

MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

SCOPE

FURNISH, INSTALL, TEST, PLACE INTO OPERATION AND GUARANTEE, COMPLETE, OPERABLE, AND APPROVED MECHANICAL AND PLUMBING WORK. SECURE AND PAY FOR ALL MATERIALS, EQUIPMENT, LABOR, SUPERVISION, FEES, TESTS, PERMITS, AND ALL OTHER COSTS REQUIRED.

REGULATIONS IN EFFECT

NATIONAL, STATE, AND CITY CODES, ORDINANCES, ETC., HAVING JURISDICTION. RULES AND REQUIREMENTS OF UTILITY SERVING AGENCIES.

NO ADDITIONAL FUNDS WILL BE ALLOCATED FOR WORK REQUIRED TO CONFORM TO REGULATIONS AND REQUIREMENTS.

QUALIFICATIONS OF WORKMEN

USE SUFFICIENT JOURNEYMEN CRAFTSMEN AND COMPETENT SUPERVISORS, TO ENSURE PROMPT, PROPER, AND SAFE EXECUTION OF WORK.

DESIGN DRAWINGS

DESIGN DRAWINGS ARE DIAGRAMMATIC AND ONLY DEFINE BASIC FUNCTIONS REQUIRED. PROVIDE ALL WORK, MATERIAL, ETC., TO ACCOMPLISH THESE REQUIREMENTS. MINOR DEVIATIONS FROM DESIGN LAYOUT ARE ANTICIPATED AND ARE A PART OF WORK INCLUDED, HOWEVER, MAKE NO CHANGES THAT ALTER CHARACTER OF WORK. DO NOT SCALE DESIGN DRAWINGS.

SHOP DRAWINGS

INDEXED BROCHURE COMPLETELY DESCRIBING MAJOR PRODUCTS AND SYSTEMS (SEVEN HARD BOUND COPIES).

FOR INFORMATION AND COORDINATION ONLY. PROVIDE SUFFICIENT DATA TO CLEARLY DEFINE THE WORK REQUIRED OF OTHER TRADES FOR PROPER INSTALLATION, OPERATION, AND SERVICE OF EQUIPMENT.

SHOP DRAWINGS ARE NOT A FORUM FOR CHANGES IN PROJECT SCOPE OR REQUIREMENTS.

PART 2 - PRODUCTS

GENERAL

NEW AND UNUSED PRODUCTS OF ESTABLISHED AND REPUTABLE AMERICAN MANUFACTURERS. SIMILAR ITEMS SHALL BE OF SAME MANUFACTURER.

COMPLETE AND OPERABLE SYSTEMS. INCLUDE ANY AND ALL ACCESSORIES REQUIRED FOR PROPER OPERATION AS THOUGH SPECIFICALLY INDICATED. SUCH AS: FILTERS, CONDENSATE DRAINS WITH VENTED TRAPS, RELIEF VALVES, SERVICE VALVES AND STOPS, THERMOSTATS, LOW VOLTAGE WIRING, VIBRATION ISOLATORS, AND ITEMS SPECIFICALLY RECOMMENDED BY MANUFACTURER.

REFERENCE TO A MANUFACTURER'S PRODUCT IS TO ESTABLISH TYPE, QUALITY, AND PERFORMANCE REQUIRED. THESE QUALIFICATIONS ARE IN ADDITION TO REQUIREMENTS SHOWN ELSEWHERE.

AIR CONDITIONING UNITS

AIR COOLED DIRECT EXPANSION TYPE UNIT WITH REVERSE CYCLE HEATING. DECORATIVE WEATHERPROOF CABINET, ENAMEL FINISH. FACTORY PREWIRED INCLUDING CONTROLS, SAFETIES, MOTOR STARTERS, ETC.. BALANCED CENTRIFUGAL MULTI-SPEED SUPPLY AIR BLOWER, ACCESSIBLE FOR LUBRICATION. VERTICAL DISCHARGE CONDENSER FAN.

REFRIGERANT SYSTEM. HERMETIC COMPRESSORS WITH FIVE (5) YEAR WARRANTY. COPPER PIPING THROUGHOUT. INCLUDE SERVICE AND CHARGING VALVES, FILTER DRYER, HIGH-LOW PRESSURE CONTROLS, REFRIGERANT ACCUMULATOR, AND CRANKCASE HEATER.

EXHAUST FANS:

CEILING MOUNTED, CENTRIFUGAL DIRECT-DRIVE. STATICALLY AND DYNAMICALLY BALANCED. FURNISH WITH OVERLOAD PROTECTION, DISCONNECT, BACKDRAFT DAMPER. ACOUSTIC LINED HOUSINGS IN UNITS OVER 100 CFM.

ROOF MOUNTED: BELT DRIVE. STATICALLY AND DYNAMICALLY BALANCED. FURNISH WITH OVERLOAD PROTECTION, DISCONNECT, BACKDRAFT DAMPER.

DUCTWORK

GALVANIZED STEEL. MATERIAL GAGES, JOINTS, SUPPORTS AND BRACING IN COMPLIANCE WITH MECHANICAL CODE AND SMACNA RECOMMENDATIONS.

ALTERNATE (AIR CONDITIONING BELOW ROOF ONLY): 1" THICK FIBERGLASS DUCTBOARD, WITH FOIL-SCRM-KRAFT FIRE RESISTANT OUTER JACKET, CLOSED WITH THERMAL-ACTIVATED TAPE. DO NOT UTILIZE PRESSURE SENSITIVE TAPE. UL-181 (CLASS I) AND NFPA 90A AND 90B.

FLEXIBLE DUCT FOR AIR CONDITIONING TERMINAL BRANCHES: 1" THICK FIBERGLASS DUCT SUPPORTED OVER SPRING STEEL WIRE HELIX. WOVEN FIBERGLASS MESH LINER AND FIBERGLASS REINFORCED METALIZED OUTER JACKET. UL-181 (CLASS I) AND NFPA 90A AND 90B.

RTI-6: UTILIZE ALUMINUM DUCTWORK FOR THESE UNITS

DUCT INSULATION

REFER TO COMCHECK

GRILLES, REGISTERS, AND DIFFUSERS

SELECT AND SIZE AIR DISTRIBUTION DEVICES IN ACCORDANCE WITH THE REQUIREMENTS OF EACH APPLICATION. DEVICES, GENERALLY, SHALL PROVIDE UNIFORM, DRAFT-FREE AND QUIET AIR DISTRIBUTION. RIGID FRAMES, COMPATIBLE WITH SURFACE OR STRUCTURE.

PART 3 - EXECUTION

GENERAL

PERFORM ALL WORK IN BEST TRADE PRACTICE. ARRANGE FOR GREATEST PRACTICAL EASE OF OPERATION AND SERVICE. INSTALL SQUARELY WITH BUILDING LINES, PROVIDE RIGID, PERMANENT, LEVEL, BASES AND SUPPORTS. ELIMINATE VIBRATION AND RATTLING.

FOLLOW THESE SPECIFICATIONS AND MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.

COVER AND PROTECT ALL EQUIPMENT AND MATERIALS FROM WEATHER, THEFT, ETC.. PLUG OR CAP ALL OPEN ENDS OF INSTALLED PIPING AND DUCTWORK.

ROUGH-IN AND FINAL CONNECTIONS

THE DRAWINGS INDICATE GENERAL ARRANGEMENTS ONLY. PROVIDE ROUGH-IN AND FINAL CONNECTIONS FOR FIXTURES AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S SUGGESTIONS AND PRODUCT REQUIREMENTS.

DUCTWORK

RIGID AND AIRTIGHT. TIGHTLY FITTED JOINTS WITH NO VOIDS. CLOSE MINOR GAPS WITH CANVAS TAPE SET INTO AND SEALED WITH BRUSH APPLIED ADHESIVE, OR WITH SILICONE

CAULKING COMPOUND. DO NOT UTILIZE PRESSURE SENSITIVE TAPE.

THROAT RADIUS OF ELBOWS EQUAL TO DUCT WIDTH OR USE SQUARE ELBOWS WITH TURNING VANES. TRANSITIONS NOT TO EXCEED 4 TO 1 RATIO.

SIZES SHOWN ARE NET INSIDE DIMENSIONS.

SEAL ALL JOINTS OF DUCTWORK ABOVE ROOF WITH GLASS FIBER TAPE EMBEDDED IN ROOFING CEMENT. APPLY SECOND COAT OF CEMENT AFTER FIRST HAS SET AND FINISH WITH TWO COATS OF ALUMINUM ROOFING PAINT.

SHIP-LAP CUT ALL JOINTS IN FIBERGLASS DUCTWORK. USE METAL REINFORCING AT ALL CONNECTIONS. CLOSE WITH THERMAL ACTIVATED TAPE.

CONNECT FLEXIBLE DUCTS TO RIGID TRUNK DUCTS WITH FACTORY FABRICATED FITTINGS WITH DAMPER AND SCOOPI (WHERE "TAPINS" SERVE SINGLE OUTLETS, AND WHERE TAP-IN DAMPER IS ACCESSIBLE, OUTLET DAMPER MAYBE OMITTED). SECURE FLEX DUCT WITH FANDUIT CLAMPS, INSTALLED TO FACTORY RECOMMENDED TENSION.

DUCT INSULATION

WRAP NO VOIDS AND 4" MINIMUM OVERLAP. SECURE WITH WIRES NOT EXCEEDING 18" SPACINGS.

AIR DISTRIBUTION DEVICES

INSTALL TIGHTLY AND SQUARE WITH BUILDING LINES. VERIFY EXACT POSITIONING OF ALL DEVICES WITH ARCHITECTURAL DRAWINGS AND NOTES. FLANGED DEVICES SHALL BE SEALED AIR TIGHT WITH SPONGE RUBBER GASKETS. ADJUST BLADES AND DAMPERS FOR PROPER AIR DISTRIBUTION AND FLOW.

COMMISSIONING

VERIFY PROPER POWER TO ELECTRIC MOTORS AND CONTROLS. TEST AND ADJUST CONTROLS AND SYSTEMS AND CONFIRM PROPER OPERATION.

AN INDEPENDENT AABC OR NEBB CERTIFIED CONTRACTOR SHALL BALANCE AIR DISTRIBUTION TO VALUES LISTED ON DRAWINGS. A FINAL COPY OF THE TEST AND BALANCE REPORT SHALL BE PROVIDED TO THE ENGINEER UPON COMPLETION OF THE REPORT. A PROJECT SHALL NOT BE CONSIDERED IN COMPLIANCE WITH THE PLANS AND SPECIFICATIONS UNTIL SUCH A REPORT HAS BEEN PROVIDED TO THE ENGINEER.

BEFORE ACCEPTANCE AND FINAL PAYMENT, IT SHALL BE DEMONSTRATED THAT ALL APPARATUS IS FUNCTIONING PROPERLY AND EFFICIENTLY. THE CONTRACTOR SHALL MAKE A THOROUGH TEST OF EACH SUPPLY, RETURN, AND EXHAUST SYSTEMS TO ASSURE THAT EACH DIFFUSER AND REGISTER HAS THE PROPER QUANTITY OF AIR IN ACCORDANCE WITH AABC OR NEBB.

THE TEST AND BALANCE CONTRACTOR HAS THE RIGHT TO COMMUNICATE ANY INFORMATION TO THE MECHANICAL ENGINEER.

UPON REQUEST OF OWNER, AND AT HIS CONVENIENCE, PROVIDE SUFFICIENT QUALIFIED PERSONNEL AND TIME, TO INSTRUCT OWNER OR HIS REPRESENTATIVE IN THE SAFE AND PROPER OPERATION OF SYSTEMS PROVIDED.

PACKAGED AC UNIT SCHEDULE WITH ELECT HEAT

TAG	NOM TONS	CARRIER MODEL #	AIR CAPACITIES TOTAL CFM	ESP INGS	SENS MBH COOL @ ARI	SENS MBH COOL @ 80/63/115	ELECT HEATER KW	EER	WT LBS	REMARKS
RTI-7	20	50HCAD24ABA6	8000	0.5	240	170	23	12.2	2304 LB5	SEE NOTES BELOW

NOTES:

1. PROVIDE FACTORY 8" ROOF CURB, MANUAL OSA WITH FILTER & DAMPER, 2" THROW-AWAY FILTERS. WEIGHT DOES NOT INCLUDE CURB
2. PROVIDE WITH 2" FILTER RACK
3. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL INFORMATION PRIOR TO ORDERING EQUIPMENT
4. CONTROLS TO BE BACNET-COMPATIBLE INTERFACE TO INTEGRATE INTO OWNER PROVIDED BUILDING MANAGEMENT SYSTEM TO ALLOW FOR REMOTE ACCESS, MONITORING AND CONTROL OF UNITS
5. REFER TO VENTILATION CALCULATION FOR OSA REQUIREMENTS. MECHANICAL DESIGN IS INTENDED SO THAT THE AIR CONDITIONING SYSTEM WILL OPERATE CONTINUOUSLY TO MAINTAIN CURRENT VENTILATION REQUIREMENTS, 2018 IMC 403.2, 403.3 - SET FAN TO 'ON' POSITION - FAN TO BE ON CONTINUOUSLY WHILE BLDG IS OCCUPIED TO MAINTAIN CURRENT VENTILATION REQUIREMENTS
6. PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH AUTOMATIC SETBACK TO 55° (HEAT) AND 85° (COOL), 2-HOUR OCCUPANT OVERRIDE, 10 HOUR BACKUP

PACKAGED HEAT PUMP UNIT SCHEDULE

TAG	NOMINAL TONS	CARRIER MODEL #	SENS MBH COOL @ ARI	SENS MBH COOL @ 80/63/115	AIR CAPACITIES TOTAL CFM	ESP INGS	LBS	EER/SEER	COP HSPF	REMARKS
HP1, 2	5.0	50GCGH06	51.0 MBH	44.0 MBH	2000	0.5	610	16.2 SEER	8.3 HSPF	SEE NOTES 1-6

NOTES:

1. PROVIDE FACTORY 8" ROOF CURB, MANUAL OSA WITH FILTER & DAMPER, 2" THROW-AWAY FILTERS
2. PROVIDE WITH 2" FILTER RACK
3. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL INFORMATION PRIOR TO ORDERING EQUIPMENT
4. WEIGHT DOES NOT INCLUDE CURB
5. REFER TO VENTILATION CALCULATION FOR OSA REQUIREMENTS. MECHANICAL DESIGN IS INTENDED SO THAT THE AIR CONDITIONING SYSTEM WILL OPERATE CONTINUOUSLY TO MAINTAIN CURRENT VENTILATION REQUIREMENTS, 2018 IMC 403.2, 403.3 - SET FAN TO 'ON' POSITION - FAN TO BE ON CONTINUOUSLY WHILE BLDG IS OCCUPIED TO MAINTAIN CURRENT VENTILATION REQUIREMENTS
6. PROVIDE WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH AUTOMATIC SETBACK TO 55° (HEAT) AND 85° (COOL), 2-HOUR OCCUPANT OVERRIDE, 10 HOUR BACKUP

GRILLE, REGISTER & DIFFUSER SCHEDULE

TAG	TITUS MODEL #	DESCRIPTION	FRAME	FINISH	MATERIAL	DAMPER	MAX. NG	REMARKS
CD1	TMS	SUPPLY DIFFUSER	LAY-IN	WHITE	STEEL	YES	25	
CD2	TDC	SUPPLY DIFFUSER	FLANGE	WHITE	STEEL	YES	25	
SG1	300FL	SUPPLY GRILLE	FLANGE	WHITE	STEEL	YES	25	
RG1	350RL	RETURN GRILLE	LAY-IN	WHITE	STEEL	-	25	

EXHAUST FAN SCHEDULE

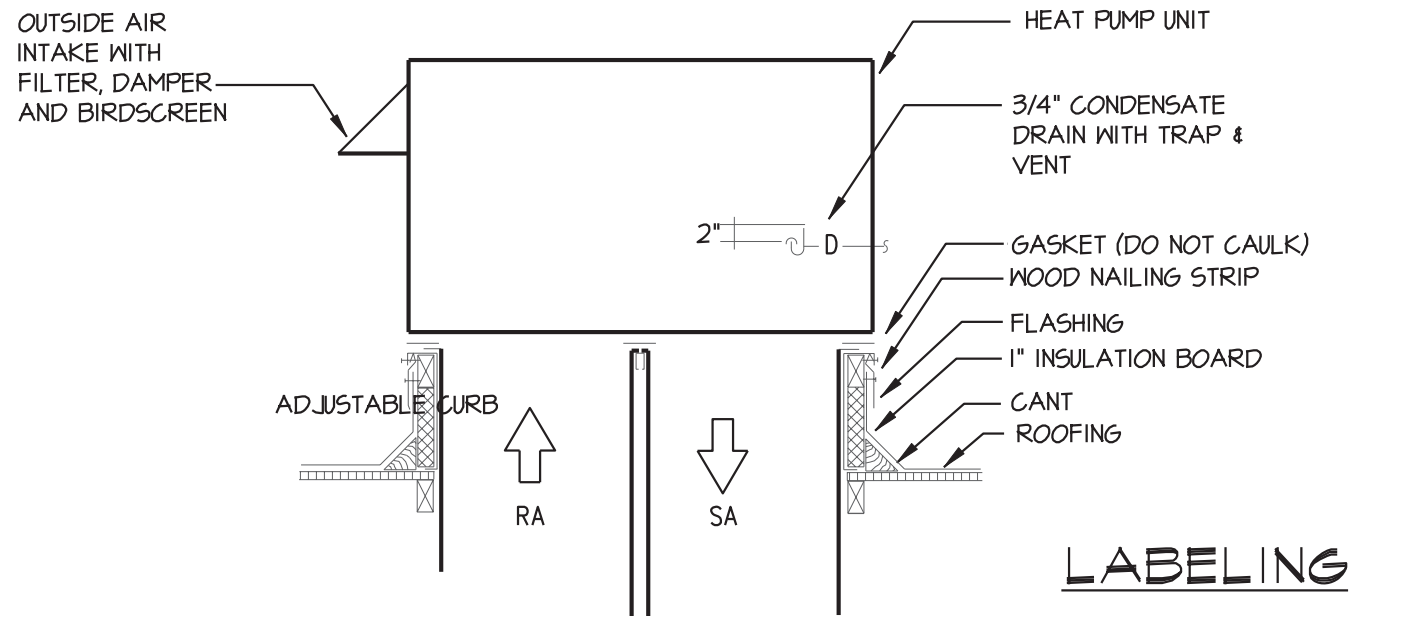
EF TAG	MANUF./MODEL #	TYPE	CFM	E.S.P.	B.D.D.	DRIVE	OPER. WT.	DISCH	REMARKS
EF1	COOK ACRUB 145R9B	ROOF	6000	.35"	YES	BELT	200 LBS	UPPLAST	SEE NOTES 1, 3, 5, 6
EF2-4	COOK GC12B	CEILING	50	.25	YES	DIRECT	30 LBS.	6"ø	SEE NOTES 1-4

NOTES:

1. COORDINATE WITH ELECTRICAL CONTRACTOR FOR ELECTRICAL INFORMATION PRIOR TO ORDERING EQUIPMENT
2. SEE ELECTRICAL DRAWINGS FOR CONTROLS
3. DISCHARGE EXHAUST MIN. 10' FROM FRESH AIR INTAKES
4. EXHAUST TO OPERATE CONTINUOUSLY WHILE OCCUPIED. REFER TO ELECTRICAL PLANS: EXHAUST FANS ARE INTERLOCKED WITH OCCUPANCY SENSOR IN EACH RESTROOM.
5. EXHAUST FAN TO BE THERMOSTATICALLY CONTROLLED; SET THERMOSTAT TO 110°F.
6. PROVIDE WITH SPEED CONTROLLER AND ADJUSTABLE TIME DELAY TO SHUTOFF. ADJUST SPEED CONTROLLER TO MAXIMIZE AVAILABLE AIRFLOW FROM FAN WHILE MAINTAINING LOUVER PRESSURE DROP AT LESS THAN 0.2" WG

ELECTRIC HEATER

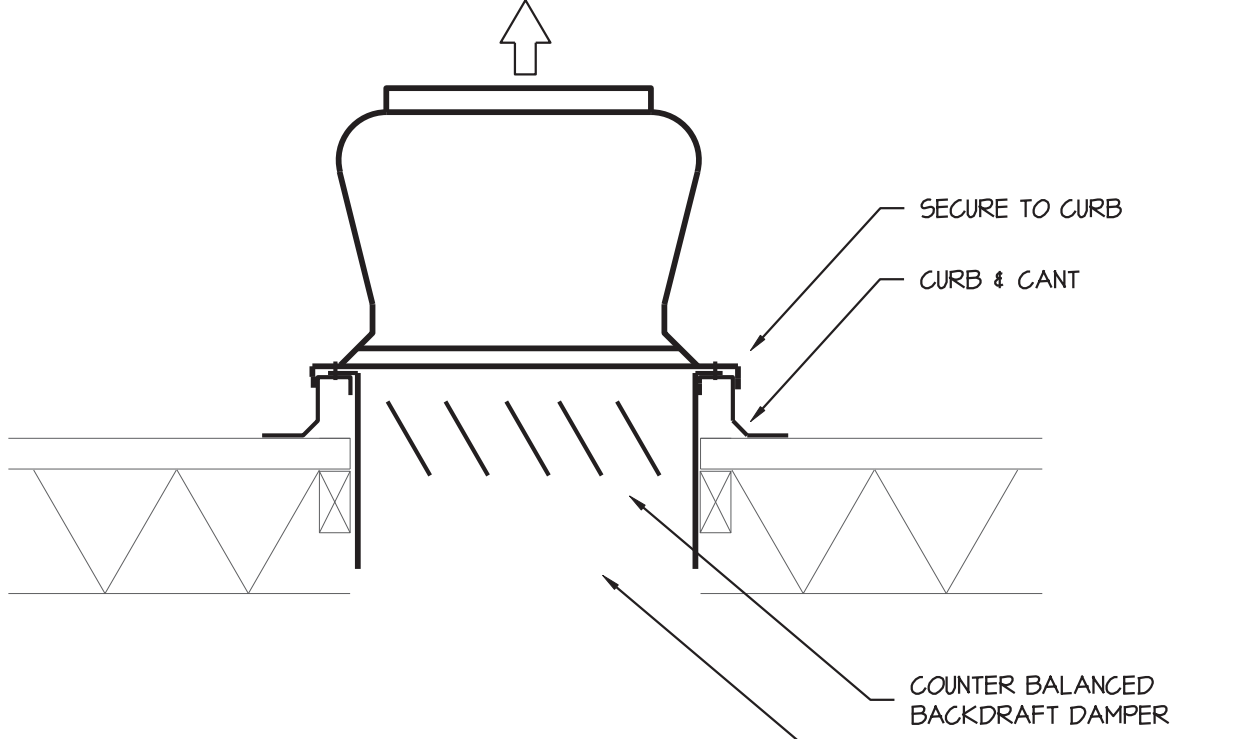
MALL MOUNTED. 3 KW @ 208V 1PH. GRANGER 2YU61. THERMOSTATICALLY CONTROLLED - ROOM TO MAINTAIN A MINIMUM OF 40°F.



RT1-7 AND HP1-2 INSTALLATION

LABELING

PROVIDE PERMANENT SUN-LIGHT RESISTANT LABEL ON EACH EXISTING ROOF TOP EQUIPMENT IDENTIFYING THE AREA SERVED SUCH EQUIPMENT IMC 304.10



EXHAUST FAN #1 INSTALLATION

VENTILATION PER 2018 IMC

HP1														
Zone Identification										Design Case				
Zone Identification	Occupancy Category	Zone Area (sf), Az	People Outdoor Airflow Rate (cfm/person), Rp	Area Outdoor Airflow Rate (cfm/sf), Ra	Zone Population, Pz	Breathing Zone Outdoor Airflow (cfm), Vbz	Zone Air Distribution Effectiveness, Ez	Standard Zone Outdoor Airflow (cfm), Voz	System Ventilation Efficiency, Ev	Outdoor Air Intake Flow, Vot (cfm)	Design Minimum Zone Outside Air Flow (cfm)	Design Zone Primary Airflow (cfm), Vpz	Primary Outdoor Air Fraction, Zp	Meets Standard ?
BREAK ROOM	BREAK ROOMS	146	5	0.06	4	24	1.0	24	0.46	30	31	150	0.19	Yes
OPEN OFFICE	OFFICE SPACE	1065	5	0.06	6	94	0.8	117	1.00	117	164	1650	0.07	Yes
Total HP1		1211				123		146		147	200	1800		Yes
50 CFM EXHAUST REQUIRED PER WC/UR. TOTAL EXHAUST REQUIRED/PROVIDED: 200 CFM. MAKE UP (SUPPLY) AIR PROVIDED: 200 CFM. EXHAUST TO OPERATE CONTINUOUSLY WHILE OCCUPIED														
HP2														
Zone Identification										Design Case				
Zone Identification	Occupancy Category	Zone Area (sf), Az	People Outdoor Airflow Rate (cfm/person), Rp	Area Outdoor Airflow Rate (cfm/sf), Ra	Zone Population, Pz	Breathing Zone Outdoor Airflow (cfm), Vbz	Zone Air Distribution Effectiveness, Ez	Standard Zone Outdoor Airflow (cfm), Voz	System Ventilation Efficiency, Ev	Outdoor Air Intake Flow, Vot (cfm)	Design Minimum Zone Outside Air Flow (cfm)	Design Zone Primary Airflow (cfm), Vpz	Primary Outdoor Air Fraction, Zp	Meets Standard ?
BREAK 101	BREAK ROOMS	146	5	0.06	4	24	1.0	24	0.46	30	31	150	0.19	Yes
OPEN OFFICE 100	OFFICE SPACE	828	5	0.06	5	75	0.8	93	1.00	93	136	1255	0.07	Yes
OFFICE 101	OFFICE SPACE	166	5	0.06	1	15	0.8	19	1.00	19	19	320	0.06	Yes
STORAGE 102	STORAGE ROOMS	90		0.12		11	0.8	14	0.97	14	14	75	0.15	Yes
Total HP2		1230				124		154		156	200	1800		Yes
50 CFM EXHAUST REQUIRED PER WC/UR. TOTAL EXHAUST REQUIRED/PROVIDED: 200 CFM. MAKE UP (SUPPLY) AIR PROVIDED: 200 CFM. EXHAUST TO OPERATE CONTINUOUSLY WHILE OCCUPIED														
P														
RT1 (2-7 SAME)														
Zone Identification										Design Case				
Zone Identification	Occupancy Category	Zone Area (sf), Az	People Outdoor Airflow Rate (cfm/person), Rp	Area Outdoor Airflow Rate (cfm/sf), Ra	Zone Population, Pz	Breathing Zone Outdoor Airflow (cfm), Vbz	Zone Air Distribution Effectiveness, Ez	Standard Zone Outdoor Airflow (cfm), Voz	System Ventilation Efficiency, Ev	Outdoor Air Intake Flow, Vot (cfm)	Design Minimum Zone Outside Air Flow (cfm)	Design Zone Primary Airflow (cfm), Vpz	Primary Outdoor Air Fraction, Zp	Meets Standard ?
WAREHOUSE 300	WAREHOUSE	13030	10	0.06		782	0.8	977	N/A	977	977	8000	0.12	Yes
Total RT1 (2-7 SAME)		13030				782		977		977	977	8000		Yes

VENTILATION SYSTEMS SHALL BE BALANCED USING A NATIONALLY ACCEPTED AIR BALANCING TEST METHOD. SUCH BALANCING SHALL VERIFY THAT THE VENTILATION SYSTEM IS CAPABLE OF SUPPLYING THE AIR FLOW RATES REQUIRED BY SECTION 403. A FINAL REPORT SHALL BE PROVIDED TO THE ENGINEER OF RECORD AND THE MECHANICAL TECHNICIAN RESPONSIBLE FOR PERFORMING THE AIR BALANCE TEST SHALL BE CERTIFIED WITH AABC OR NEBB AND SHALL BE AN INDEPENDENT THIRD-PARTY INDIVIDUAL OR FIRM AND SHALL NOT BE THE INSTALLING CONTRACTOR. PROVIDE A COPY OF THE AIR BALANCE REPORT TO THE INSPECTOR AT THE TIME OF INSPECTION