071, TYPE I OR II.
   b. THICKNESS: 1-1/2 INCHES.
2. APPLICATION: FACTORY APPLIED WITH ADHESIVE AND MECHANICAL FASTENERS TO THE INTERNAL SURFACE OF CURB.
   a. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.
   b. MECHANICAL FASTENERS: GALVANIZED STEEL, SUITABLE FOR ADHESIVE ATTACHMENT, MECHANICAL ATTACHMENT, OR WELDING ATTACHMENT TO DUCT WITHOUT DAMAGING LINER WHEN APPLIED AS RECOMMENDED BY MANUFACTURER AND WITHOUT CAUSING LEAKAGE IN CABINET.
   c. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.
   d. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

B. CURB HEIGHT: 14 INCHES TYPICAL UNO. PROVIDE 24 INCH CURB IN AREAS WITH EXPECTED HEAVY SNOWFALL.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF RTUS.

B. EXAMINE ROUGHING-IN FOR RTUS TO VERIFY ACTUAL LOCATIONS OF PIPING AND DUCT CONNECTIONS BEFORE EQUIPMENT INSTALLATION.

C. EXAMINE ROOFS FOR SUITABLE CONDITIONS WHERE RTUS WILL BE INSTALLED.

D. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.2 INSTALLATION

A. ROOF CURB: INSTALL ON ROOF STRUCTURE, LEVEL AND SECURE. INSTALL RTUS ON CURBS AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION. RTUS TO UPPER CURB RAIL, AND SECURE CURB BASE TO ROOF FRAMING OR CONCRETE BASE WITH ANCHOR BOLTS.

3.3 CONNECTIONS

A. THE FOLLOWING ARE SPECIFIC CONNECTION REQUIREMENTS:

1. INSTALL DUCTS TO TERMINATION AT TOP OF ROOF CURB.
2. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB.

3.4 COORDINATION

A. CONTRACTOR TO COORDINATE WITH KITCHEN EQUIPMENT SUPPLIER TO ENSURE THAT THE RTUS ARE COORDINATED WITH THE KITCHEN EQUIPMENT, PARTICULARLY THE EXHAUST HOODS AND THE MAKE-UP AIR UNIT, TO PROPERLY PRESSURIZE THE BUILDING/SPACE.

B. CONTRACTOR TO ENSURE THAT ALL THERMOSTATS AND SENSORS ARE COMPATIBLE WITH THE RTU CONTROLS.

3.5 FIELD QUALITY CONTROL

A. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.

B. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING. REPORT RESULTS IN WRITING.

C. TESTS AND INSPECTIONS:

1. AFTER INSTALLING RTUS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.
2. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.
3. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

D. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.

3.6 STARTUP SERVICE

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE.

B. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND DO THE FOLLOWING:

1. INSPECT FOR VISIBLE DAMAGE TO UNIT CASING, FURNACE COMBUSTION CHAMBER, COMPRESSOR, COILS, AND FANS.
2. VERIFY THAT LABELS ARE CLEARLY VISIBLE, CLEARANCES HAVE BEEN PROVIDED FOR SERVICING, CONTROLS ARE CONNECTED AND OPERABLE, AND FILTERS ARE INSTALLED.
3. CLEAN CONDENSER COIL AND FURNACE AND INSPECT FOR CONSTRUCTION DEBRIS.
4. REMOVE PACKING FROM VIBRATION ISOLATORS.
5. VERIFY LUBRICATION ON FAN AND MOTOR BEARINGS.
6. INSPECT FAN-WHEEL ROTATION FOR MOVEMENT IN CORRECT DIRECTION WITHOUT VIBRATION AND BINDING.
7. ADJUST FAN BELTS TO PROPER ALIGNMENT AND TENSION.
8. START UNIT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
   a. INSPECT AND RECORD PERFORMANCE OF INTERLOCKS AND PROTECTIVE DEVICES; VERIFY SEQUENCES.
10. OPERATE UNIT FOR AN INITIAL PERIOD AS RECOMMENDED OR REQUIRED BY MANUFACTURER.
11. PERFORM THE FOLLOWING OPERATIONS FOR BOTH MINIMUM AND MAXIMUM FIRING. ADJUST BURNER FOR PEAK EFFICIENCY.
    a. MEASURE GAS PRESSURE ON MANIFOLD.
    b. INSPECT OPERATION OF POWER VENTS.
    c. MEASURE SUPPLY-AIR TEMPERATURE AND VOLUME WHEN BURNER IS AT MAXIMUM FIRING RATE AND WHEN BURNER IS OFF. CALCULATE USEFUL HEAT TO SUPPLY AIR.
12. ADJUST AND INSPECT HIGH-TEMPERATURE LIMITS.
13. INSPECT OUTDOOR-AIR DAMPERS FOR PROPER STROKE AND INTERLOCK WITH RETURN-AIR DAMPERS.
14. INSPECT CONTROLS FOR CORRECT SEQUENCING OF HEATING, MIXING DAMPERS, REFRIGERATION, AND NORMAL AND EMERGENCY SHUTDOWN.
15. SIMULATE MAXIMUM COOLING DEMAND AND INSPECT THE FOLLOWING:
    a. COMPRESSOR REFRIGERANT SUCTION AND HOT-GAS PRESSURES.
    b. SHORT CIRCUITING OF AIR THROUGH CONDENSER COIL OR FROM CONDENSER FANS TO OUTDOOR-AIR INTAKE.
16. VERIFY OPERATION OF REMOTE PANEL INCLUDING PILOT-LIGHT OPERATION AND FAILURE MODES. INSPECT THE FOLLOWING:
    a. HIGH-TEMPERATURE LIMIT ON GAS-FIRED HEAT EXCHANGER.
    b. LOW-TEMPERATURE SAFETY OPERATION.
    c. FILTER HIGH-PRESSURE DIFFERENTIAL ALARM.
    d. ECONOMIZER TO MINIMUM OUTDOOR-AIR CHANGEOVER.
    e. RELIEF-AIR FAN OPERATION.
    f. SMOKE ALARMS.
17. AFTER STARTUP AND PERFORMANCE TESTING AND PRIOR TO SUBSTANTIAL COMPLETION, REPLACE EXISTING FILTERS WITH NEW FILTERS.

3.7 CLEANING AND ADJUSTING

A. OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO SITE DURING OTHER-THAN-NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.

B. AFTER COMPLETING SYSTEM INSTALLATION AND TESTING, ADJUSTING, AND BALANCING RTU AND AIR-DISTRIBUTION SYSTEMS, CLEAN FILTER HOUSINGS AND INSTALL NEW FILTERS.

END OF SECTION

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CAVA

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233 S WACKER DRIVE
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PROJECT NUMBER:
CAV070

ISSUANCE
SELF-CERT 02/19/25
COMMENTS
PERMIT 03/12/2025
ISSUANCE
IFC SET 03/31/2025

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MECHANICAL SPECIFICATIONS

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