

PACKAGED ROOFTOP AIR CONDITIONING UNITS – GAS HEAT												
MARK	NOM TONS	SEER (IEER)	SUPPLY FAN		OA CFM EACH	GAS HEATER		ELEC V/PH	WEIGHT (LBS)	BASIS OF DESIGN		REMARKS
			CFM	ESP (W.G.)		INPUT MBH	EFF%			MANUFACTURER	MODEL	
RTU-4,5,6,7	4	14.0	1,600	0.8	335	100	81	208/3	700	TRANE	YSC048	(1)(2)(3)

- (1) UL AND CGA LISTED NAT GAS HEATING FURNACE AND DX COOLING UNIT; HEAVY GAUGE STEEL CABINET, BAKED ENAMEL FINISH; SEAMLESS TOP; REMOVABLE ACCESS PANELS; FWD CURVED, EVAPORATOR FAN W/ADJ BELT DRIVE; ALUMINUM STEEL HAT EXCHANGER W/INDUCED DRAFT BLOWER AND SPARK PILOT IGNITION; ALUMINUM FIN/COPPER TUBE EVAPORATOR COIL WITH FREEZE/STAT; FILTER RACK WITH 1" PLEATED MEDIA MERV-8 FILTERS; SCROLL COMPRESSOR WITH VIBRATION ISOLATION MOUNTING; THERMOSTATIC EXPANSION VALVE; ALUMINUM FIN/COPPER TUBE CONDENSER COIL W/HAIL GUARD; DIRECT DRIVE PROPELLER TYPE CONDENSER FAN; EXTERNAL SERVICE VALVES; REFRIGERANT FILTER DRYER; CRANKCASE HEATER; COMPRESSOR START ASSIST; SHORT CYCLE, THERMAL AND HI/LO PRESSURE COMPRESSOR OVERLOAD PROTECTION; CONTROL VOLTAGE TRANSFORMER; LOW AMBIENT KIT FOR COOLING OPERATION DOWN TO 0°F; SINGLE POINT ELECTRICAL CONNECTION; R-410A.
- (2) 7-DAY PROGRAMMABLE, AUTOMATIC CHANGEOVER THERMOSTAT WITH SETPOINT OVERLAP PROTECTION, 5°F DEADBAND, OPTIMUM START CONTROL, SETBACK CONTROL WITH 4 OCCUPIED/UNOCCUPIED EVENTS PER DAY, SYSTEM AUTO/HEAT/COOL/OFF CONTROL, 2-HOUR PROGRAM OVERRIDE, AND MIN 24 HR BATTERY BACKUP.
- (3) OA HOOD WITH BIRDSCREEN AND 2 POSITION, MOTORIZED OA DAMPER.

FANS											
MARK	TYPE	SERVICE	CFM	ESP (W.G.)	MOTOR	ELEC (60 HZ)		MAX SONES	BASIS OF DESIGN		REMARKS
						V/PH	DISC BY		MANUFACTURER	MODEL	
EF-4,5,6,7	CEILING-MTD	RESTROOMS	100	0.375	8.4 W	120/1	MC	2.3	GREENHECK	SP-110-VG	(1)

- (1) CENTRIFUGAL ROOF MOUNTED DOWNBLAST FAN; SPUN ALUMINUM HOUSING; ALUMINUM CENTRIFUGAL FAN WHEEL; BACKDRAFT DAMPER; BIRDSCREEN; ROOF CURB; CONDUIT CHASE; ECM MOTOR

OUTDOOR AIR REQUIREMENTS (GA MECHANICAL CODE 2018)							
SPACE TYPE	AREA (Az)	PEOPLE-RELATED OA			AREA-RELATED OA		MIN BREATHING ZONE OA, Vb (Pz x Rp) + (Az x Ra)
		# OCC (Pz)	CFM/OCC (Rp)	CFM (Pz x Rp)	CFM/SF (Ra)	CFM (Az x Ra)	
RETAIL/SALES	1138	17	7.5	127	0.12	136	263
RESTROOM	47	-	-	-	0.06	3	3
SUB-TOTAL (Vb)							266
ZONE AIR DISTRIBUTION EFFECTIVENESS (Ez)							0.8
MINIMUM ZONE OUTDOOR AIR REQUIRED (Voz/Ez)							333
ACTUAL OUTDOOR AIR PROVIDED							335

DIFFUSERS, REGISTERS, AND GRILLES												
MARK	TYPE	MOUNTING	NECK DAMPER	MAX NC	MAX ΔP	SIZE		MAT'L	FINISH	BASIS		REMARKS
						NECK	FRAME			MFGR	MODEL	
S1	4-WAY LOUVERED DIFFUSER	LAY-IN	N	30	0.1"	PER PLANS	24x24	AL	(3)	TITUS	TMS	(1)
S2	4-WAY LOUVERED DIFFUSER	SURFACE	Y	30	0.1"	PER PLANS	12x12	AL	(3)	TITUS	TDC	
R1	LOUVERED GRILLE	LAY-IN	N	30	0.05"	PER PLANS	24x24 UNO	AL	(3)	TITUS	3F	(1)(2)

- (1) INSTALL IN LAY-IN CEILING.
- (2) PROVIDE 12"H PLENUM WITH ROUND NECK FOR FLEX DUCT CONNECTION.
- (3) AIR DEVICE COLOR SHALL MATCH COLOR OF CEILING SYSTEM IN WHICH INSTALLED. CONTRACTOR SHALL COORDINATE.

HVAC ABBREVIATIONS			
ABBREV.	DEFINITION	ABBREV.	DEFINITION
A/C	ABOVE CEILING	L&S	LOUVER AND SCREEN
AD	ACCESS DOOR	LAHJ	LOCAL AUTHORITY HAVING JURISDICTION
AFF	ABOVE FINISHED FLOOR	LF	LINEAR FEET
B/F	BELOW FLOOR	MD	MANUAL DAMPER
B/G	BELOW GRADE	MECH	MECHANICAL
BB	BASE BUILDING	MFGR	MANUFACTURER
BD	BACKDRAFT DAMPER	MOD	MOTOR-OPERATED DAMPER
BLDG	BUILDING	MTD	MOUNTED
CD	CONDENSATE DRAIN	N/A	NOT APPLICABLE
CF(H/M)	CUBIC FEET PER (HOUR / MINUTE)	NC	NOISE CRITERIA
CLG	CEILING	NIC	NOT IN CONTRACT
CONC	CONCRETE	NOM	NOMINAL
CONN	CONNECT(ION)	OA	OUTSIDE AIR
CONT	CONTINUATION	OC	ON CENTERS
DIA	DIAMETER	OPNG	OPENING
DIV 15/16	DIVISION 15000 (MECH) / 16000 (ELEC)	PLBG	PLUMBING
DN	DOWN	RA	RETURN AIR
EA	EACH or EXHAUST AIR	SA	SHOULDER AIR
ELEC	ELECTRICAL	SF	SQUARE FEET
EXH	EXHAUST	SQ	SQUARE
EXIST	EXISTING	TBD	TO BE DETERMINED
FA	FREE AREA	THRU	THROUGH
FACP	FIRE ALARM CONTROL PANEL	TP	THERMOSTAT
FD	FIRE DAMPER	TY	TYPICAL
FLEX	FLEXIBLE	UNO	UNLESS NOTED OTHERWISE
FLR	FLOOR	WC	WATER COLUMN
FP	FIRE PROTECTION	WG	WATER GAUGE
FSD	COMBINATION FIRE AND SMOKE DAMPER	XFER	TRANSFER

HVAC LEGEND	
SYMBOL	DESCRIPTION
	EXISTING MECHANICAL CONSTRUCTION (CROSS HATCHED = TO BE REMOVED)
	CONNECTION TO EXISTING CONSTRUCTION
	AIR DEVICE TAG
	SUPPLY AIR DEVICE
	RETURN / EXHAUST AIR DEVICE
	DUCTWORK, SIZED AS SPECIFIED (LINED WHERE NOTED/SPECIFIED)
	FLEXIBLE DUCT OR CONNECTOR
	DUCTWORK, SIZED AS SPECIFIED (LINED WHERE NOTED/SPECIFIED)
	DUCT OFFSET: (R)ISE, (D)ROP - ARROW SHOWS DIRECTION OF OFFSET.
	FD = FIRE DAMPER
	FSD = FIRE/SMOKE DAMPER
	FD = FIRE DAMPER
	FSD = FIRE/SMOKE DAMPER
	MD = MANUAL DAMPER
	MOD = MOTOR-OPERATED DAMPER
	MOTOR-OPERATED DAMPER
	(T)HERMOSTAT, (H)UMIDISTAT

HVAC GENERAL NOTES	
1.	WORK SHALL BE INSTALLED BY A LICENSED CONTRACTOR IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES AND STANDARDS ADOPTED BY THE AUTHORITY HAVING JURISDICTION AND ALL APPLICABLE LOCAL ORDINANCES.
2.	CONTRACTOR SHALL OBTAIN ALL PERMITS, LICENSES, INSPECTIONS, ETC., AND PAY ALL INCIDENTAL FEES, AS REQUIRED TO OBTAIN A PERMIT AND A PERMANENT CERTIFICATE OF OCCUPANCY.
3.	WORK SHALL BE COORDINATED WITH ALL OTHER TRADES PRIOR TO INSTALLATION TO AVOID CONFLICTS. CONFLICTS WHICH ARISE DUE TO LACK OF PROPER COORDINATION SHALL BE CORRECTED AT THE CONTRACTOR'S COST.
4.	DESIGN INDICATED IS SCHEMATIC AND MAY NOT REFLECT ALL CONSTRAINTS IMPOSED BY ACTUAL PROJECT CONDITIONS. CONTRACTOR SHALL VISIT SITE AND REVIEW CONSTRUCTION DOCUMENTS (INCLUDING ALL TRADES) TO FAMILIARIZE HIMSELF WITH THE PROJECT PRIOR TO BID. CONTRACTOR'S BID SHALL INCLUDE ANY AND ALL COSTS REQUIRED TO REWORK THE DESIGN TO FIT WITHIN THE PHYSICAL CONSTRAINTS WHILE ACHIEVING THE OVERALL DESIGN INTENT.
5.	THE BASIS-OF-DESIGN PRODUCTS WERE USED TO DETERMINE DIMENSIONS, INSTALLATION AND ACCESS CLEARANCES, SUPPORTS, ELECTRICAL SERVICE, CONNECTION ARRANGEMENTS, ETC. WHERE ALTERNATE PRODUCTS ARE PROVIDED IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL REQUIREMENTS AND RECTIFY ANY CONFLICTS AT THE CONTRACTOR'S COST.
6.	ALL WORK SHALL BE INSTALLED TO AVOID CONFLICT WITH ELECTRICAL EQUIPMENT "DEDICATED SPACE" AS REQUIRED BY NEC AND LOCAL ORDINANCES. COORDINATE LOCATIONS OF ALL ELECTRICAL GEAR (DISTRIBUTION PANELS, TRANSFORMERS, SWITCHGEAR, ETC.) WITH ELECTRICAL CONTRACTOR PRIOR TO FABRICATION AND INSTALLATION.
7.	CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS FOR ALL EQUIPMENT AND DEVICES WITH THE ELECTRICAL CONTRACTOR PRIOR TO ORDERING.
8.	ALL MATERIALS AND EQUIPMENT SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO ORDERING. CONTRACTOR ASSUMES LIABILITY AND COSTS FOR ANY PRODUCT WHICH IS ORDERED PRIOR TO RECEIPT OF APPROVED SUBMITTALS.
9.	EQUIPMENT START-UP AND COMMISSIONING SHALL BE PERFORMED BY FACTORY-AUTHORIZED AGENTS ONLY. SUBMIT WRITTEN START-UP PROCEDURES TO OWNER FOR APPROVAL PRIOR TO PERFORMANCE OF START-UP ACTIVITIES. FINAL REPORTS SHALL BE APPROVED BY OWNER.
10.	ALL PENETRATIONS OF FIRE AND/OR SMOKE RATED ASSEMBLIES SHALL BE FIRE STOPPED WITH UL-LISTED SYSTEM APPROVED FOR THE APPLICATION.
11.	FLASH AND ALL PENETRATIONS OF BUILDING EXTERIOR, WALLS AND ROOF WITH APPROVED SEALANT.
12.	EXCEPT WHERE SPECIFIED OTHERWISE, MECHANICAL CONTRACTOR SHALL PROVIDE STARTERS AND ELECTRICAL DISCONNECTS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT.
13.	PROVIDE PERMANENT LABELS FOR ALL EQUIPMENT, CONTROLS, AND PIPING.
14.	ALL DUCTWORK SHALL BE G90 GALVANIZED STEEL, LOCK-FORMING QUALITY, FABRICATED AND INSTALLED PER SMACNA "THE DUCT CONSTRUCTION STANDARDS" AND CODE. DUCTWORK SHALL BE RATED FOR 1"WG, AND SEALED TO CLASS A SEAL USING UL-181B OR 181B WATER-BASED MASTIC. DUCT SIZES SHOWN ARE NET FREE AREA DIMENSIONS, ADJUST SHEETMETAL SIZE FOR DUCT LINER AS REQUIRED. INSULATE ALL CONCEALED METAL GENERAL DUCTWORK WITH 2", R-8 FIBERGLASS DUCT WR EXCEPT WHERE OTHERWISE SPECIFIED. PROVIDE 1", 1.5 PCF ACOUSTICAL FIBERGLASS DUCT LINER AT SUPPLY AND RETURN DUCTWORK FROM EQUIPMENT CONNECTION THRU FIRST 15 FEET OF DUCTWORK. DUCT LINER SHALL HAVE NEOPRENE COATING WITH ANTIMICROBIAL TREATMENT ON AIR SIDE.
15.	FLEXIBLE DUCT SHALL BE UL 181 CLASS 1, STEEL WIRE HELIX WITH REINFORCED INNER LAYER, R-4.2 FIBERGLASS INSULATION, AND FOIL-FACED OUTER VAPOR BARRIER.
16.	EXCEPT WHERE NOTED OTHERWISE, EACH SUPPLY AIR DEVICE SHALL HAVE MANUAL BALANCING DAMPER AT TAKE-OFF CONNECTION TO SUPPLY TRUNK DUCT.
17.	AIR DEVICES SHALL BE AS NOTED OR SCHEDULED. COORDINATE BORDER AND MOUNTING WITH SURFACE IN WHICH INSTALLED, REFER TO ARCHITECTURAL DRAWINGS. AIR DEVICES IN FINISHED SPACES SHALL BE FREE OF VISIBLE FASTENERS. COLOR AND FINISH SHALL BE APPROVED BY THE ARCHITECT.
18.	PROVIDE UL 555 FIRE DAMPERS (UL 555S COMBINATION FIRE/SMOKE DAMPERS) AT ALL AIR DISTRIBUTION SYSTEM PENETRATIONS OF FIRE RATED (FIRE AND SMOKE RATED) ASSEMBLIES.
19.	SUPPORT EQUIPMENT DIRECTLY FROM BUILDING STRUCTURE PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE VIBRATION ISOLATION FOR ALL EQUIPMENT WITH ROTATING PARTS.
20.	TEST EQUIPMENT, ECONOMIZERS, AND CONTROLS FOR PROPER OPERATION, CALIBRATION AND ADJUSTMENT.
21.	PROVIDE COMPLETE AS-BUILT DRAWINGS FOR ALL HVAC SYSTEMS AND O&M MANUALS FOR ALL EQUIPMENT TO OWNER WITHIN 90 DAYS OF SYSTEM ACCEPTANCE. AS-BUILT DRAWINGS SHALL NOT BEAR THE NAME OR SEAL OF THE ARCHITECT OR ENGINEER.
22.	CONDENSATE PIPING TO BE SCHEDULE 40 PVC PIPE SLOPED AT 1/8" PER FOOT. CONDENSATE PIPE SHALL NOT BE LESS THAN 3/4" AND SHALL NOT DECREASE IN SIZE.
23.	REMOVE ANY HVAC CONSTRUCTION WHICH IS NOT TO BE REUSED.

TESTING, ADJUSTING AND BALANCING	
1.	PROVIDE CERTIFIED TESTING, ADJUSTING, AND BALANCING (TAB) REPORT FOR ALL MECHANICAL CONSTRUCTION SERVING AREAS UNDER THIS SCOPE OF WORK. TAB SHALL BE PERFORMED BY NEBB OR ABC CERTIFIED AGENT, USING PROCEDURES COMPLYING WITH CERTIFYING AUTHORITY. SUBMIT FINAL REPORT TO ENGINEER FOR REVIEW AND APPROVAL.
2.	REPORT SHALL INCLUDE NAME, CONTACT INFORMATION, AND PROOF OF CERTIFICATION FOR TAB AGENT.
3.	FINAL BALANCE ALL QUANTITIES TO WITHIN +/-5% OF DESIGN. ADJUST FAN SPEED TO LOWEST POSSIBLE.
4.	KITCHEN HOODS SHALL BE BALANCED BY TESTING AGENCY CERTIFIED BY HOOD MANUFACTURER.
5.	AT A MINIMUM, THE FOLLOWING SHALL BE CERTIFIED IN THE REPORT (DESIGN QUANTITIES AND FINAL, BALANCED QUANTITIES):
5.1.	MANUFACTURER, MODEL #, AND SERIAL # OF ALL EXISTING AND NEW EQUIPMENT.
5.2.	ELECTRICAL CHARACTERISTICS OF ALL EXISTING AND NEW EQUIPMENT.
5.3.	AIR CONDITIONING SYSTEM PERFORMANCE: UNIT SUPPLY AIR FLOW, UNIT OUTSIDE AIR FLOW, FAN INLET AND DISCHARGE PRESSURES, UNIT INLET AND DISCHARGE PRESSURES, FAN SPEED AND AMP DRAW, COOLING AND HEATING COIL ENTERING AND LEAVING TEMPERATURES (DRY BULB AND WET BULB), OUTSIDE AIR TEMPERATURE (DRY BULB AND WET BULB).
5.6.	AIR DISTRIBUTION: AIRFLOWS AT EACH AIR DEVICE, CONFIRMATION OF DIRECTIONAL ADJUSTMENT OF SUPPLY DIFFUSER PATTERN CONTROLLERS WHERE NOTED ON PLANS.
5.7.	DESCRIPTION OF ANY PROBLEMS NOTED DURING BALANCING.

Order Plans @

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