

REFRIGERANT VACUUM TESTING

LEAK TESTING AND EVACUATION SHALL BE PROVIDED FOR ALL REFRIGERANT PIPING SYSTEMS IN ACCORDANCE WITH US EPA "GREEN CHILL BEST PRACTICES GUIDELINE ENSURING LEAK-TIGHT INSTALLATION OF COMMERCIAL REFRIGERANT EQUIPMENT". EVACUATION PROCEDURES FOR EACH REFRIGERANT PIPING SYSTEM SHALL BE PERFORMED TO THE MANUFACTURER'S RECOMMENDATIONS OR GENERALLY AS FOLLOWS:

- EVACUATE THE SYSTEM TO 4000 MICRONS. BREAK THE VACUUM WITH DRY NITROGEN TO A PRESSURE OF 2-3 PSI AND HOLD FOR 15 MINUTES.
- EVACUATE SYSTEM TO 1500 MICRONS AND MAINTAIN FOR 20 MINUTES. BREAK THE VACUUM WITH DRY NITROGEN TO A PRESSURE OF 2-3 PSI AND HOLD FOR 15 MINUTES.
- EVACUATE SYSTEM TO BELOW 500 MICRONS AND HOLD FOR 60 MINUTES.
- EVACUATE SYSTEM TO BELOW 300 MICRONS AND HOLD FOR 24 HOURS.

VACUUM PUMP CHECK VALVE MUST BE USED TO PREVENT OILS BEING DRAWN INTO THE SYSTEM. WHERE MINIMUM MANUFACTURER'S REQUIREMENTS EXCEED OR CONFLICT WITH THE ABOVE PROCEDURES, THE MANUFACTURER'S REQUIREMENTS SHALL TAKE PRECEDENCE.

SPLIT SYSTEM HEAT PUMPS - OUTDOOR UNITS

UNIT TAG	EQUIPMENT TYPE	COOLING CAPACITY			HEATING CAPACITY	ELECTRICAL				NOMINAL TONS	MANUFACTURER BASIS OF DESIGN
		TOTAL	SENS	SENS		V	PH	MCA	MOP		
HP-A	MULTI-ZONE	48 MBH	38 MBH	38 MBH	48 MBH	208	1	27	30	4	DAIKIN RMXS48
HP-B	MULTI-ZONE	48 MBH	38 MBH	48 MBH	208	1	27	30	4	DAIKIN RMXS48	
HP-C	MULTI-ZONE	48 MBH	38 MBH	48 MBH	208	1	27	30	4	DAIKIN RMXS48	
HP-D	SINGLE ZONE	12 MBH	9 MBH	NONE	208	1	12	15	1	DAIKIN RK12	
HP-E	SINGLE ZONE	9 MBH	7 MBH	9 MBH	208	1	8	15	3/4	DAIKIN RXS09	

- NOTES:
- SEE "SPLIT SYSTEM HEAT PUMP NOTES" ON THIS SHEET AND CONTROLS SHEET M-601 FOR ADDITIONAL REQUIREMENTS.

SPLIT SYSTEM HEAT PUMPS - INDOOR UNITS

UNIT TAG	ROOM NAME	EQUIPMENT TYPE	BRANCH UNIT	OUTDOOR UNIT	CAPACITY			HEATING			MANUFACTURER BASIS OF DESIGN (DAIKIN)
					NOMINAL TONS	TOTAL MBH	SENS MBH	TOTAL MBH	PH	SENS MBH	
FC-A1	DINING	DUCTED	BP-1	HP-A	2	24	18	24			DAIKIN FDXS24
FC-A2	KITCHEN	2X2 CASSETTE	BP-1	HP-A	1	12	9	12			DAIKIN FFQ12
FC-A3	OFFICE	2X2 CASSETTE	BP-1	HP-A	0.75	9	6.75	9			DAIKIN FFQ09
FC-B1	BUNK	2X2 CASSETTE	BP-2	HP-B	0.75	9	6.75	9			DAIKIN FFQ09
FC-B2	BUNK	2X2 CASSETTE	BP-2	HP-B	0.75	9	6.75	9			DAIKIN FFQ09
FC-B3	BUNK	2X2 CASSETTE	BP-2	HP-B	0.75	9	6.75	9			DAIKIN FFQ09
FC-B4	BUNK	2X2 CASSETTE	BP-3	HP-B	0.75	9	6.75	9			DAIKIN FFQ09
FC-B5	BUNK	WALL-MOUNT	BP-3	HP-B	0.5	6	4.5	6			DAIKIN CTXS07
FC-B6	OFFICE	2X2 CASSETTE	BP-3	HP-B	0.75	9	6.75	9			DAIKIN FFQ09
FC-C1	LOCKERS	2X2 CASSETTE	BP-4	HP-C	0.75	9	6.75	9			DAIKIN FFQ09
FC-C2	CORRIDOR	DUCTED	BP-4	HP-C	0.75	9	6.75	9			DAIKIN FDXS09
FC-C3	FITNESS	2X2 CASSETTE	BP-5	HP-C	1	12	9	12			DAIKIN FFQ12
FC-C4	FITNESS	2X2 CASSETTE	BP-5	HP-C	1	12	9	12			DAIKIN FFQ12
FC-D1	COMM	WALL-MOUNT	---	HP-D	1	12	9	---			DAIKIN FTK12
FC-E1	MAINT	DUCTED	---	HP-E	0.75	9	6.75	9			DAIKIN FDXS09

- NOTES:
- SEE "SPLIT SYSTEM HEAT PUMP NOTES" ON THIS SHEET AND CONTROLS SHEET M-601 FOR ADDITIONAL REQUIREMENTS.

SPLIT SYSTEM HEAT PUMPS - BRANCH BOXES

UNIT TAG	EQUIPMENT LOCATION	EQUIPMENT TYPE	OUTDOOR UNIT	INDOOR UNITS	ELECTRICAL				MANUFACTURER BASIS OF DESIGN
					V	PH	MCA	MOP	
BP-1	HALLWAY	3-PORT BOX	HP-A	FC- A1, A2, A3	208	1	27	30	DAIKIN BPMKS049A3U
BP-2	HALLWAY	3-PORT BOX	HP-B	FC- B1, B2, B3	208	1	27	30	DAIKIN BPMKS049A3U
BP-3	HALLWAY	3-PORT BOX	HP-B	FC- B4, B5, B6	208	1	27	30	DAIKIN BPMKS049A3U
BP-4	HALLWAY	2-PORT BOX	HP-C	FC- C1, C2	208	1	12	15	DAIKIN BPMKS048A2U
BP-5	FITNESS	2-PORT BOX	HP-C	FC- C3, C4	208	1	12	15	DAIKIN BPMKS048A2U

- NOTES:
- SEE "SPLIT SYSTEM HEAT PUMP NOTES" FOR ADDITIONAL REQUIREMENTS.
 - DESIGN ASSUMES NO CONDENSATION AT BRANCH BOXES. FOR ALTERNATES, PROVIDE DRAIN PIPING AS NEEDED.

AIR DEVICES

TAG	DESCRIPTION	FACE SIZE (IN.)	NECK SIZE (IN.)	AIRFLOW (CFM)	MAX PD (IN. WG)	MAX NC	MANUFACTURER BASIS OF DESIGN
S1	SQUARE PLAQUE SUPPLY DIFFUSER	12X12	6#	0 - 160	0.08	25	PRICE ASPD
S3	SQUARE PLAQUE SUPPLY DIFFUSER	24X24	6#	0 - 180	0.08	25	PRICE ASPD
S4	SQUARE PLAQUE SUPPLY DIFFUSER	24X24	8#	181 - 280	0.08	25	PRICE ASPD
S5	SQUARE PLAQUE SUPPLY DIFFUSER	24X24	10#	281 - 400	0.10	25	PRICE ASPD
S6	LOUVERED SUPPLY GRILLE	10x8	8x6	0 - 250	0.08	25	PRICE 640
R1	EGG-CRATE GRILLE	12X12	6X6	0 - 160	0.10	25	PRICE 80
R2	EGG-CRATE GRILLE	24X24	20X20	0-1500	0.10	25	PRICE 80
R3	EGG-CRATE FILTER GRILLE	24X24	20X20	0-1500	0.10	25	PRICE 80FF
R4	HEAVY DUTY LOUVERED FACE GRILLE	18X18	16X16	0-500	0.10	25	PRICE 98

- NOTES:
- ALL AIR DEVICES SHALL BE ALUMINUM WITH MANUFACTURER'S STANDARD WHITE FINISH (INCLUDING SCREWS), INSULATED WITH R-6 BACKING.
 - ALL EXHAUST AND RETURN GRILLES SHALL HAVE LOUVER VANES AT 45° OR STRAIGHT GRIDS WITH NO MORE THAN 1/2-INCH SPACING.
 - ALL SUPPLY GRILLES (S4) SHALL HAVE ADJUSTABLE VANES AT NO MORE THAN 3/4-INCH SPACING.
 - PROVIDE HEAVY DUTY GRILLES (R4) FOR VEHICLE EXHAUST SYSTEM IN APPARATUS BAY.
 - PROVIDE 1-INCH FILTER GRILLES (R3) FOR ALL FAN COIL RETURN DUCTS. (DO NOT FILTER EXHAUST DUCTS)

GENERAL NOTES

- CONTRACTOR SHALL ADHERE TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ALL EQUIPMENT BEING INSTALLED.
- COORDINATE ALL INTERDISCIPLINARY WORK SO AS TO PROVIDE COMPLETE AND FUNCTIONAL SYSTEMS. SUCH SYSTEMS SHALL NOT INTERFERE WITH OR BE RENDERED INOPERABLE BY OTHER WORK BEING PERFORMED WITHIN THE BUILDING, SUCH AS (BUT NOT LIMITED TO) STRUCTURAL CONSIDERATIONS, ARCHITECTURAL CHANGES, ELECTRICAL EQUIPMENT AND WIRING, AND PLUMBING EQUIPMENT OR PIPING.
- ALL CONDENSATE DRAIN PIPING SHALL BE A MINIMUM OF 3/4 INCH AND SLOPED AT LEAST 1 DEGREE IN THE DIRECTION OF FLOW (1/8 INCH PER FOOT). CONDENSATE PIPING SHALL BE PVC AND HAVE A MINIMUM OF 1/2 INCH OF ELASTOMERIC INSULATION.
- ALL DUCTWORK SHALL BE MINIMUM 6" IN DIAMETER. MANUAL BALANCING DAMPERS SHALL BE INSTALLED IN ALL DUCT RUN-OUTS TO DIFFUSERS. MODULATING DAMPERS IN VENTILATION SYSTEMS SHALL BE CONFIGURED TO REMAIN AT LEAST 75% OPEN DURING ALL OCCUPIED HOURS. ALL DUCTWORK SHALL BE A MINIMUM OF 26 GAUGE GALVANIZED STEEL AND BE CONSTRUCTED IN CONFORMANCE WITH SMACNA STANDARDS FOR RIGID METAL DUCTWORK. SEE DUCT CONSTRUCTION SCHEDULE ON THIS SHEET AND DETAILS ON SHEET M-101 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- MOUNT ALL THERMOSTATS 48" AFF (IN ACCORDANCE WITH ADA STANDARDS). COORDINATE LATERAL PLACEMENT WITH ARCHITECTURAL PLANS SUCH THAT THERE ARE NO OBSTRUCTIONS BELOW OR IN FRONT OF THERMOSTATS.
- ALL EQUIPMENT AND COMPONENTS SCHEDULED OR INDICATED BY MANUFACTURER'S NAME AND MODEL NUMBER SERVE AS THE BASIS OF DESIGN AND ARE INTENDED TO SHOW THE GENERAL SIZE, CONFIGURATION, LOCATION, OR FEATURES OF THE SPECIFIED EQUIPMENT WITH RELATION TO THE OTHER BUILDING SYSTEMS. EQUALS OR EQUIVALENTS FROM ALTERNATE MANUFACTURERS MAY BE SUBMITTED.

SPLIT SYSTEM HEAT PUMP NOTES

- SYSTEMS SHALL BE CAPABLE OF MEETING SCHEDULED CAPACITIES AT DESIGN CONDITIONS. DESIGN OUTDOOR AMBIENT IS 95°F DB/75°F WB FOR COOLING AND 26°F DB FOR HEATING. INDOOR SETPOINT RANGE FOR CONDITIONED SPACES ARE 70°F (HEATING) AND 75°F (COOLING) AT 50% HUMIDITY.
- PROVIDE EACH HEAT PUMP SYSTEM WITH MANUFACTURER'S STANDARD CONTROLS AND WIRING, INCLUDING MANUFACTURER'S WALL MOUNTED, PROGRAMMABLE, SYSTEM POWERED, BACKLIT DIGITAL DISPLAY THERMOSTAT IN EACH ZONE. SEE M-601 FOR ADDITIONAL REQUIREMENTS.
- PROVIDE ELECTRICAL POWER FOR EQUIPMENT, DEVICES, AND CONTROLS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS. COORDINATE PURCHASING AND INSTALLATION WITH ELECTRICAL DRAWINGS AND SPECIFICATIONS.
- PROVIDE LONG RADIUS ELBOWS WITH STRAIGHT DISTANCES OF REFRIGERANT PIPING, NO LESS THAN 2FT, LEADING UP TO ALL EQUIPMENT CONNECTIONS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- PROVIDE ALL ABOVE-CEILING FAN COIL UNITS WITH MANUFACTURER'S INTEGRAL CONDENSATE PUMP.
- PROVIDE AND CONNECT REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNITS AND PROVIDE ADDITIONAL REFRIGERANT CHARGE FOR REFRIGERANT LINE LENGTHS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
- PROVIDE INDOOR UNITS WITH MANUFACTURER'S RECOMMENDED SUPPORTS AND NOISE AND VIBRATION ISOLATION. MOUNT OUTDOOR CONDENSING UNIT, BRANCH PROVIDER UNITS, PIPING, CONTROL DEVICES, AND INDOOR FANCOIL UNITS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

SPACE HEATING UNITS

TAG	ROOM	TYPE	FUEL	MOUNTING	POWER (W)	INPUT (MBH)	OUTPUT (MBH)	ELECTRICAL			WEIGHT (LBS)	MANUFACTURER BASIS OF DESIGN
					PH	V	A					
UH-1	LAUNDRY	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-2	WORKSHOP	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-3	TURN OUT	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-4	TURN OUT	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-5	EMS STOR	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-6	STORAGE	FORCED AIR	ELECTRIC	CEILING RECESSED	500	---	2	1	120	4.7	10	Q-MARK QCH1101F
UH-7	RISER	FORCED AIR	ELECTRIC	CEILING RECESSED	1,000	---	3	1	120	8.3	10	Q-MARK QCH1101F
GH-1	MAINT BAY	FORCED AIR	GAS	SUSPENDED 8FT AFF	---	45	36	1	120	2.7	77	DETROIT RADIANT UH-45
GH-2	MEZZANINE	FORCED AIR	GAS	SUSPENDED 8FT AFF	---	30	24	1	120	2.7	77	DETROIT RADIANT UH-30
IR-1	APP BAY	INFRARED TUBE	GAS	SUSPENDED 16FT AFF	---	75	50	1	120	4.8	160	DETROIT RADIANT HL3-20
IR-2	APP BAY	INFRARED TUBE	GAS	SUSPENDED 16FT AFF	---	75	50	1	120	4.8	160	DETROIT RADIANT HL3-20
IR-3	APP BAY	INFRARED TUBE	GAS	SUSPENDED 16FT AFF	---	75	50	1	120	4.8	160	DETROIT RADIANT HL3-20

- NOTES:
- PROVIDE EACH HEATER WITH DIGITAL DISPLAY PROGRAMMABLE THERMOSTAT AND MANUFACTURER'S DISCONNECT SWITCH. SEE M-601 FOR ADDITIONAL REQUIREMENTS.
 - GAS HEATERS SHALL BE SEPERATED COMBUSTION TYPE. SEE DUCT PLANS FOR VENTING.
 - PROVIDE MANUFACTURER'S MOUNTING HARDWARE FOR ALL HEATERS AND MAINTAIN ALL RECOMMENDED CLEARANCES.

DEDICATED OUTDOOR AIR SYSTEM NOTES














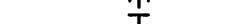


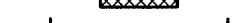




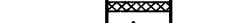


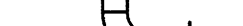



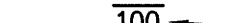







- PROVIDED EQUIPMENT SHALL BE RATED FOR USE IN 100% OUTDOOR AIR APPLICATION TO DELIVER SPACE NEUTRAL AIR AND BE CAPABLE OF DEFROSTING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE WITH MANUFACTURER BASE AND ROOF CURB. COORDINATE CURB HEIGHT AND DUCT CONNECTION CLEARANCE WITH STRUCTURAL. UNIT SHALL BE CONFIGURED FOR BOTTOM (THROUGH CURB) SUPPLY AND RETURN DUCT CONNECTIONS.
- PROVIDE WITH DOUBLE WALL CABINET INSULATED (R-13) WITH A THERMAL BREAK AND SLOPED ROOF. CABINET AIR LEAKAGE SHALL NOT EXCEED 1% OF TOTAL AIRFLOW WHEN TESTED TO AHRI STANDARD TOTAL STATIC PRESSURE. PROVIDE WEATHER HOOD AND BIRD SCREEN ON INTAKE AND EXHAUST. PROVIDE UNIT WITH, AND RATED FOR, 2-INCH MERV-8 FILTER ON OUTDOOR AIR INTAKE.
- PROVIDE SINGLE POINT POWER CONNECTION WITHIN THE EQUIPMENT CASING AND FACTORY WIRE 115V CONVENIENCE OUTLET.
- PROVIDE WITH LOW LEAKAGE DAMPERS (CLASS 1A FOR THE DIRECTION OF FLOW).
- PROVIDE SUPPLY AND EXHAUST FANS WITH VARIABLE FREQUENCY DRIVES. (FANS SHALL RUN AT CONSTANT VOLUME; VARIABLE FREQUENCY SHALL BE USED FOR BALANCING.) MAXIMUM COOLING/HEATING COIL FACE VELOCITY SHALL NOT EXCEED 300 FPM.
- PROVIDE UNIT WITH INTEGRAL ENERGY RECOVERY WHEEL CAPABLE OF PERFORMING AT STATED DESIGN CONDITIONS. WHEEL SUPPLY EAT EQUALS OUTDOOR AMBIENT, WHEEL SUPPLY LAT EQUALS COIL EAT, WHEEL RETURN EAT EQUALS INDOOR TEMP (SETPPOINT).
- PROVIDE UNIT WITH MODULATING (4:1) GAS HEAT, WITH CORROSION-RESISTANT (STAINLESS STEEL) HEAT EXCHANGER.

DEDICATED OUTDOOR AIR SYSTEM

UNIT TAG	AIRFLOW DIRECTION	FAN INFORMATION			WHEEL (SUMMER)	DX COOLING COIL				HGHR COIL		WHEEL (WINTER)	GAS HEATING FURNACE				UNIT WEIGHT (LBS)	ELECTRICAL				MANUFACTURER BASIS OF DESIGN
		FLOW (CFM)	ESP (IN. WG)	MOTOR HP	EAT (AMBIENT) (DBF/WBF)	COIL EAT (DBF/WBF)	COIL LAT (DBF/WBF)	SENSIBLE (MBH)	TOTAL (MBH)	LAT (DB F)	TOTAL (MBH)	EAT (AMBIENT) (DB F)	EAT (DBF)	LAT (DBF)	INPUT (MBH)	OUTPUT (MBH)		V	PH	MCA	MOP	
DOAS-1	SUPPLY	2495	0.75	1.69	93 / 73	86.1 / 69.9	50.8 / 50.6	96.9	148.8	75.8	67.5	70	40	70	100	80	3000	208	3	65.3	80	GREENHECK RVE-40-36P-30H-12.5
	EXHAUST	1640	0.75	0.8	75 / 64							70										

- NOTES:
- SEE "DEDICATED OUTDOOR AIR SYSTEM NOTES" ON THIS SHEET AND CONTROLS SHEET M-601 FOR ADDITIONAL REQUIREMENTS.

LEGEND AND SYMBOLS

	REFRIGERANT LINESET
	CAP
	DROP / RISE IN PIPING
	ELBOW, TURNED DOWN
	ELBOW, TURNED UP
	TEE, OUTLET UP
	TEE, OUTLET DOWN
	UNION
	PRESSURE GAGE (RANGE AS INDICATED)
	PRESS GAGE TAP W/CAP & PET COCK
	THERMOMETER (RANGE AS INDICATED)
	GATE VALVE
	BALL VALVE
	GLOBE VALVE
	CHECK VALVE (DIRECTION AS INDICATED)
	FLEXIBLE CONNECTOR
	DUCT SIZE, FIRST FIGURE IS SIDE SHOWN
	DUCT SECTION, POSITIVE PRESSURE,
	DUCT SECTION, NEGATIVE PRESSURE,
	CHANGE OF ELEVATION
	DUCT WITH FLEXIBLE CANVAS CONNECTION
	ELBOW WITH TURNING VANES.
	DUCT WITH ROUND ELBOW 1.5# TURNING RADIUS MIN.
	DUCT W/TRANSITION
	AIR DEVICE TAG
	AIRFLOW (CFM)
	MECHANICAL FIRE DAMPER
	COMBINATION SMOKE AND FIRE DAMPER
	DUCT SMOKE DETECTOR
	MOTORIZED DAMPER
	AIRFLOW DIRECTION
	EQUIPMENT W/ CLEARANCE
	THERMOSTAT (MOUNT 48" AFF)
	CARBON MONOXIDE DETECTOR/ALARM (MOUNT ON WALL AT MIN 60" AFF)
	SENSOR/CONTROL WIRE
	PLAN REFERENCE NOTE

ABBREVIATIONS

A	AMPS
AD	ACCESS DOOR (12X12 MIN)
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
AO	ANALOG OUTPUT
APD	AIR PRESSURE DROP
BHP	BREAK HORSEPOWER
BI	BINARY INPUT
BO	BINARY OUTPUT
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET PER MINUTE