

ROOFTOP AIR HANDLING UNITS: RHEEM						
UNIT MARK	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	RTU-6
AREA SERVED	SHOWROOM	SHOWROOM	OFFICE	OFFICE	SERVICE RECEPTION	SERVICE WORKSHOP
CV OR VAV	CV	CV	CV	CV	CV	CV
DUCT ORIENTATION	DOWNFLOW	DOWNFLOW	DOWNFLOW	DOWNFLOW	DOWNFLOW	DOWNFLOW
SUPPLY FAN AIRFLOW, CFM	3,625	3,625	1,825	1,950	1,650	6,000
ESP, IN W.C.	1	1	1	1	1	1
MOTOR BHP	2.07	2.07	---	---	---	3.29
OUTSIDE AIRFLOW, CFM	200	200	200	395	130	440
COOLING COIL (DX)						
TOTAL CAPCITY, MBH	99.9	99.9	59.1	59.9	58.0	192.2
SENSIBLE CAPACITY, MBH	73.7	73.7	40.3	41.6	38.3	144.2
ENT. AIR TEMP. °F, DB / WB	80.7 / 67.3	80.7 / 67.3	81.3 / 67.7	82.5 / 68.3	81.0 / 67.5	80.9 / 67.5
LEAV. AIR TEMP. °F, DB / WB	61.2 / 58.4	61.2 / 58.4	59.5 / 56.7	60.2 / 57.3	58.3 / 55.6	57.7 / 56.9
HEATING COIL (NG)						
HEATING CFM	3,625	3,625	1,825	1,950	1,650	6,000
INPUT CAPACITY, MBH	150	150	75	75	75	350
OUTPUT CAPCITY, MBH	121.5	121.5	60.75	60.75	60.75	283.5
ENT. AIR TEMP. °F, DB	70	70	70	70	70	70
LEAV. AIR TEMP. °F, DB	99.9	99.9	99.7	97.8	103.2	112.1
FILTERS						
SUPPLY	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8
UNIT ELECTRICAL, V / PH	460 / 3	460 / 3	460 / 3	460 / 3	460 / 3	460 / 3
ROOFTOP UNIT MCA / MOP, A	22 / 30	22 / 30	15 / 20	15 / 20	15 / 20	37 / 45
ESTIMATED UNIT WEIGHT, LBS	894	894	592	592	592	2,196
UNIT MODEL NO.	RGEDYB102ADG	RGEDYB102ADG	RGECYB060ADU	RGECYB060ADU	RGECYB060ADU	RGEHYB180ADG
NOTES:						
ALL RTUS:						
1. PROVIDE SINGLE-POINT ELECTRICAL CONNECTION W/ FACTORY-INSTALLED DISCONNECT.						
2. PROVIDE 14" MANUFACTURER CURB SUITABLE FOR PITCHED ROOF.						
3. PROVIDE OUTSIDE AIR HOOD WITH MOTORIZED OUTSIDE AIR DAMPER, ENTHALPY ECONOMIZER, AND BAROMETRIC RELIEF HOOD.						
4. PROVIDE STAND-ALONE FACTORY CONTROLLER W/ THERMOSTAT, FREEZE STAT KIT, LOW-AMBIENT CONTROL KIT, AND HINGED ACCESS DOORS.						
5. PROVIDE HOT GAS REHEAT.						
RTU-1,2,3,4,6:						
1. PROVIDE FACTORY WIRED RETURN AIR SMOKE DETECTOR.						
RTU-1,3,5,6:						
1. PROVIDE FACTORY-INSTALLED, FIELD-WIRED CONVENIENCE OUTLET.						

SPLIT SYSTEM HEAT PUMP: TRANE OR EQUEAL												
MARK	TYPE	AIRFLOW (CFM) (HIGH/MED/LOW)	COOLING			HEATING		ELECTRICAL			TRANE MODEL #	NOTES
			TOTAL CAP (MBH)	SENS CAP (MBH)	EAT COOLING DEG F, DB/WB	TOTAL CAP (MBH)	EAT HEATING DEG F.	V/PH	MCA	MOCP		
DSS-1	WALL-MOUNTED	391/228/143	9	8.7	80/67	12	70	POWERED BY OUTDOOR UNIT			MSZ-EX09NLB	1, 2, 3, 4
HP-1	OUTDOOR CONDENSING UNIT	---	---	---	---	---	---	208/1	13	22	SUZ-AA09NL	1, 2, 3, 4
NOTES:												
1. COOLING AND HEATING CAPACITY BASED ON ARI CONDITIONS.												
2. FURNISH WITH SEVEN DAY PROGRAMMABLE THERMOSTAT.												
3. PROVIDE 208V CONDENSATE DRAIN PUMP PER MANUFACTURER SPECIFICATIONS, MANUFACTURER 30" LINESET, AND DISCONNECT SWITCH.												
4. CONFIRM CAPACITY REQUIREMENTS WITH DATA / IT VENDOR.												

FANS: GREENHECK											
MARK	TYPE	DRIVE	CFM	ESP	RPM	MOTOR HP	VOLTS/PH	UNIT WEIGHT (LBS)	MODEL	NOTES	
EF-1	ROOF DOWNBLAST	DIRECT	650	0.4	1,490	1/6	115/1	46	G-095-VG	1, 2, 3	
IEF-1	INLINE	BELT	5,000	0.5	1,053	1 1/2	460/3	185	BSQ-200	4, 5	
IEF-2	INLINE	DIRECT	300	0.5	1,540	1/6	115/1	34	SQ-90-VG	2, 6	
NOTES:											
1. PROVIDE MANUFACTURER 14" CURB W/ BACKDRAFT DAMPER.						2. PROVIDE SPEED CONTROLLER FOR BALANCING.					
3. CONTROL FAN VIA TIMECLOCK OR INTERLOCK W/ NEAREST RTU TO RUN IN OCCUPIED MODE.						4. PROVIDE INLET GUARD, LINE VOLTAGE THERMOSTAT, AND DISCONNECT.					
5. INTERLOCK FAN OPERATION WITH INTAKE AND EXHAUST MOTOR OPERATED DAMPERS.						6. PROVIDE LINE VOLTAGE HEATING ONLY THERMOSTAT.					

ELECTRIC UNIT HEATERS: MARKEL							
MARK	TYPE	CAPACITY (KW)	AIRFLOW (CFM)	VOLTS/PH	UNIT WEIGHT (LBS)	MODEL #	NOTES
EW-1	WALL MOUNT	2.0	175	277/1	22	3310	1, 3, 4
EUH-1	HORIZONTAL	5.0	400	480/3	44	UHE05	2, 3, 4
EUH-2	HORIZONTAL	5.0	400	480/3	44	UHE05	2, 3, 4
EUH-3	HORIZONTAL	5.0	400	480/3	44	UHE05	2, 3, 4
NOTES:							
1. PROVIDE MANUFACTURER WALL MOUNTING BRACKET AND INTERNAL THERMOSTAT.							
2. PROVIDE LINE-VOLTAGE THERMOSTAT.							
3. PROVIDE FACTORY-INSTALLED DISCONNECT SWITCH.							
4. PROVIDE BUILT-IN RESETTING TYPE LIMIT CONTROLS FOR OVERHEATING.							

### GENERAL NOTES:

- ALL DUCTWORK AND PIPES SHALL BE COORDINATED WITH OTHER NEW DUCTS, PIPES, LIGHTS, STRUCTURAL SYSTEMS, CEILING SUPPORTS AND FRAMING BEFORE INSTALLATION. MINOR DUCT AND PIPE OFFSETS AND MINOR DUCT TRANSITIONS SHALL BE PROVIDED AS REQUIRED. WHERE TRANSITIONS ARE REQUIRED, CROSS SECTIONAL AREA OF DUCT SHALL NOT BE REDUCED. MEASUREMENTS FOR VERTICAL CLEARANCES OF DUCTWORK SHALL BE TAKEN AT THE JOB SITE BEFORE FABRICATION OF ANY DUCTWORK.
- ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTRUCTIONS.
- MATERIALS AND INSTALLATION SHALL COMPLY WITH LOCAL CODES, APPLICABLE PROVISIONS OF LATEST EDITION OF NATIONAL FIRE PROTECTION ASSOCIATION, LOCAL UTILITY REGULATIONS AND GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.
- VERIFY ROOF AND WALL OPENINGS WITH STRUCTURE.
- VERIFY THE LOCATION OF ALL THERMOSTATS, TEMPERATURE SENSORS, PANELS AND CONTROL INSTRUMENTS WITH THE ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- REFER TO ARCHITECTURAL, STRUCTURAL AND ELECTRICAL DRAWINGS TO COORDINATE THE EXACT LOCATIONS OF DIFFUSERS, REGISTERS, GRILLES, PIPING AND OTHER MECHANICAL EQUIPMENT WITH CEILING GRID, LIGHTS, BEAMS AND OTHER BUILDING COMPONENTS.
- CONTRACTOR SHALL PROVIDE ALL SUPPORTS REQUIRED TO MOUNT MECHANICAL EQUIPMENT, PIPING AND DUCTWORK.
- DUCTWORK SHALL BE ZINC-COATED SHEET STEEL OR ALUMINUM, CONSTRUCTED AND INSTALLED AS RECOMMENDED BY THE LATEST EDITION OF SMACNA "HVAC DUCT CONSTRUCTION STANDARDS".
- ALL FLEXIBLE DUCTS CONNECTED TO SUPPLY DIFFUSERS SHALL BE SIZED TO EQUAL THE DIFFUSER NECK DIAMETER.
- FLEXIBLE DUCTS SHALL BE FLEXIBLE METAL OR METAL AND NEOPRENE-COATED CANVAS HOSE INSULATED WITH 1" THICK FIBERGLASS WITH VINYL VAPOR BARRIER. ALL ROUND DUCT TAKE-OFFS SHALL BE MADE WITH SPIN-IN FITTINGS WITH 45 DEG. EXTRACTOR AND BALANCING DAMPER. THE DUCT DIAMETER SHALL MATCH THE AIR DIFFUSER SIZE UNLESS OTHERWISE INDICATED.
- PROVIDE FLEXIBLE DUCT CONNECTIONS BETWEEN THE SUPPLY AND RETURN DUCTS FROM THE ROOFTOP UNITS AND INLINE FANS.
- PROVIDE CONDENSATE DRAIN PIPING FROM AIR CONDITIONING UNITS DRAIN PAN AND EXTEND TO FLOOR DRAIN OR AS INDICATED. PIPING SHALL BE THE SAME SIZE AS THE DRAIN PAN CONNECTION AND SHALL INCLUDE A 6-INCH TRAP TO PREVENT SIPHONING BY THE SUPPLY AIR FAN.
- EXPOSED PIPING RUNOUTS SHALL BE INSTALLED IN PRACTICAL ALIGNMENT WITH THE BUILDING AND SHALL BE ADEQUATELY SECURED TO THE BUILDING STRUCTURE.
- FOR EXACT LOCATIONS OF CEILING DEVICES, SEE REFLECTED CEILING PLAN.
- FINAL LOCATION OF ROOF-MOUNTED EQUIPMENT SHALL BE COORDINATED WITH ROOF FRAMING. VERIFY ROOF OPENINGS WITH STRUCTURE.
- PROVIDE ACCESS DOORS OF SUFFICIENT SIZE FOR ALL CONCEALED CONTROLS, DAMPERS OR ANY ITEMS REQUIRING ACCESS.
- AIR DEFLECTORS SHALL BE PROVIDED IN ALL SQUARE ELBOWS.
- ROOF CURBS FOR FANS AND AIR UNITS SHALL BE SUITABLE FOR SLOPING ROOF.
- CONTRACTOR SHALL VERIFY THAT VFDS ARE PROVIDED WITH INTEGRAL DISCONNECT TO DISCONNECT POWER TO THE CONTROLLER AND THE MOTOR. VFDS SHALL BE LOCATED WITHIN SIGHT OF THE MOTOR BEING SERVED.
- CEILING GRID AND OTHER ITEMS SHALL NOT BE SUPPORTED FROM OR IN CONTACT WITH DUCT, PIPING, OR MECHANICAL EQUIPMENT. CONDUIT, WIRING, PIPING AND SUPPORTS SHALL NOT BE LOCATED BELOW FAN COIL ACCESS PANELS.
- DUCTWORK AND PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL PANELS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING WITH ELECTRICAL PANELS WHEN SHOWN NEAR PANELS OR OVER ELECTRICAL ROOMS.
- SYSTEMS SHALL OPERATE UNDER CONDITIONS OF LOAD WITHOUT UNUSUAL OR EXCESSIVE NOISE OR VIBRATION. UNUSUAL OR EXCESSIVE NOISE OR VIBRATION SHALL BE CORRECTED.
- EQUIPMENT, MATERIALS AND LABOR REQUIRED BY THESE CONTRACT DRAWINGS SHALL BE GUARANTEED TO BE FREE FROM DEFECTIVE MATERIALS OR WORKMANSHIP FOR ONE YEAR AFTER FINAL ACCEPTANCE OF THE PROJECT UNLESS SPECIFIED OTHERWISE. DEFECTIVE MATERIALS OR WORKMANSHIP OCCURRING DURING THIS PERIOD SHALL BE CORRECTED AT NO ADDITIONAL COST.
- ALL MATERIALS INSTALLED IN AIR PLENUMS SHALL COMPLY WITH SECTION 602.2 OF THE 2021 VIRGINIA MECHANICAL CODE.

### HVAC LEGEND

ABOVE FINISHED FLOOR	AFB	
ABOVE	ABV	
BACKDRAFT DAMPER	BD	
BELOW	BEL	
BETWEEN	BET	
CAPACITY	CAP	
CEILING	CLG	
CEILING DIFFUSER	CD	
CEILING GRILLE	CG	
CEILING REGISTER	CR	
CLEANOUT	CO	
CUBIC FEET PER MINUTE	CFM	°F
DEGREES FAHRENHEIT	°F	
DIAMETER	DIA	
DIRECTION OF FLOW		
DIRECTION OF SLOPE DOWN		
DOWN	DN	
DRAIN PIPE (COOLING COIL CONDENSATE)	D	
DRY BULB	DB	
DUCT SLOPE DOWN	DN	
DUCT SLOPE UP	UP	
ENTERING AIR TEMPERATURE	EAT	
EXHAUST AIR	EA	
EXHAUST FAN	EF	
EXTERNAL STATIC PRESSURE	ESP	
FEET	FT	
FEET PER MINUTE	FFM	
FIRE DAMPER	FD	
FIRESTAT	FS	
FLEXIBLE DUCT CONNECTION		
FLOOR	FL	
FROM	FR	
GALLONS PER MINUTE	GPM	
HORSEPOWER	HP	
HOOR	HR	
INFRARED HEATER	IR	
INCH	IN	
KILOWATT	KW	
LEAVING AIR TEMPERATURE	LAT	
LOUVER	LVR	
MANUAL BALANCING DAMPER	MD	
MOTOR OPERATED DAMPER	MOD	
NORMALLY CLOSED	NC	
NORMALLY OPEN	NO	
OUTDOOR AIR	OA	
PIPING INDICATION WITH RESPECT TO FLOW:		
BOTTOM TAKEOFF		
SIDE CONNECTION		
TOP TAKEOFF		
TURN DOWN OR FROM BELOW		
TURN UP OR DOWN		
TURN UP OR FROM ABOVE		
POUNDS	LBS	
POUNDS PER SQUARE INCH GAGE	PSIG	
PRESSURE DROP	PD	
REFRIGERANT PIPE	R	
RETURN AIR	RA	
REVOLUTIONS PER MINUTE	RPM	
ROOF VENT	RV	
ROOFTOP AIR HANDLING UNIT	RTU	
STATIC PRESSURE	SP	
SUPPLY AIR	SA	
THERMOSTAT OR TEMPERATURE SENSOR	TSTAT	
THOUSAND BTU PER HOUR	MBH	
VEHICLE EXHAUST FAN	VEF	
WET BULB	WB	
WATER PRESSURE DROP	WPD	

### GRILLES, REGISTERS AND DIFFUSERS: PRICE

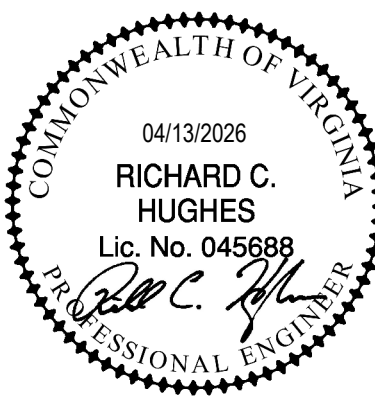
MARK	SERVICE	TYPE	FACE SIZE, IN. x IN.	NECK SIZE, IN. x IN.	NO. SLOTS	SLOT WIDTH	MAX AIR P.D., IN. H2O	MAX N.C.	MODEL #	NOTES
A	SUPPLY	LAY-IN DIFFUSER	24 x 24	6" Ø	--	--	0.1	25	SPD	1, 2, 3
B	SUPPLY	LAY-IN DIFFUSER	24 x 24	8" Ø	--	--	0.1	25	SPD	1, 3
C	SUPPLY	LAY-IN DIFFUSER	24 x 24	10" Ø	--	--	0.1	25	SPD	1, 3
D	SUPPLY	LAY-IN DIFFUSER	24 x 24	12" Ø	--	--	0.1	25	SPD	1, 3
E	SUPPLY	SURFACE MOUNT GRILLE	10 x 10	8 x 8	--	--	0.1	25	520	2, 3, 4
F	SUPPLY	LINEAR SLOT DIFFUSER	48" LENGTH	7" Ø	2	3/4"	0.1	25	SDS-075	5, 8
G	SUPPLY	LINEAR SLOT DIFFUSER	48" LENGTH	10" Ø	3	1"	0.1	25	SDS-100	5, 7
H	SUPPLY	SURFACE MOUNTED REGISTER	8 x 8	6 x 6	--	--	0.1	25	620	2, 3, 4
I	SUPPLY	SURFACE MOUNTED REGISTER	10 x 8	8 x 6	--	--	0.1	25	620	2, 3, 4
R	TRANSFER	SURFACE MOUNTED GRILLE	12 x 12	10 x 10	--	--	0.05	20	30	2, 3
S	TRANSFER	LAY-IN GRILLE	24 x 24	10 x 10	--	--	0.05	20	80	3
U	RETURN	SURFACE MOUNTED GRILL	32 x 20	30 x 18	--	--	0.05	20	530	3
V	RETURN	SURFACE MOUNTED GRILL	34 x 32	32 x 30	--	--	0.05	20	530	3
W	RETURN	LINEAR SLOT DIFFUSER	48" LENGTH	---	2	3/4"	0.05	20	SDR-075	6
X	EXHAUST	SURFACE MOUNTED REGISTER	8 x 8	6 x 6	--	--	0.05	20	630	2, 3
Y	EXHAUST	SURFACE MOUNTED REGISTER	12 x 12	10 x 10	--	--	0.05	20	630	2, 3
Z	RETURN	LAY-IN GRILLE	24 x 24	22 x 22	--	--	0.05	20	80	---

- NOTES:
- DIFFUSER SHALL BE 4-WAY UNLESS OTHERWISE NOTED.
  - PROVIDE SURFACE MOUNT FRAME AS REQUIRED FOR INSTALLATION IN HARD CEILING. SEE ARCHITECTURAL RCP FOR CEILING TYPES.
  - DUCT CONNECTION SHALL EQUAL THE INLET OF DIFFUSER, GRILLE, OR REGISTER CONNECTION.
  - DOUBLE DEFLECTION SUPPLY GRILLE OR REGISTER.
  - PROVIDE PLENUM BOX FOR LINEAR SLOT DIFFUSER UNLESS NOTED OTHERWISE ON PLANS.
  - PROVIDE MANUFACTURER RETURN AIR SIGHT BAFFLE OR BLANK-OFF PLATE AS INDICATED ON DRAWINGS.
  - PAINT DIFFUSER BLACK TO MATCH ARCHITECTURAL CEILING WHERE INDICATED ON DRAWINGS.
  - PROVIDE CABLE OPERATED DAMPER. SEE FLOOR PLAN NOTES AND MECHANICAL SPECIFICATIONS.



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MOTOR MILE HYUNDAI  
NEW COMMERCIAL BUILDING  
HVAC LEGEND, NOTES, AND SCHEDULES

DRAWN BY: JCW  
DESIGNED BY: JCW  
CHECKED BY: RCH  
DATE: 04/13/2026  
SCALE: As indicated  
REVISIONS:

M0.01

# SPECIFICATIONS FOR HVAC WORK

- SCOPE OF THE WORK: Work shall include complete HVAC systems. Provide supervision, labor, material, equipment, machinery, plant and items necessary for complete systems tested and ready for operation.
- REGULATIONS: Materials and installation shall comply with local codes, applicable provisions of latest edition of National Fire Protection Association, local utility regulations and governmental departments having jurisdiction.
- DRAWINGS: These drawings are diagrammatic and indicate general arrangement of systems and work included. Where variances occur include the items of better quality, greater quantity or higher cost.
- COORDINATION OF WORK: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of other trades. Contractor shall provide dimensions and locations of all openings, shafts and similar items to the proper trades and shall install work as required so as not to delay the building construction. The Contractor is responsible for damage caused by his work or workmen. Repairing of damaged work shall be done by the Contractor at no additional cost.
- ACCESSIBILITY: Locate equipment which must be serviced or maintained in fully accessible positions where possible. Otherwise, furnish access panels of sufficient size and located so that the concealed equipment can be serviced.
- ROUGH-IN: Rough-in openings shall align vertically and horizontally with building structure. Wall-mounted thermostats shall be mounted 48" above finished floor to the top of the thermostat.
- CUTTING AND PATCHING: The Contractor shall provide all cutting and patching necessary to install his work. Patching shall match adjacent surfaces. No structural members shall be cut without the approval of the Architect.
- CLEANING: Equipment and piping shall be cleaned to remove foreign materials. Provide temporary filters for air units that are operated during construction. Plug or cap openings in equipment, ductwork, piping and materials until connection is made to the system. Remove from the premises all unused material and debris resulting from the performance of HVAC work.
- WIRING: Starters that are specified to be furnished as an integral part of the mechanical equipment shall be complete with properly sized overload heaters. Temperature control wiring, equipment control wiring and control interlock wiring for mechanical equipment shall be furnished by the HVAC Contractor. Control wiring shall not include any wiring which carries motor current. All wiring shall be in metal conduit and shall comply with the Electrical specifications.
- QUIET OPERATION: Systems shall operate under conditions of load without unusual or excessive noise or vibration. Unusual or excessive noise or vibration shall be corrected.
- TESTING AND BALANCING: HVAC Contractor shall test all scheduled RTUs, Fans, Split Systems, and Electric Unit Heaters to assure that the proper sequence of control is established and operating in a safe manner. The air quantities for equipment, diffusers and registers shall be balanced for the CFM as indicated on the drawing.
- INSTRUCTIONS TO OWNER: Instruct the Owner in the proper operation and maintenance of the mechanical systems until the Owner is fully prepared to operate and maintain the systems. However, length of instruction time shall be limited to one (1) full day.
- OPERATING AND MAINTENANCE: Provide the Owner with one (1) bound set, and one (1) PDF of Operating and Maintenance Instructions for all scheduled HVAC equipment and controls.
- GUARANTEE: Equipment, materials and labor required by these contract drawings shall be guaranteed to be free from defective materials or workmanship for one (1) year after final acceptance of the project unless specified for a longer period in other portions of the specifications. Defective materials or workmanship occurring during this period shall be corrected at no additional cost.
- IDENTIFICATION OF EQUIPMENT: Each piece of scheduled equipment shall be identified by engraved nameplate that will read the same as the identification shown on mechanical or electrical drawings. Engraved name plates not less than 1" height, white letters on a black background, 1/16 inch thick plastic laminate, beveled edges, screw mounting. Seton Name Plate Company, EMED Co., Marking Services Inc., or equal.
- AIR DEVICES
  - Diffusers, registers and grilles shall be Price or equal. Price model numbers used for BOD. Ceiling devices shall have white baked enamel finish unless noted as black finish on drawings unless otherwise noted. All other devices shall have prime finish. GRDs noted as "Registers" in schedule shall include manufacturer register damper.
  - Diffusers (Type A,B,C,D): Square ceiling supply diffusers shall be Model SPD 24" x 24" square plaque diffusers for lay-in mount for inverted T-bar ceiling without panel extensions. Face panel shall have smooth edges and rounded corners to blend with back cone. Diffuser shall deliver 360 degree radial horizontal air pattern. Provide equalizing deflectors. Construction shall be steel with mitered blade joints. Provide surface mount frame where installed in hard ceiling.
  - Surface Mount Supply Grilles/Registers (Type E,H,I). Supply grilles shall be Type 520 (steel) or 620 (aluminum) as indicated in schedule. Grille shall be double deflection and shall have free area of not less than 75%. Register dampers shall be steel or aluminum to match grille and be opposed blade type, face operated. Sponge rubber gasket shall be provided on frame. Long blades shall be in the horizontal position. Borders shall be standard 1-1/4" with countersunk screwholes.
  - Surface Mount Return/Exhaust Grilles/Registers (Type R,U,J,X,Y): Return grilles shall be Type 530 (steel) or 630 (aluminum) as indicated in schedule. Grille shall be 45 degree fixed blade deflecting vanes on 3/4" centers and shall have free area of not less than 75%. Register dampers shall be steel or aluminum to match grille and be opposed blade type, face operated. Sponge rubber gasket shall be provided on frame. Long blades shall be in the horizontal position. Borders shall be standard 1-1/4" with countersunk screwholes.
  - Slot Diffusers (Type F,G): Supply linear slot diffusers shall be extruded aluminum Series SDS adjustable pattern type complete with mounting frame for lay-in or surface mount application, acoustically-lined duct plenum (SDBI), and accessories. Insulation type shall be fiber free foam. Provide slot quantity and width as indicated on drawings. See schedule and floor plans for diffusers requiring black paint. Provide remote operated dampers for diffusers located above hard ceilings.
  - Slot Diffusers (Type W): Return linear slot diffusers shall be extruded aluminum Series SDR adjustable pattern type complete with mounting frame for surface mount application. Provide slot quantity and width as indicated on drawings. Provide manufacturer blank-off plate or return air sight baffle as indicated on drawings.
  - Return Grilles (Type S,Z): Lay-in return grilles shall be Model 80 Eggcrate Face Return, 2x2" face for lay-in application. Construction shall be 1/2" x 1/2" x 1/2" aluminum grid cone with extruded aluminum borders and frames.
  - Wall Louvers shall be Greenheck Model ESD-403 or equal stationary drainable blade aluminum louver complete with 1/2" mesh matching bird screen in removable frame. Frame shall be 4" deep and blade spacing shall not exceed 4" O.C. Finish shall match adjacent framing. Submit color options with submittal for approval by Architect.
- DUCTWORK
  - General: Ductwork shall be zinc-coated sheet steel or aluminum, constructed and installed as recommended by the latest edition of SMACNA.
  - All ductwork indicated to be watertight on drawings upstream of the exhaust grille serving TECH SHOWER 119: Aluminum alloy sheets, ASTM B 209, alloy 1100, 3003, or 5052.
  - Duct clearance shall be established at the job site before any ducts are fabricated. The Contractor will not be allowed any extra costs for ducts fabricated and then found not to fit.
  - Manual volume control dampers shall have accessible operating mechanism. Blade height shall not exceed 8 inches.
  - Remote Cable-Operated Dampers shall be round internal gear driven cable operated dampers by Duro Dyne or equal. Damper and cable system shall be provided complete by the manufacturer. Dampers shall be manufactured of G60 or better galvanized steel. Cable case shall be galvanized steel, solid core control wire shall be stainless steel. Cable system shall be installed per manufacturer instructions. Damper size shall match diffuser inlet, cable shall be of sufficient length to reach from diffuser to associated damper. Complete system shall allow for damper adjustment through the face of the associated diffuser.
  - Backdraft Dampers shall be self-operating, multi-blade damper to open fully on 0.06 inch w pressure difference and close by gravity. Aluminum, 16 gage frame, 0.023-inch blades of flat or elliptical shape, with tie-bar to connect blades for parallel operation. Provide resilient gasket for air seal and quiet operation. Blade pivots shall be in the nylon bushings. Provide adjustable counter balance weight(s) as necessary for proper operation.
  - Motorized dampers shall be opposed blade construction for modulating service and parallel blade construction for two-position service. Motorized dampers shall be constructed with brass bearings, channel frame and interlocking blades with air-tight felt seals. Actuators for dampers are specified in paragraph - TEMPERATURE CONTROL SYSTEM.
  - Air deflectors shall be provided in all square elbows and duct-mounted supply outlets.

		PIPE SIZE/INSULATION THICKNESS(1)						
System	Temp. Range (oF)	Less than 1"	1" to 1-1/4"	1-1/2" to 3"	4" to 6"	8" Up	Ins. Type (2)	
Condensate Drain	45-75	0.5	0.5	1.0	1.0	1.0	A,B	
Refrigerant	Below 40	1.0	1.0	1.5	1.5	1.5	B	

- NOTES:
- Minimum thickness for insulation listed in preceding table is based on Thermal Conductivity, "K" not exceeding 0.27 Btu per inch-hr. x sq. ft. x Deg. F, based on Mean Temperature of 75 Deg. F. Insulation with greater Thermal Conductivity shall have increased thickness to provide same performance characteristics as specified.
  - A. Fiberglass type insulation; B. Elastomeric type insulation.

- Elastomeric pipe insulation seams, voids and butt joints shall be sealed with a vapor barrier adhesive or taped with 1-1/2 inch wide 3M #471 tape. Flexible elastomeric insulation exposed to weather shall be covered with two coats of Armstrong Amalflex Finish (vinyl lacquer).
- Ductwork Not to be Insulated: All return ductwork. All transfer ducts. All exhaust ductwork beyond 10 feet of connections to outdoors.
- Ductwork to be Insulated: Unless noted in the paragraph above, all supply ducts shall be insulated. Exhaust ductwork located in plenums shall be insulated within 10 feet of connections to outdoors. All lower plenum boxes up to motor operated damper. All insulation shall be flexible duct insulation meeting ASTM C 533. Insulation shall have a factory-applied facing of foil-scrim kraft paper jacket reinforced with fiberglass yarn mesh. Insulation shall be secured to rectangular ducts by impaling over metal stick clips spaced 12" center each way. Round duct insulation shall be secured with No. 18 gauge copperweld wire spaced not over 18" on center. Where insulation joints occur, facing tabs shall be lapped not less than 2"; all joints, voids and punctures in facing shall be effectively vapor sealed with Foster Vapor-Safe or Vapor-Fas adhesive. All duct insulation shall be 1-1/2" thick and shall have a minimum total thermal resistance (R) of 5.6 at a mean temperature of 75 Deg. F.

- PACKAGED ROOFTOP AIR CONDITIONING UNITS:
  - General Equipment and material specified under this heading shall be furnished and installed by a certified representative of the unit manufacturer. Units shall be Rheem model indicated on schedule, and shall be a complete, self-contained unit with hermetic motor-compressor, cooling coil, supply fan, gas fired heating section, condenser coil and fan(s), hot gas reheat coil, economizer, outside air weather hood, barometric relief, dampers, filters, interconnecting piping, filter-dryer, sight glass, roof curb, controls, 7-day programmable thermostat, and wiring enclosed in a weather-resistant steel enclosure suitable for roof mounting. Provide factory pre-wired integral non-fused disconnect and single point power connection thru the curb. Supply fan motor shall be direct drive plenum fan. Provide a trap in the condensate drain piping from the evaporator coil drain pan of sufficient depth to prevent blowout or siphoning of water. Unit shall be fitted and rated in accordance with ARI Standard 240. Provide compressor anti-short cycling control and low ambient control for cooling operation to 45 Deg. F. Provide hail guards for intake and discharge openings to protect condenser fans and coils. Where units are indicated to have hot gas reheat, factory mounted hot gas reheat coil, associated piping, accessories, and controls shall be provided.
  - Unit Casing: Unit casing shall be zinc coated, heavy gauge, galvanized steel construction. Exterior surface shall be finished with weather resistant baked enamel finish suitable for outside, roof mounting. Hinged, insulated, and gasketed access doors shall be provided to allow full access to all refrigerant and control components for proper servicing and/or replacement. Access doors shall be coordinated with the installation to allow proper clearances. Units shall be provided complete with supply and return duct flanges.
  - Fan and Motor: Fan and motor assembly shall be direct drive plenum fans designed to provide specified air volume at specified external static pressures. Fan motors shall be permanently lubricated and provided with internal thermal overload protection.
  - Refrigerant Piping: Units shall have a sealed refrigerant circuit including a high efficiency scroll, rotary or reciprocating compressor designed for cooling operation, a capillary tube assembly for refrigerant metering, and safety controls including a high pressure switch, low pressure switch (loss of charge), and coil low temperature sensor. Refrigerant circuit access ports shall be fitted with locking type tamper resistant caps in strict accordance with the VMC.
  - Compressors: The compressors shall have an internal spring vibration isolation and sound muffling system. Compressors shall have internal thermal overload protection. Refrigerant to air condenser coil shall be leak tested to 200 PSIG pressure.
  - The heating section shall have standard two-stage gas. Heat exchanger shall be an induced draft design and shall incorporate a direct-spark ignition system and redundant main gas valve and shall be controlled by the unit controller. Heat exchanger design shall allow combustion process condensate to gravity drain. Heat exchanger construction shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance. Burner shall be of the in-shot type constructed of aluminum-coated steel.
  - Hot Gas Reheat: This option shall consist of a modulating hot-gas reheat coil located on the leaving air side of the evaporator coil pre-piped and circled with a low pressure switch. Thermostat for this unit shall include space relative humidity to initiate hot gas reheat, see Sequence of Control in Section TEMPERATURE CONTROL SYSTEM.

- Economizer: Unit shall include all necessary options to run factory economizer including outside air hood, modulating outside and return air dampers, barometric relief, and necessary controls and sensors.
  - Drain Pan: Drain Pan shall be constructed of corrosion resistant material and insulated to prevent sweating. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. Drain outlet shall be connected from pan directly to IPT fitting.
  - Filters: Filters shall be 2" thick MERV-8 pleated filters. All units shall be provided with filter rack and filters. New filters shall be provided prior to occupancy.
  - Unit Controller: Unit controls for safe automatic controlled operation of the system shall be factory furnished, microprocessor based, installed, and coordinated to operate with the Control system and Sequences specified in Section TEMPERATURE CONTROL SYSTEM. Controls shall be for stand-alone operation and include manufacturer 7-day programmable thermostat.
  - Roof Curb: Rooftop units shall be provided with factory fabricated curb suitable for vibration isolation rail. Curb shall consist of die formed galvanized steel sections. Curb shall be full perimeter type with gasketing provided for field installation between curb and unit base. Curb height shall be coordinated with the roofing system and shall be a minimum of 14" above the top of the roofing system. Curb shall be pitched to match the pitch of the roof such that the top of the curb is level without the use of shims or other similar devices. Unit curb shall fully encompass the unit perimeter (to include condensing unit section).
  - The system shall be completely charged with refrigerant and oil and shall be guaranteed to be free of leakage for one (1) year. Compressors shall have labor and material guaranteed to be free from defective materials or workmanship for five (5) years after final acceptance of the project.
  - A factory-trained service mechanic shall test and check out the system for safe, controlled operation. One week before final inspection, a letter from the unit manufacturer's representative shall be submitted to the Engineer certifying that the system is performing safely and satisfactorily.
  - Warranty: Unit shall be warranted to be free from defects in material and workmanship for a period of one year from the project final completion date. Motors shall be warranted by the motor manufacturer for a period of one year from the project final completion date. Motor-compressor shall be guaranteed for 5 years from the project final completion date.
  - Convenience Outlet: Provide factory-installed, field-wired convenience outlet where indicated on RTU schedules.
  - Safety: Unit shall be provided with a freestat to prevent freezing temperatures on the evaporator coil and factory installed overflow sensor in cooling coil drain pan.
  - Smoke Detector: Provide factory return air smoke detector where indicated on RTU schedules.
- FANS:
    - Rooftop Exhaust Fans: Greenheck Model indicated on drawings or equal, centrifugal non-overloading fan, backward inclined. Construction: The fan housing shall consist of the motor cover, shroud, curb cap, and lower windward and shall be constructed of heavy-gauge aluminum. The housing shall have a rigid internal support structure and leak-proof design. Wheels shall be statically and dynamically balanced in accordance to AMCA Standard 204.05. Motors shall be mounted on true vibration isolators, out of the airstream. Drive shall be belt drive. Bearings shall be pre lubricated and sealed at the factory. Bearings shall not be within the airstream. All fans shall bear the AMCA Certified Ratings Seal for both air and sound performance. Prefabricated Roof Curb: As scheduled and as specified in this section.
    - Prefabricated Roof Curbs: Galvanized steel or extruded aluminum, with continuous welded and mitered corner seams, to form a rigid and leak-proof shell. Curb material shall be compatible with the roof materials. Two inch wall thickness, rack or flange to support dampers, treated wood nailer 1 1/2 inch thick, 3 pound density rigid mineral fiberboard insulation with metal liner, built-in cant strip. For surface insulated roof, deck flange shall be recessed so the cant strip starts at the upper surface of the insulation. Curbs shall be built for pitched roof or ridge mounting as required to keep top of curb level. Curb height shall be minimum 14 inches above the top of the roofing system. Perimeter dimensions shall match equipment. Provide curb with integral backdraft damper.
    - In-line Exhaust Fans: Greenheck Model as indicated on drawings or equal, centrifugal fan, backward inclined. Construction: Straight through blower complete with backward curved non overloading aluminum blades, rubber mounted motor, square steel enclosure, rubber in shear vibration isolators, and disconnect switch wired to motor. Unit shall be suitable for mounting at any angle. Power unit shall be accessible without disconnecting ductwork. Motor and Drive: Drive shall be belt connected or direct drive as indicated on schedule. Bearings shall be pre lubricated and sealed at the factory. Fan shall bear the AMCA Certified Ratings Seal for both air and sound performance.
  - ELECTRIC WALL HEATERS:
    - Furnish and install Markel Modes indicated on drawings or equal electric wall heaters with capacities and voltage as indicated on the drawings.
    - Wall heaters shall be complete with enclosure, 18 gauge steel front grill with rigid aluminum extruded frame, thermal limit switch, fan and fan motor, and built-in disconnect switch and integral tamper-proof thermostat.
    - Heating element shall be sealed tubular type with parallel steel fins.
    - All controls shall be concealed behind a locked door.
    - Provide mounting for surface type as noted in equipment schedules.
  - ELECTRIC UNIT HEATERS:
    - Markel Model as indicated on drawings or equal. Furnish and install electric horizontal unit heaters of capacities and voltage as indicated on drawings. Heaters shall be U.L. labeled and approved.
    - Casing shall be constructed of heavy gauge furniture steel. It shall be phosphatized and completely dip painted with a heavy duty baked enamel.
    - Motor shall be of the totally enclosed continuous fan duty sleeve bearing type equipped with built in thermal overload protection. Each unit shall be equipped with a combination fan guard/motor support resiliently mounted at four points to absorb any motor vibration. The fan motor shall be wired within the unit heater to the electric heating coil power supply, thus eliminating need for external motor starters or a separate fan motor circuit to the unit.
    - Fan shall be of the direct drive, broad bladed propeller fan type that has been statically and dynamically balanced at the factory to eliminate vibration.
    - Electric coil shall be of the fired steel sheathed type and shall have built in overheat protection.
    - U.L. Label: The unit heater shall have a U.L. label attached to the unit heater.
    - Louver: The unit shall be equipped with louvers for horizontal diffusion.
    - Controls: The unit shall be controlled as shown on drawings. Thermostat location shall be as shown on drawings.
  - SPLIT-SYSTEM HEAT-PUMP:
    - General: Trane Model as indicated on drawings or equal. Equipment and material specified under this heading shall be furnished and installed by a certified representative of the unit manufacturer. System shall consist of Trane condensing unit, air unit, refrigerant piping, and system controls. System shall be fitted and rated in accordance with ARI Standard 210.
    - Condensing (outdoor) unit shall be complete with compressor-motor unit, direct expansion condenser-evaporator coil, outdoor fans, starters, controls, and change-over piping enclosed in a sheet steel enclosure recommended for outside installation. Outdoor fans shall be horizontal discharge. Provide guards for intake and discharge to protect coil and fan. Condensing unit controls shall provide for low ambient operation down to 0 Deg. F, outside air temperature. Crankcase heater shall be provided in compressor body. Provide compressor anti-short cycling control and low ambient control for cooling operation to 55 Deg. F. Mount unit on rails as indicated in this section.
    - Indoor fan section shall be complete with fan and motor with direct drive, heating-cooling coil with expansion device, washable filters and rack, and insulated steel casing enclosing fan, motor, starters, drive, coil, and filter. Drain pan shall be completely watertight. Provide rubber-in-shear vibration isolators for unit. Provide a trap in the condensate drain piping from the evaporator coil drain pan of sufficient depth to prevent blowout or siphoning of water.
    - Refrigerant lines shall be hard-drawn, dehydrated, and sealed copper tubing, sized and connected as recommended by the unit manufacturer. Suction line shall be insulated and effectively vapor sealed. Refrigerant circuit access ports shall be fitted with locking type tamper resistant caps in strict accordance with the VMC.

- Controls - Wall thermostat shall be programmable type with LED display, setback mode, override mode, heating/cooling setpoints, heating/cooling/auto modes, and fan On/Off/Auto modes.
  - The system shall be completely charged with refrigerant and oil and shall be guaranteed to be free of leakage for one (1) year.
  - The system shall be tested and checked out for safe, controlled operation. One week before final inspection, a letter from the unit manufacturer's representative shall be submitted to the Engineer certifying that the system is performing safely and satisfactorily. Compressors shall be guaranteed to be free from defective materials or workmanship for five (5) years after final acceptance of the project.
  - Equipment rails for mounting rooftop condensing unit shall be Greenheck Model GESR or equal for insulated roof. Welded aluminum or galvanized steel construction with wooden nailer and counter flashing
- TEMPERATURE CONTROL SYSTEM:
    - General - There is no central controls system for this building. Packaged Rooftop Air Handling Units shall run independently on the unit controller provided by the equipment manufacturer. Electric Unit Heater and Split System Heat Pump shall run on their respective unit controllers. Provide independent unit controllers for intake and roof exhaust fans as required to meet the Sequence of Control. Controllers shall be provided where indicated for the integration of Motor Operated Dampers with their associated equipment.
    - Provided component part to support these systems shall be manufactured by one control manufacturer and/or by the particular HVAC equipment manufacturer. In either case, the Temperature Control Contractor shall be responsible for achieving the "Sequence of Control". The system shall be installed by competent, trained mechanics. Room thermostat locations shall be coordinated to align vertically or horizontally with adjacent light switches or control instruments. Provide all equipment and materials as required to accomplish the Sequence of Control.
    - Materials
  - Thermostats: Cooling-only thermostats shall be as required for the Sequence of Control.
  - Damper Actuators: Controls Contractor shall provide actuators for dampers not factory installed by equipment manufacturers. Actuators shall be Mechanical Spring Return. Capacitors or other non-mechanical forms of fail-safe are not acceptable. The actuator mounting arrangement and spring return feature shall permit normally open or normally closed positions of the damper.
  - Coordination of Work: All wiring in connection with the Temperature Control System shall be furnished and installed by the Controls System Contractor. Wiring shall be installed in accordance with the Electrical Specification. Wiring without conduit above ceilings shall be properly supported without sags. Loose wires lying on ceilings, lights, or pipes will not be acceptable at any location.
  - Service and guarantee - Systems shall be serviced and maintained in first-class condition by the control manufacturer for a period of one year after acceptance at no extra cost to the Owner.
  - Sequence of Control:
 

Packaged Rooftop Air Handling Units (RTU-1,2,3,4,5,6):

    - Morning Warm-up/Cool Down Mode: The controls shall optimally start the unit and stage or modulate the gas heat or energize the DX cooling to reach occupied setpoint by scheduling occupied time. The outside air damper shall be closed and the return air damper shall be open.
    - Occupied Mode: The supply air fan shall operate continuously and the outside air damper shall open to the minimum outside air position. The DX cooling shall sequence or the gas heat shall stage to maintain room temperature setpoint of 75 Deg F in cooling and 70 Deg F in heating (adjustable). The outdoor air damper shall further modulate open in the economizer cycle. The return air damper shall modulate proportionately toward the closed position.
    - Economizer: An enthalpy economizer shall compare indoor and outdoor enthalpy or the outdoor air and return air temperature and modulate the unit outdoor air damper and return air damper during the cooling cycle to provide up to 100% outdoor air for free cooling. Economizer shall shut off when outdoor enthalpy exceeds return air enthalpy or when outdoor air temperature exceeds 75 deg. F.
    - Unoccupied Mode: The supply air fan shall cycle, the outside air damper shall close, the return air damper shall open, the unit gas heat shall stage/modulate or the DX cooling shall energize as required to maintain setback temperature of 80 deg F in cooling and 65 Deg F in heating (adjustable).
    - Hot Gas Reheat: At any time the space relative humidity exceeds 60 percent (adjustable), the unit shall energize and stage the DX cooling to maintain humidity setpoint. The unit shall modulate the hot gas reheat as necessary to maintain space temperature.
    - Safeties: Where indicated on the RTU schedules, a duct smoke detector shall be provided in the return air. On detection of products of combustion, the duct smoke detectors shall stop the unit.

Rooftop Exhaust Fan:

    - (EF-1) Fan shall run during occupied hours.

In-line Exhaust Fans:

    - (IEF-1) Fan shall be controlled by a line-voltage cooling thermostat. Upon a call for cooling, the exhaust air and makeup air motorized dampers shall open, and the fan shall energize. Prior to the fans energizing, the dampers shall be proven open by an end switch. Thermostat setpoint shall be 90 Deg. F (adjustable).
    - (IEF-1) Fan shall be controlled by a line-voltage cooling thermostat. Upon a call for cooling, the exhaust air and makeup air motorized dampers shall open, and the fan shall energize. Prior to the fans energizing, the dampers shall be proven open by an end switch. Thermostat setpoint shall be 90 Deg. F (adjustable).

Electric Unit Heater:

    - (EWH-1) Unit shall be controlled by a unit-mounted thermostat. When the unit is energized, the wall-mounted thermostat shall cycle the unit fan and control the electric heat to maintain the space temperature of 50 Deg. F (adjustable).
    - (EUH-1,2,3) Unit shall be controlled by a wall-mounted thermostat. When the unit is energized, the wall-mounted thermostat shall cycle the unit fan and control the electric heat to maintain the space temperature of 50 Deg. F (adjustable).

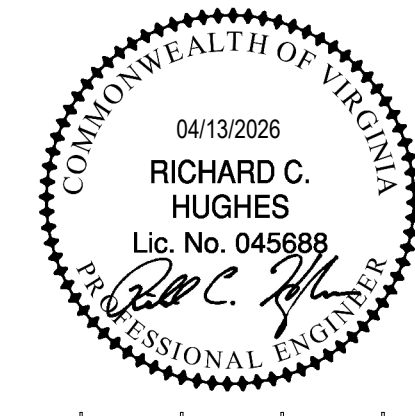
Split-System Heat-Pump (DSS-1 / HP-1):

    - System shall be controlled by the manufacturer-provided thermostat through the packaged unit controls. On a call for cooling from the thermostat, the condensing unit shall energize, and the indoor fan coil supply fan shall cycle to maintain space temperature setpoint, 80 Deg. F, (adjustable) A condensate overflow switch in the indoor unit shall shut down the system in the event of a high condensate level.



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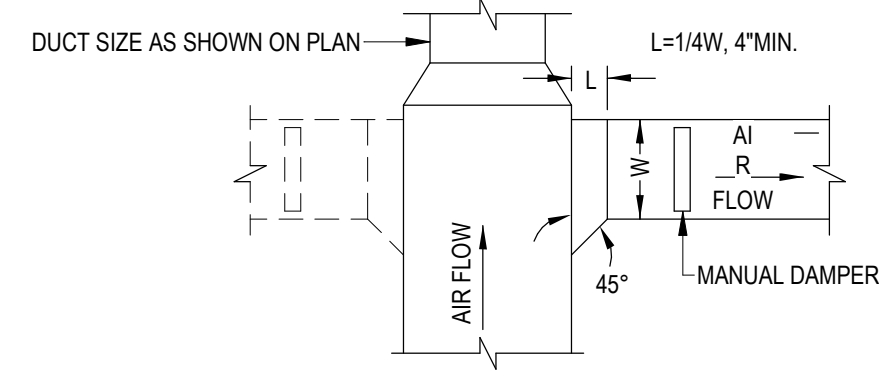


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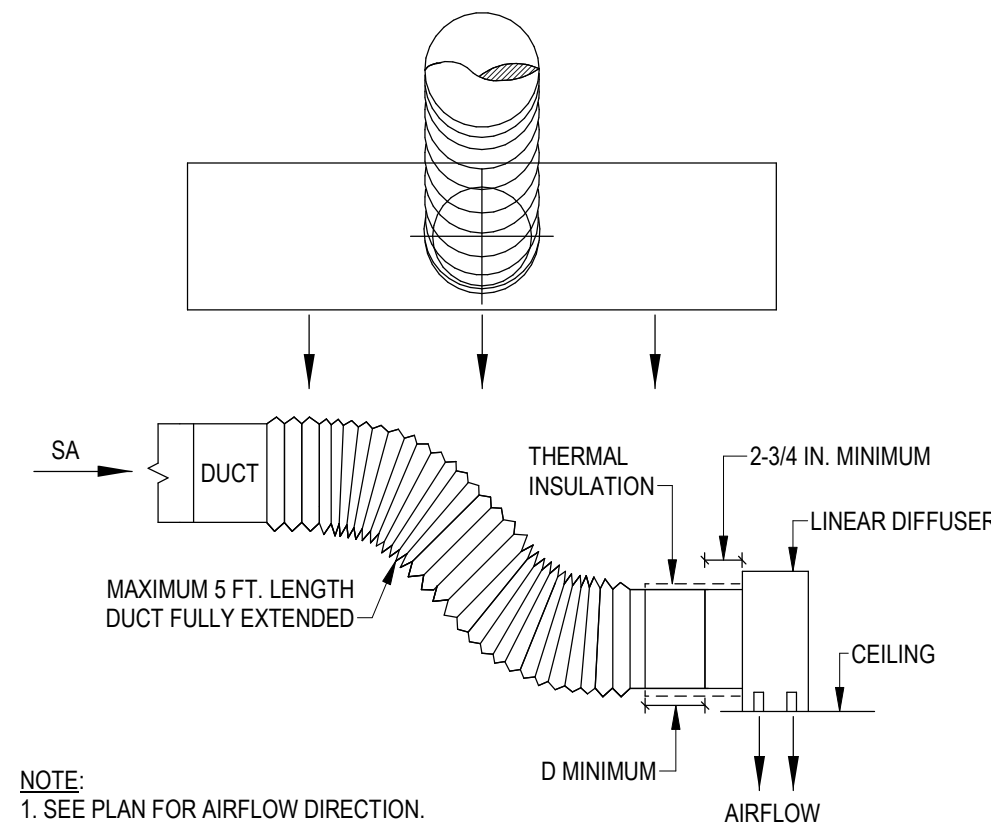
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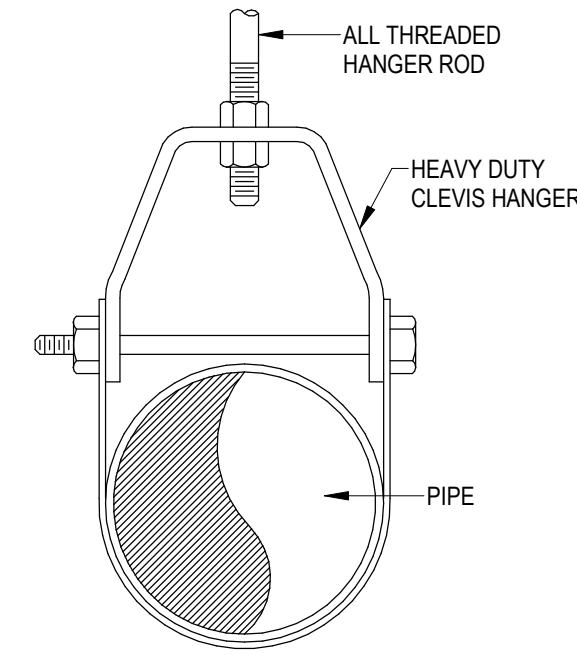
DRAWN BY **JCW**  
DESIGNED BY **JCW**  
CHECKED BY **RCH**  
DATE **04/13/2026**  
SCALE **12" = 1'-0"**  
REVISIONS



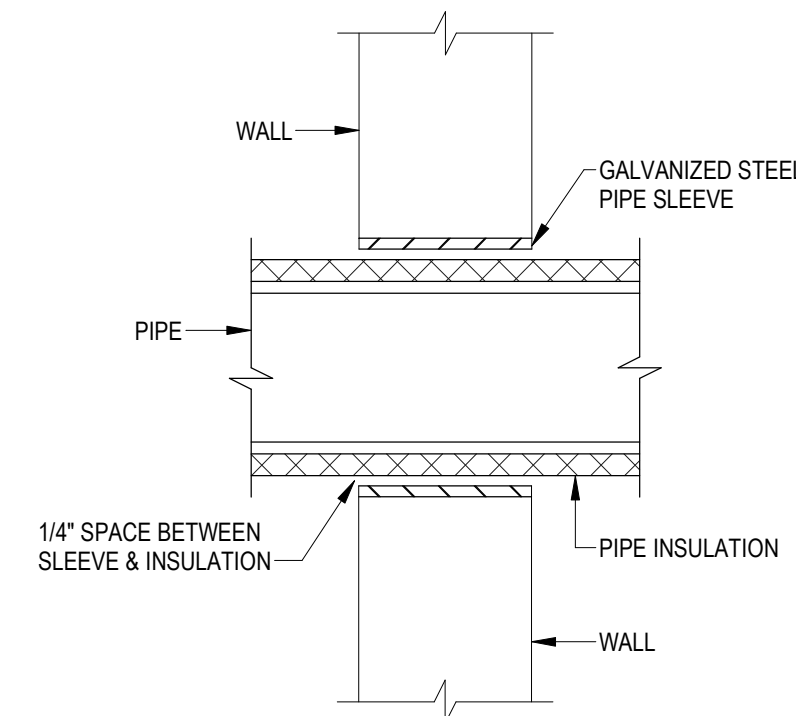
NOTE:  
**LATERAL BRANCH DUCT  
DETAIL**  
SCHEMATIC



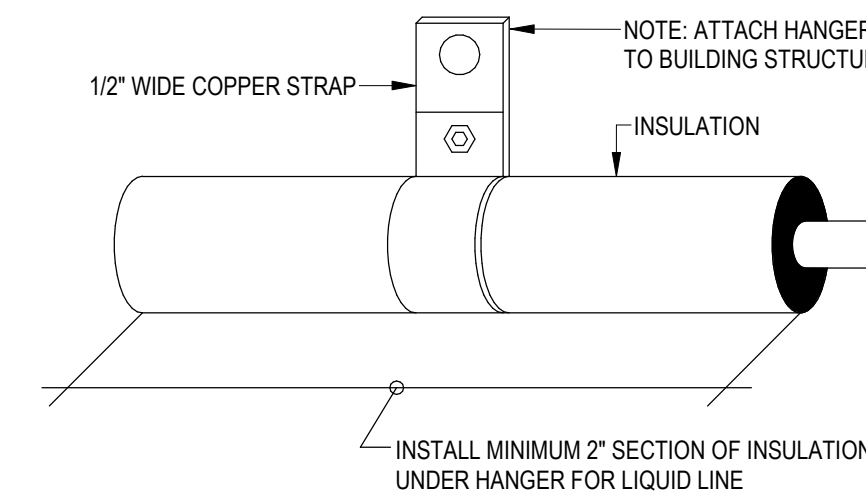
NOTE:  
1. SEE PLAN FOR AIRFLOW DIRECTION.  
**SLOT DIFFUSER DETAIL**  
NO SCALE



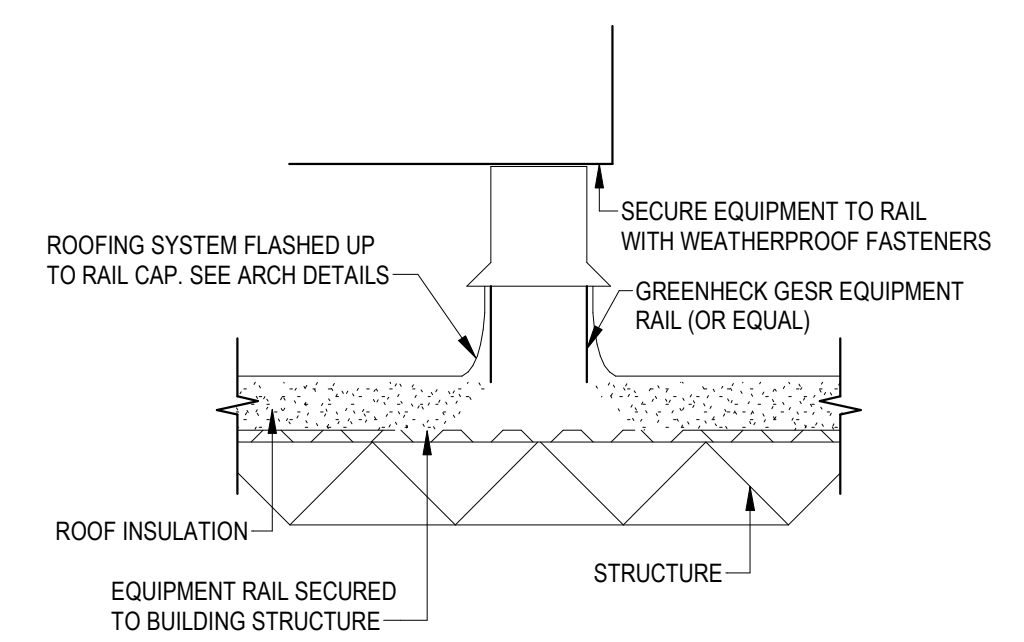
**WATER PIPE SUPPORT  
(NON-INSULATED) DETAIL**  
NO SCALE



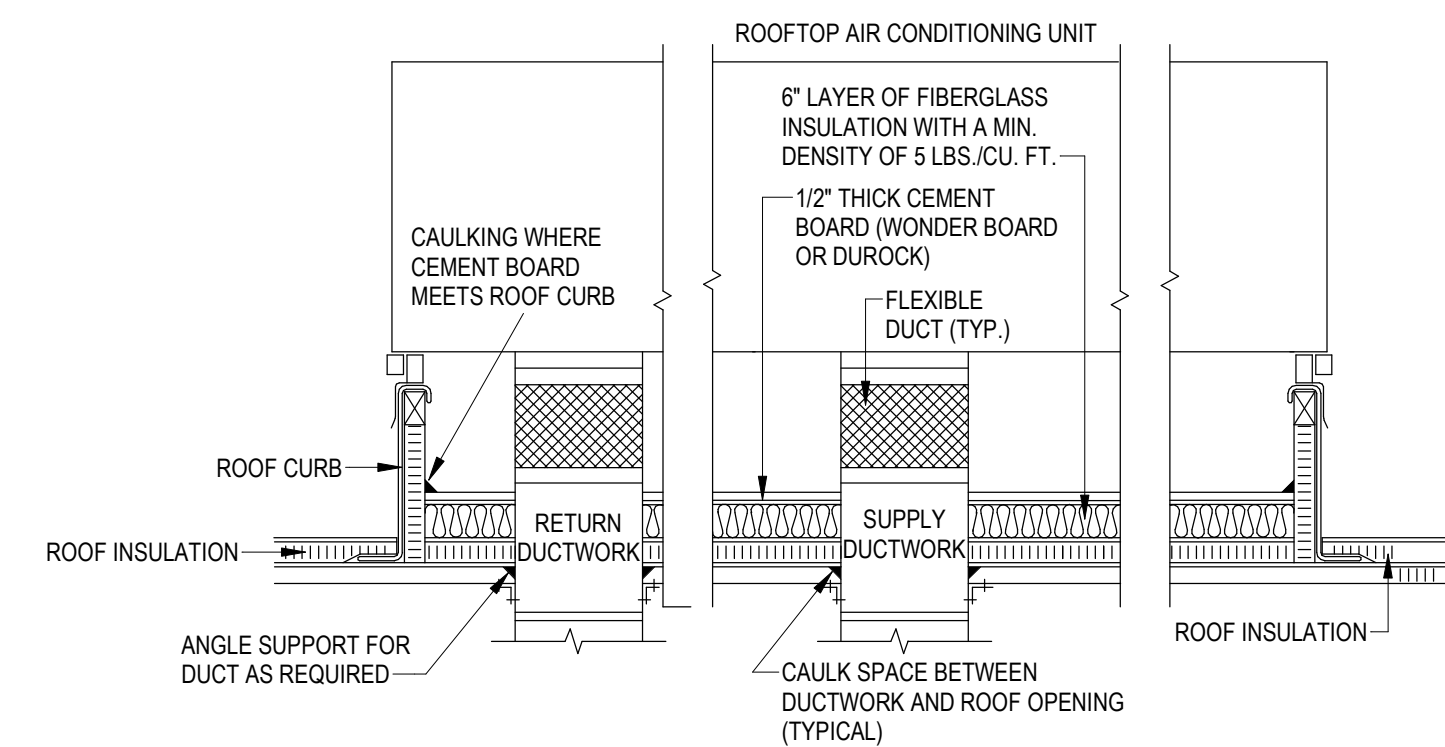
NOTE:  
WHERE PIPES PENETRATE FIRE-RATED WALLS, FILL SPACE BETWEEN PIPE & SLEEVE WITH A FIRE-RESISTANT MATERIAL WITH SUFFICIENT RATING TO MAINTAIN THE FIRE RATING OF THE WALL. WHERE PIPES PENETRATE EXTERIOR WALLS, FILL SPACE BETWEEN PIPE & SLEEVE WITH FIBERGLASS INSULATION.  
**WALL PIPE SLEEVE DETAIL**  
NO SCALE



**REFRIGERANT PIPING HANGER  
DETAIL**  
NO SCALE

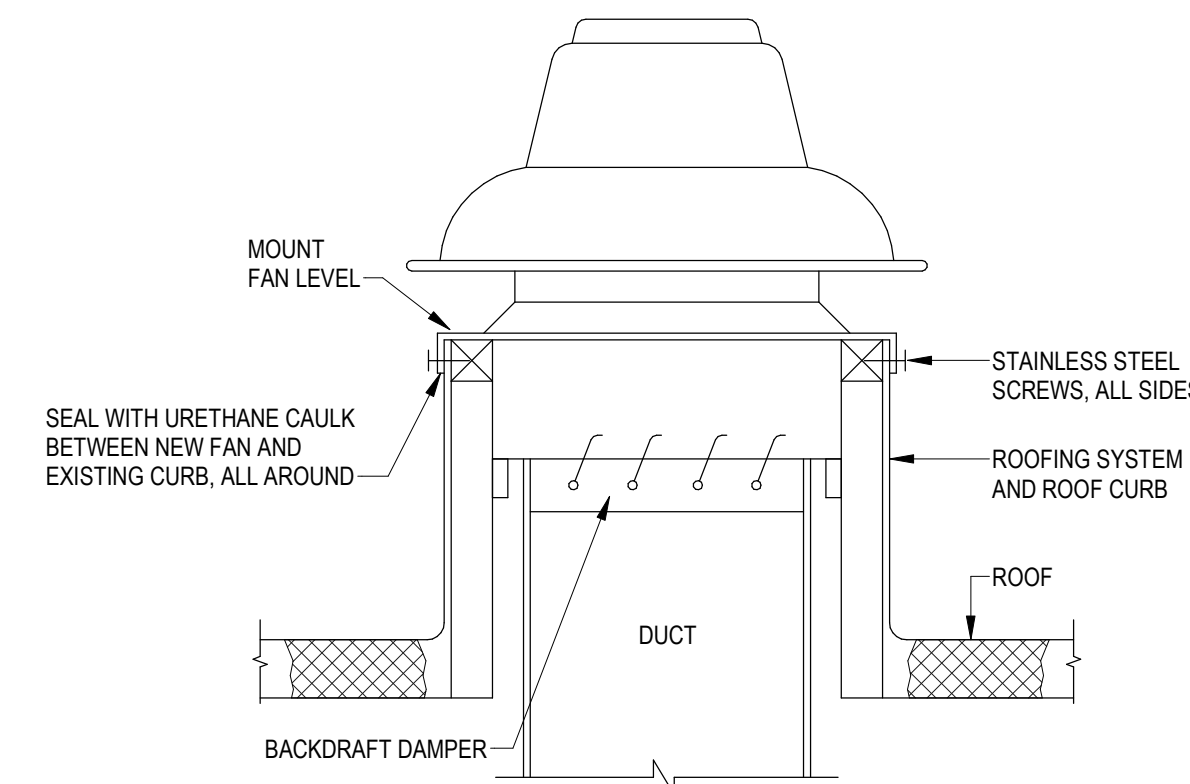


**EQUIPMENT RAIL SUPPORT  
DETAIL**  
NO SCALE

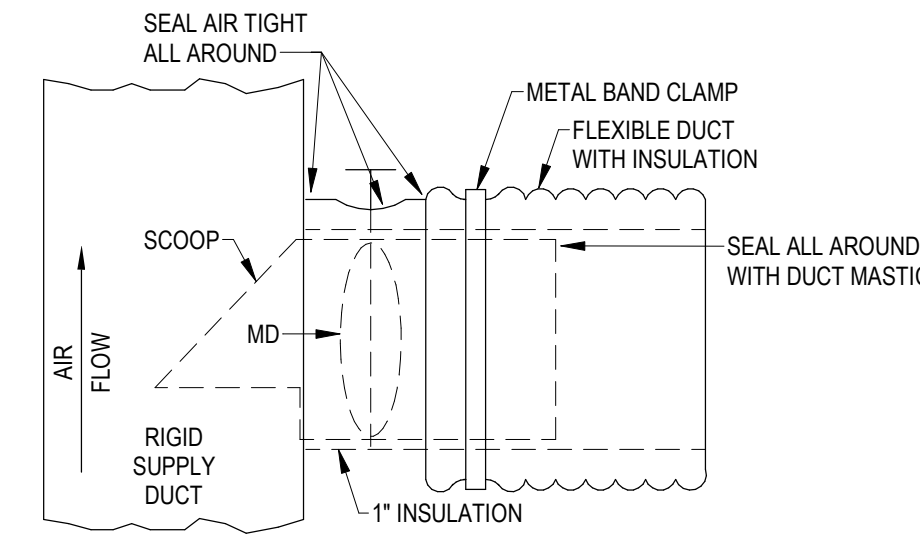


- NOTES:  
1. CUT ROOF OPENING JUST LARGE ENOUGH TO ACCOMMODATE SUPPLY AND RETURN DUCTWORK. CAULK AIR TIGHT THE SPACE BETWEEN DUCTWORK AND ROOF OPENINGS.  
2. PROVIDE 9# DENSITY INSULATION UNDER UNIT ON TOP OF ROOF AND INSIDE ROOF CURB. COVER INSULATION WITH 1/2" CEMENT BOARD AND CAULK BETWEEN CEMENT BOARD AND ROOF CURB.  
3. ROOF INSULATION SHALL EXTEND UNDER UNIT.  
4. PROVIDE ISOLATION RAILS.  
5. COORDINATE EXACT UNIT LOCATION AND SUPPORT WITH EXISTING STRUCTURAL SYSTEM.

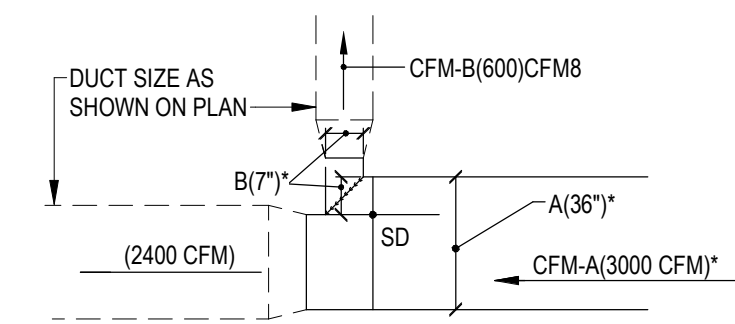
**ROOFTOP AIR CONDITIONING  
UNIT MOUNTING DETAIL**  
NO SCALE



**ROOF FAN DETAIL**  
NO SCALE

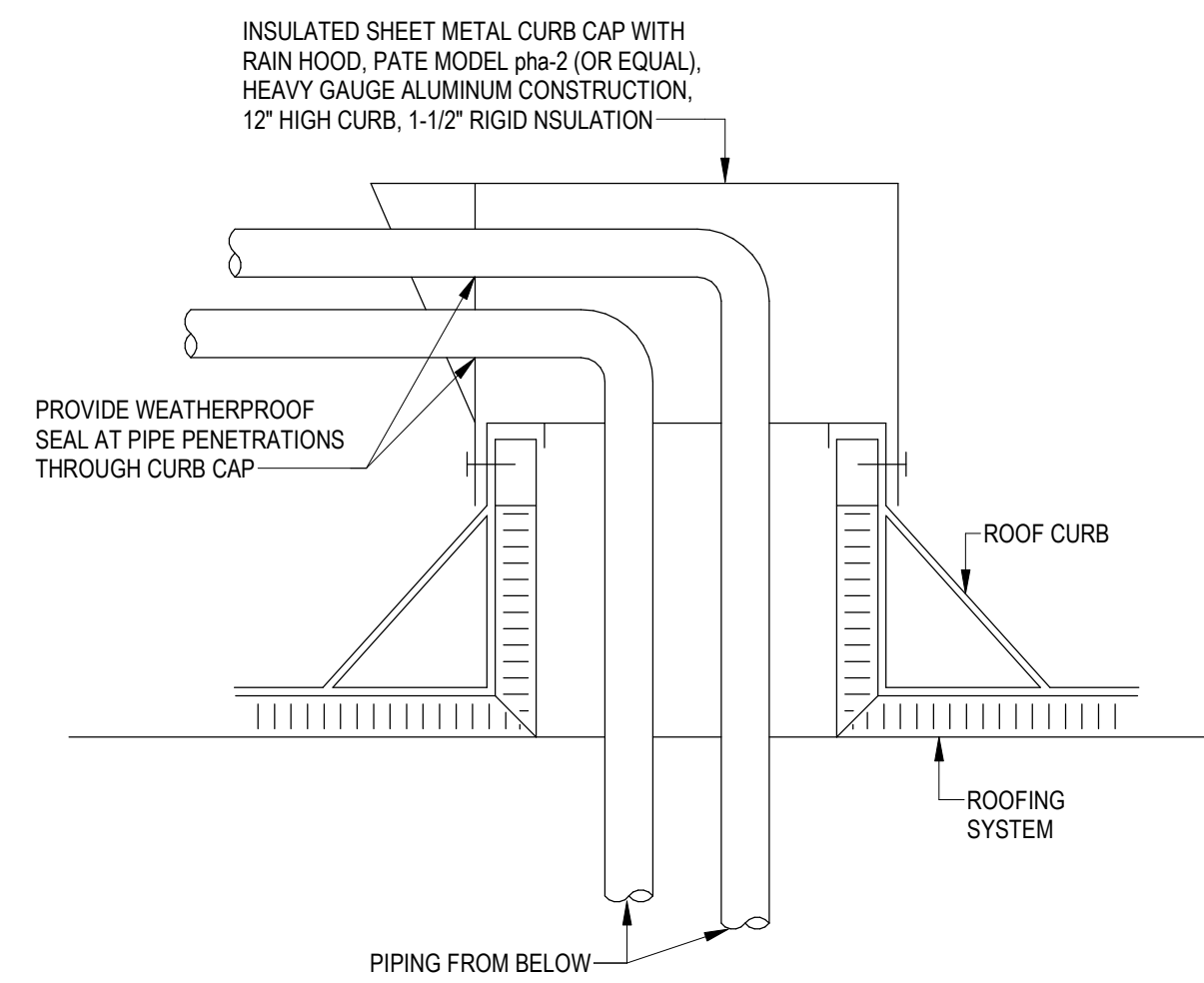


**SPIN-IN FITTING DETAIL**  
NO SCALE

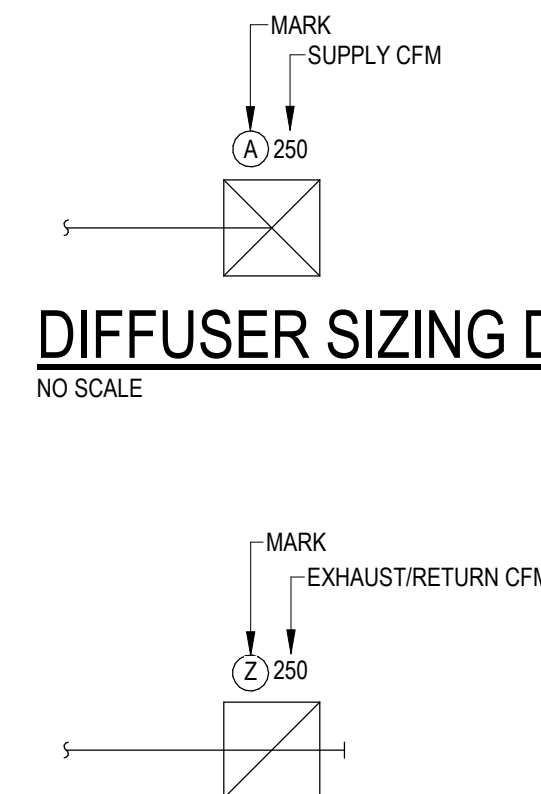


A - WIDTH OF DUCT MAIN BEFORE TAKE OFF.  
B - WIDTH OF TAKEOFF CONNECTION  
CFM-A - TOTAL AIR QUANTITY PASSING THRU DUCT AT A, INCLUDING QUANTITY REMOVED AT TAKEOFF B.  
CFM-B - AIR QUANTITY REMOVED AT TAKEOFF B.  
 $B = CFM-B / CFM-A \times A$   
\* EXAMPLE: CFM-A = 3000 CFM, CFM-B = 600 CFM, A = 36"  
 $B = \frac{600 \text{ CFM}}{3000 \text{ CFM}} \times 36" = 7.2"$   
SAY B = 7"(7.2" ROUNDED OFF TO THE NEAREST 1/2")

**SPLITTER DAMPER SIZING DETAIL**  
NO SCALE

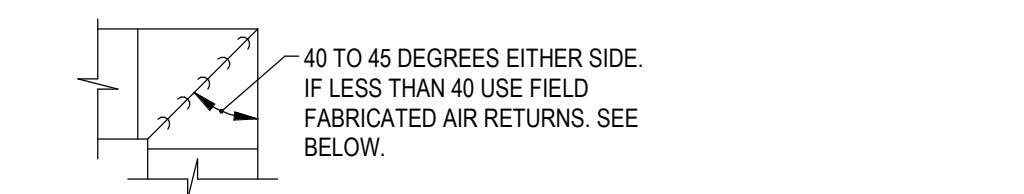


**ROOFTOP PIPING PENETRATION DETAIL**  
NO SCALE

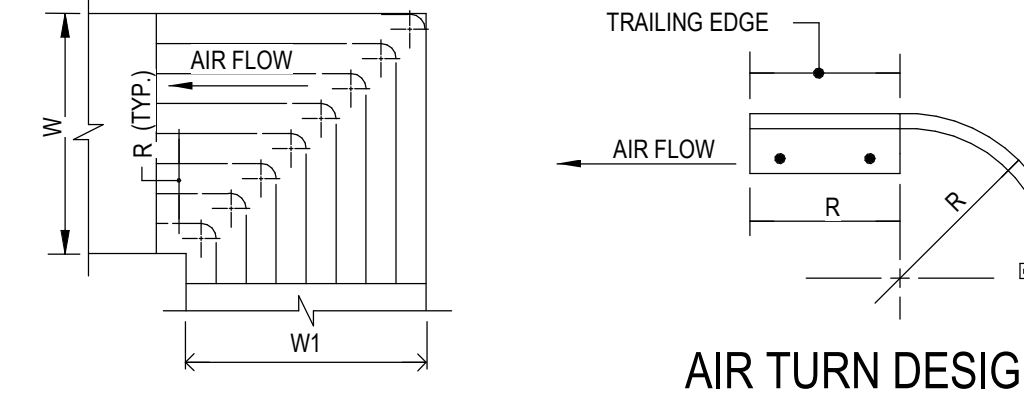


**DIFFUSER SIZING DETAIL**  
NO SCALE

**REGISTER SIZING DETAIL**  
NO SCALE



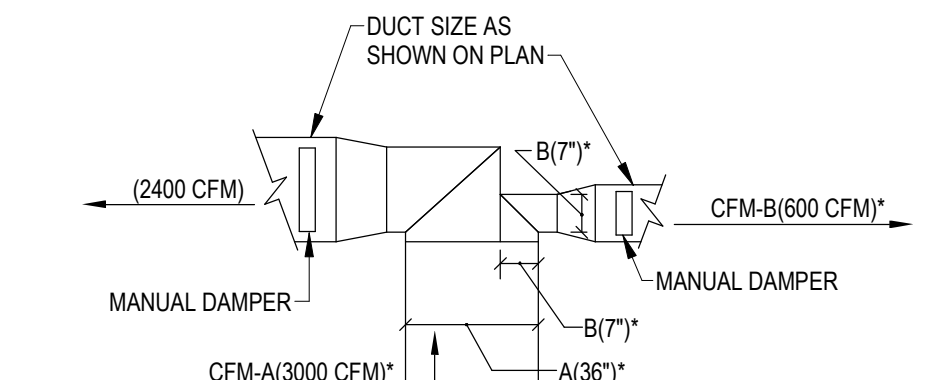
**FACTORY FABRICATED TURNING VANES**



**AIR TURN DESIGN**

**FIELD FABRICATED TURNING VANES**

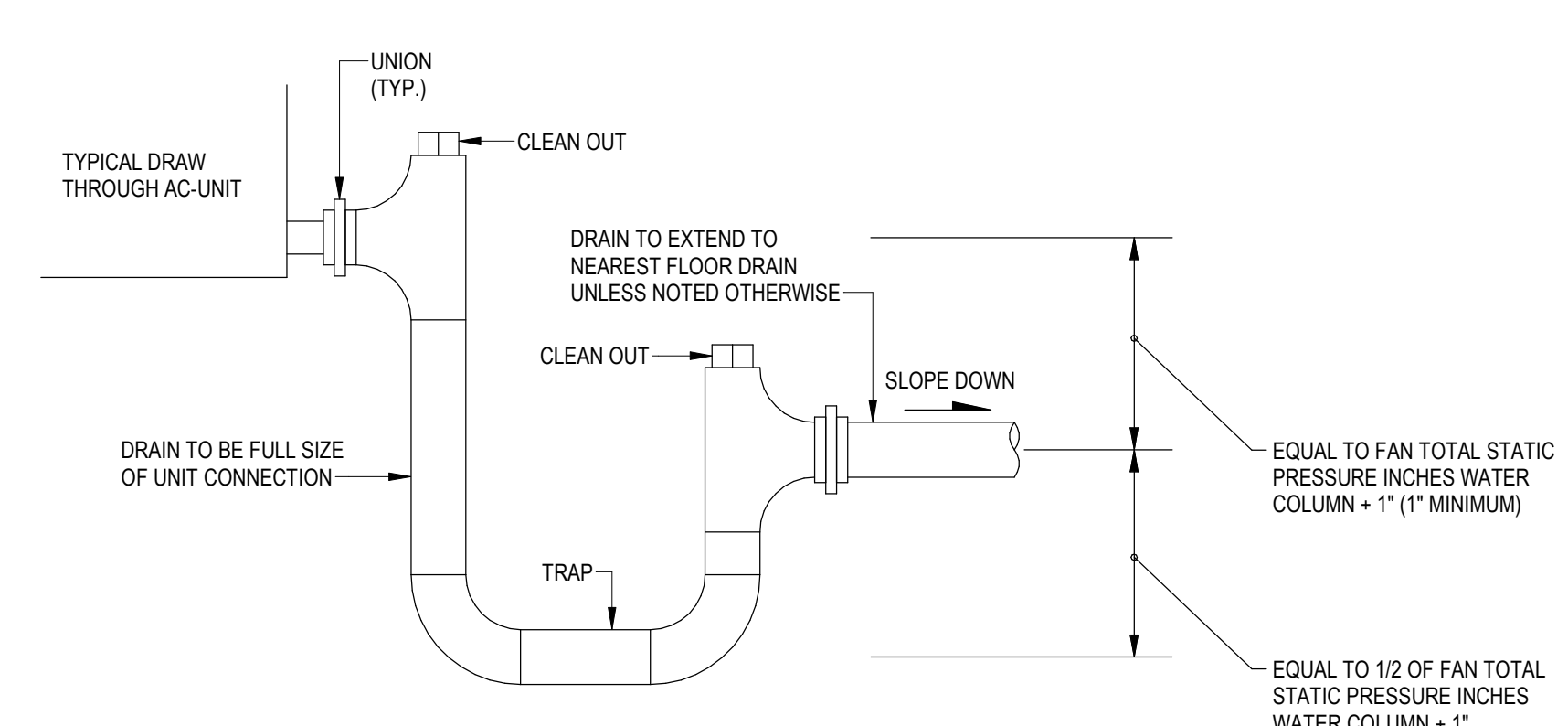
**TURNING VANE DETAIL**  
NO SCALE



A - WIDTH OF DUCT MAIN BEFORE TEE.  
B - WIDTH OF GIVEN BRANCH.  
CFM-A - TOTAL AIR QUANTITY PASSING THRU DUCT AT A, INCLUDING QUANTITY REMOVED AT BRANCH B.  
CFM-B - AIR QUANTITY REMOVED AT BRANCH B.  
 $B = \frac{CFM-B}{CFM-A} \times A$   
\* EXAMPLE: CFM-A = 3000 CFM, CFM-B = 600 CFM, A = 36"  
 $B = \frac{600 \text{ CFM}}{3000 \text{ CFM}} \times 36" = 7.2"$   
SAY B = 7"(7.2" ROUNDED OFF TO THE NEAREST 1/2")

NOTE:  
PROVIDE MD ONLY WHERE INDICATED ON DRAWINGS.

**TEE-BRANCH DUCT DETAIL**  
NO SCALE

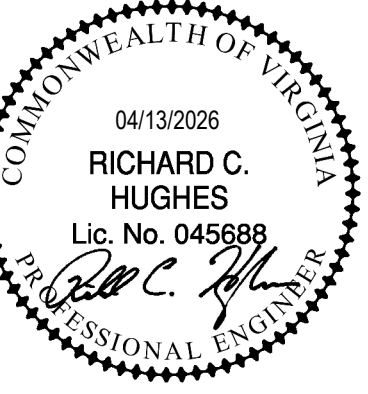


**COOLING COIL CONDENSATE DRAIN**  
NO SCALE



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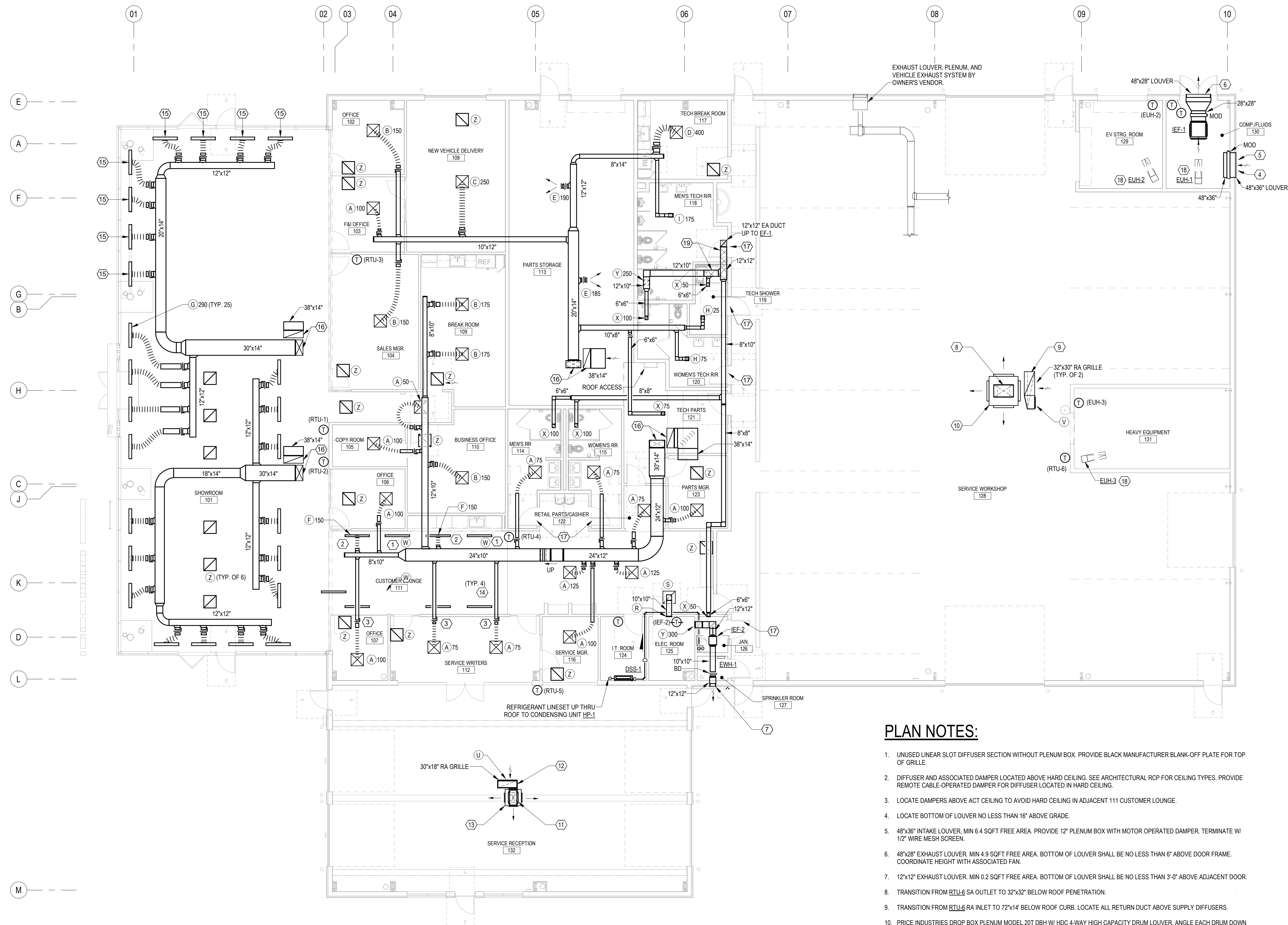


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DRAWN BY JCW  
DESIGNED BY JCW  
CHECKED BY RCH  
DATE 04/13/2026  
SCALE As indicated  
REVISIONS



**FIRST FLOOR PLAN - DUCTWORK**  
SCALE: 1/8" = 1'-0"

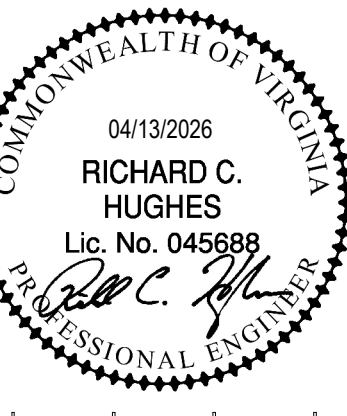
**PLAN NOTES:**

- UNUSED LINEAR SLOT DIFFUSER SECTION WITHOUT PLENUM BOX. PROVIDE BLACK MANUFACTURER BLANK-OFF PLATE FOR TOP OF GRILLE.
- DIFFUSER AND ASSOCIATED DAMPER LOCATED ABOVE HARD CEILING. SEE ARCHITECTURAL RCP FOR CEILING TYPES. PROVIDE REMOTE CABLE-OPERATED DAMPER FOR DIFFUSER LOCATED IN HARD CEILING.
- LOCATE DAMPERS ABOVE ACT CEILING TO AVOID HARD CEILING IN ADJACENT 111 CUSTOMER LOUNGE.
- LOCATE BOTTOM OF LOUVER NO LESS THAN 16" ABOVE GRADE.
- 48"x36" INTAKE LOUVER, MIN 6.4 SQFT FREE AREA. PROVIDE 12" PLENUM BOX WITH MOTOR OPERATED DAMPER. TERMINATE W/ 1/2" WIRE MESH SCREEN.
- 48"x28" EXHAUST LOUVER, MIN 4.9 SQFT FREE AREA. BOTTOM OF LOUVER SHALL BE NO LESS THAN 6" ABOVE DOOR FRAME. COORDINATE HEIGHT WITH ASSOCIATED FAN.
- 12"x12" EXHAUST LOUVER, MIN 0.2 SQFT FREE AREA. BOTTOM OF LOUVER SHALL BE NO LESS THAN 3'-0" ABOVE ADJACENT DOOR.
- TRANSITION FROM RTU-5 SA OUTLET TO 32"x32" BELOW ROOF PENETRATION.
- TRANSITION FROM RTU-5 RA INLET TO 72"x14" BELOW ROOF CURB. LOCATE ALL RETURN DUCT ABOVE SUPPLY DIFFUSERS.
- PRICE INDUSTRIES DROP BOX PLENUM MODEL 20T DBH W/ HDC 4-WAY HIGH CAPACITY DRUM LOUVER. ANGLE EACH DRUM DOWN 30 DEGREES FROM HORIZONTAL, ADJUST INDIVIDUAL BLADES TO SPREAD THROW ACROSS EACH WALL.
- TRANSITION FROM RTU-5 SA OUTLET TO 20"x20" BELOW ROOF PENETRATION.
- TRANSITION FROM RTU-5 RA INLET TO 38"x14" BELOW ROOF CURB. LOCATE ALL RETURN DUCT ABOVE SUPPLY DIFFUSERS.
- PRICE INDUSTRIES DROP BOX PLENUM MODEL 20T DBH W/ HDC 4-WAY HIGH CAPACITY DRUM LOUVER. ANGLE EACH DRUM DOWN 30 DEGREES FROM HORIZONTAL, ADJUST INDIVIDUAL BLADES TO SPREAD THROW ACROSS EACH WALL.
- PROVIDE MANUFACTURER RETURN AIR SIGHT BAFFLE ABOVE RETURN SLOT.
- PROVIDE BLACK GRILLE TO MATCH ARCHITECTURAL CEILING. SUBMIT MANUFACTURER COLOR OPTIONS WITH SUBMITTAL FOR APPROVAL BY ARCHITECT.
- TRANSITION FROM RTU MANUFACTURER RA/SA INLET/OUTLET TO DUCT DIMENSIONS NOTED ON DRAWINGS BELOW ROOF CURB.
- PROVIDE 3/4" UNDERCUT DOOR.
- MOUNT BOTTOM OF HEATER 9'-0" AFF.
- PROVIDE WATERTIGHT DUCTWORK FROM TECH SHOWER EXHAUST REGISTER UP TO EXHAUST FAN. SEE MECHANICAL SPECIFICATIONS.



**BALZER & ASSOCIATES**  
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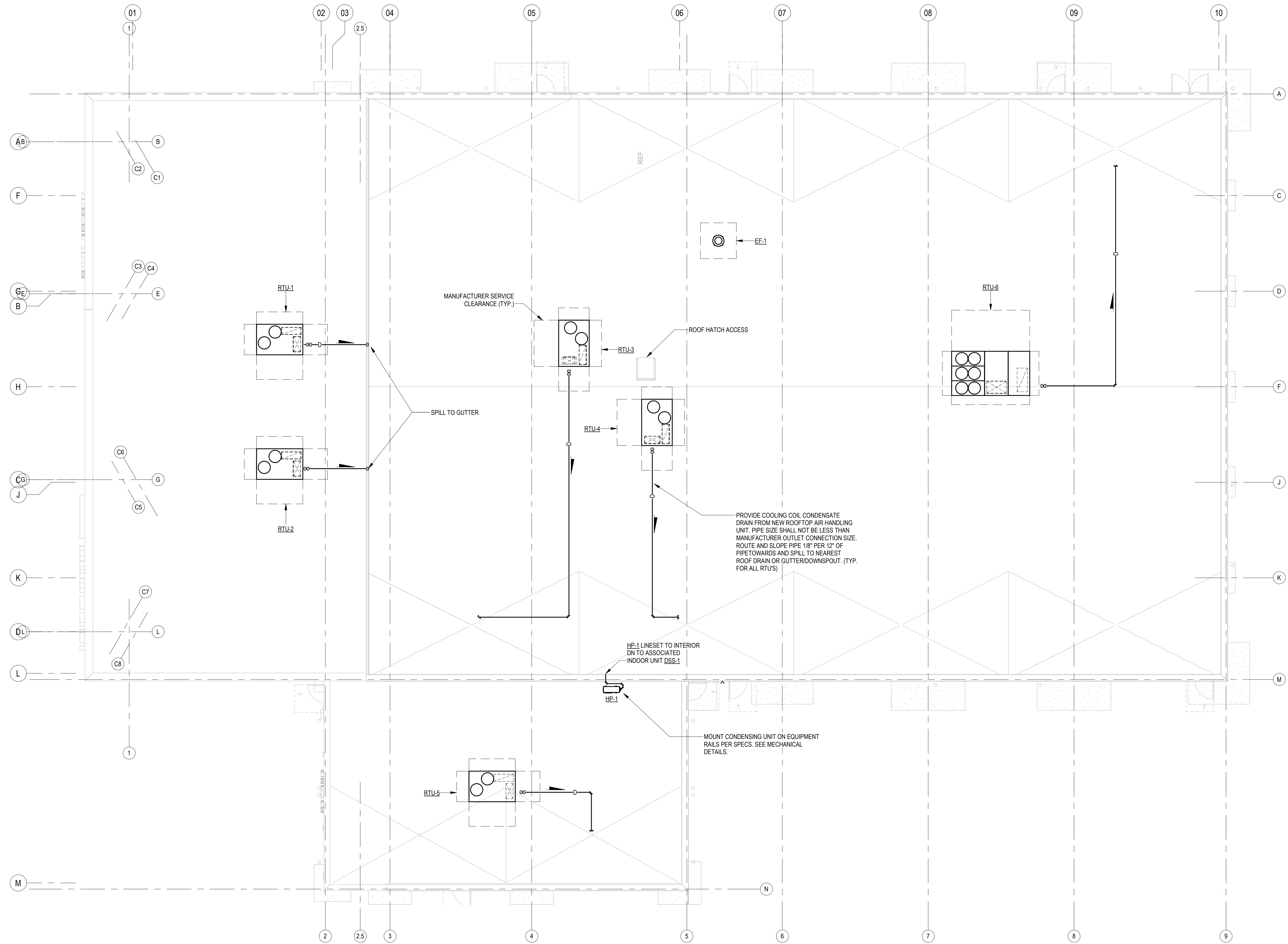
15 E Salem Avenue SE, Suite 101  
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**MOTOR MILE HYUNDAI**  
NEW COMMERCIAL BUILDING  
FIRST FLOOR PLAN - HVAC

2350 ROANOKE STREET  
CHRISTIANSBURG, VIRGINIA

DRAWN BY: JCW  
DESIGNED BY: JCW  
CHECKED BY: RCH  
DATE: 04/13/2026  
SCALE: 1/8" = 1'-0"  
REVISIONS:

**M1.01**

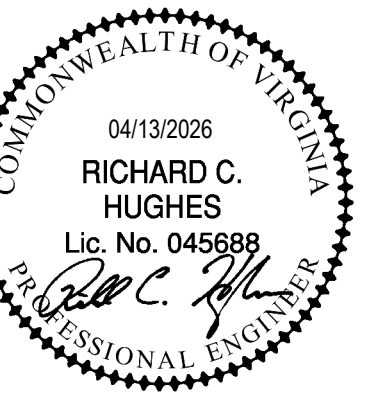


**ROOF PLAN - HVAC**  
 SCALE: 1/8" = 1'-0"



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