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100% DIRECT OUTDOOR AIR ROOFTOP UNIT SCHEDULE (DX COOLING - R454B, ENERGY RECOVERY WHEEL)

SYMBOL	AREA SERVED	SUPPLY CFM	O.A. CFM	SUPPLY E.S.P.	EXH. CFM	EXH. E.S.P.	SUMMER POST-WHEEL AIR CONDITIONS DRY BULB	WET BULB	HUM. RATIO	WINTER POST-WHEEL AIR CONDITIONS DRY BULB	WET BULB	HUM. RATIO	UNIT LEAVING AIR TEMPERATURE SUMMER DB	SUMMER WB	WINTER DB	COMPRESSOR COOLING CAPACITY QTY	NET TC (BTUH)	NET SHC (BTUH)	EER	SUPPLY FAN HP	FLA	ENERGY WHEEL HP	FLA	EXHAUST FAN HP	FLA	COMPRESSORS #1 RLA	#2 RLA	CONDENSER FANS QTY.	HP	FLA	NORMAL POWER SUPPLY MCA	MOCP	VOLTAGE	OPERATING WEIGHT	MANUFACTURER AAON	ACCESSORIES	UNIT NUMBER
RTU-11	LOCKER/SHOWERS	4,500	4,500	1.25"	4,500	1.25"	80.0 °F	65.9 °F	72.8 gr/lb	53.8 °F	44.2 °F	27.4 gr/lb	51.6 °F	51.5 °F	**53.8 °F**	2	187,000	131,000	11.7	5	7.6	.017	0.60	3	4.8	12.8	11.0	2	0.75	1.8	44	50	460V-3Φ	3,407 LBS	RNA-016-C-A-3-GABOA	SEE BELOW	RTU-11

NOTES:

1. ALL UNITS SHALL BE AGA CERTIFIED, U.L. LABELED, AND ASHRAE 90.1 COMPLIANT.
2. ALL AIR HANDLING UNITS UNITS SHALL BE PROVIDED WITH A PHOTOELECTRIC TYPE SMOKE DETECTOR MOUNTED IN THE RETURN DUCT. THE SMOKE DETECTOR SHALL BE FURNISHED AND WIRED FOR UNIT SHUT DOWN AND FIRE ALARM INTERFACE BY THE ELECTRICAL CONTRACTOR AND SHALL BE INSTALLED IN THE DUCT BY THE MECHANICAL CONTRACTOR.
3. ALL TEMPERATURES ARE MEASURED IN DEGREES FAHRENHEIT, AND HUMIDITY RATIO IS MEASURED IN GRAINS PER POUND DRY AIR.
4. OUTDOOR DESIGN CONDITIONS: SUMMER: 93° F. D.B., 74° F. W.B., WINTER: 15° F. D.B.
5. REPLACE ALL FILTERS WITH COMPLETE SET OF NEW FILTERS AT PROJECT COMPLETION. PROVIDE ONE COMPLETE ADDITIONAL SET OF FILTERS FOR OWNER STORAGE. COORDINATE WITH OWNER ON STOCK STORAGE LOCATION. PERMANENT METAL FILTER FRAMES WITH MERV-10 ROLL FILTER MEDIA.
6. PROVIDE 5-YEAR WARRANTY FOR LABOR, PARTS AND REFRIGERANT ON ALL ROOFTOP UNITS.

RTU-11 HAS A EX DUCT MOUNTED HOT WATER REHEAT COIL

ACCESSORIES:

1. - PERMANENT METAL FILTER FRAMES WITH REPLACEABLE FILTERS
2. - CONSTANT VOLUME SPEED SUPPLY/EXHAUST FANS
3. - DIRECT DRIVE PLENUM SUPPLY FAN
4. - COMPRESSORS - (1)VARIABLE SPEED SCROLL (1)FIXED SPEED SCROLL
5. - HORIZONTAL DRAW THROUGH W/DOWNFLOW DISCHARGE
6. - MERV-8 MINIMUM FILTER MEDIA
7. - DEMOLISH EX CURB INSTALL NEW CURB RE-ROOF AS NECESSARY
8. - 2" DOUBLE WALL EXTERIOR CABINET CONSTRUCTION
9. - INTERNAL VIBRATION ISOLATION
10. - EXHAUST AIR/SUPPLY AIR DAMPER/DIVIDING SECTION
11. - POLYMER ENERGY RECOVERY WHEEL
12. - STAINLESS STEEL COOLING COIL DRAIN PAN
13. - CONDENSER COIL HAIL GUARDS
14. - SINGLE POINT ELECTRICAL CONNECTION WITH CONVENIENCE OUTLET.

ROOFTOP UNIT SCHEDULE - (DX COOLING ONLY - R454B)

SYMBOL	CFM	NOMINAL TONNAGE	OUTSIDE AIR MINIMUM (CFM)	E.S.P.	COOLING CAPACITY TC (BTUH)	SHC (BTUH)	EFFICIENCY EER	IEER	COMPRESSOR (EA) NO.	BELOW	OFM QTY.	FLA	IFM QTY	MHP	EXHAUST FAN. (EA) QTY.	HP	FLA	POWER SUPPLY MCA	MOCP	VOLTAGE	OPERATING WEIGHT	ACCESSORIES	SYSTEM TYPE	MANUFACTURER TRANE MODEL
RTU-1	14,000	35	2,750-/750+*	2.5"	418,000	337,000	10.5	15.4	3	SEE NOTE "B"	3	2.2	1	20	2	-	2.2	101	125	460V-3Φ	4,695 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD420040
RTU-2	9,000	27.5	1,750-/450+*	2.5"	338,000	242,000	11.0	15.4	3	SEE NOTE "A"	3	2.2	1	15	2	-	2.2	88	100	460V-3Φ	4,615 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD330040
RTU-3	11,000	27.5	2,250+/550+*	2.5"	350,000	271,000	12.3	15.4	3	SEE NOTE "A"	3	2.2	1	15	2	-	2.2	88	100	460V-3Φ	4,615 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD330040
RTU-4	8,000	25	1,500+/400+*	1.6"	275,000	196,000	11.0	16.3	2	SEE NOTE "C"	2	2.5	1	4.6	1	-	5.5	64	80	460V-3Φ	2,496 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	THK300A4S
RTU-5	14,000	35	2,750+/750+*	2.5"	418,000	337,000	10.5	15.4	3	SEE NOTE "B"	3	2.2	1	20	2	-	2.2	101	125	460V-3Φ	4,695 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD420040
RTU-6	9,000	27.5	1,750+/450+*	2.5"	338,000	242,000	11.0	15.4	3	SEE NOTE "A"	3	2.2	1	15	2	-	2.2	88	100	460V-3Φ	4,615 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD330040
RTU-7	12,000	30	2,500+/600+*	2.5"	379,000	294,000	10.8	15.6	3	SEE NOTE "D"	3	2.2	2	15	2	-	2.2	90	100	460V-3Φ	4,603 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	TCD360040
RTU-8	7,000	20	1,500+/350+*	1.7"	243,000	175,000	11.2	16.5	2	SEE NOTE "E"	2	2.5	1	4.3	1	-	5.5	58	80	460V-3Φ	2,446 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P,R	VAV (DUCT PRESSURE CONTROL)	THK240A4S
RTU-9	3,500	7.5	750	1.5"	96,000	77,000	12.5	17.3	2	SEE NOTE "F"	1	1.5	1	3	N/A	N/A	N/A	22	25	460V-3Φ	1,118 LBS	A,B,C,D,E,F1,G,J,K,L,O,P,Q	CONSTANT VOLUME (SPACE TEMP CONTROL)	THK090A4S
RTU-10	12,000	30	2,500+/600+*	1.5"	379,000	294,000	10.8	15.6	3	SEE NOTE "D"	3	2.2	2	10	2	-	2.2	84	100	460V-3Φ	4,603 LBS	A,B,C,D,E,F2,G,H,I,J,K,L,M,N,O,P	SINGLE ZONE VAV (SPACE TEMP CONTROL)	TCD360040

COMPRESSOR NOTES:

A. COMPRESSOR #1: 14.5 RLA: COMPRESSOR #2: 19.1 RLA: COMPRESSOR #3: 19.1 RLA
B. COMPRESSOR #1: 14.5 RLA: COMPRESSOR #2: 21.8 RLA: COMPRESSOR #3: 21.8 RLA
C. COMPRESSOR #1: 23.8 RLA; COMPRESSOR #2: 14.4 RLA
D. COMPRESSOR #1: 14.5 RLA: COMPRESSOR #2: 19.8 RLA: COMPRESSOR #3: 19.8 RLA
E. COMPRESSOR #1: 22.4 RLA: COMPRESSOR #2: 12.2 RLA
F. COMPRESSOR #1: 8.1 RLA: COMPRESSOR #2: 5.2 RLA

NOTES:

1. COOLING CAPACITIES BASED ON 95° AMBIENT, 80/67 ENTERING AIR.
2. ALL UNITS SHALL BE AGA CERTIFIED, U.L. LABELED, AND ASHRAE 90.1 COMPLIANT.
3. REPLACE EXISTING DUCT SMOKE DETECTOR WITH A NEW PHOTOELECTRIC TYPE SMOKE DETECTOR, INSTALLED IN THE RETURN DUCT WIRED TO SHUT DOWN THE UNIT UPON ACTIVATION. SMOKE DETECTOR SHALL BE SUPPLIED, WIRED FOR INTERFACE WITH FIRE ALARM SYSTEM AND UNIT SHUTDOWN BY THE ELECTRICAL CONTRACTOR. SMOKE DETECTOR SHALL BE INSTALLED IN THE RETURN DUCT BY THE MECHANICAL CONTRACTOR.
4. PRIMARY COOLING COIL DRAIN PAN SHALL BE PROVIDED WITH A FLOAT SWITCH BY UNIT MFR; ACTIVATION OF THE FLOAT SWITCH SHALL SHUT DOWN UNIT AND SEND AN ALARM TO THE CENTRAL BAS.
5. PROVIDE 5-YEAR WARRANTY FOR LABOR, PARTS AND REFRIGERANT ON ALL ROOFTOP UNITS.
6. ALL UNITS MUST BE PROVIDED WITH 65K SCCR.

* DESIGN OUTSIDE AIRFLOW (CFM)
** OCCUPIED MINIMUM OUTSIDE AIRFLOW (CFM), REFER TO CO2 CONTROL ON SEQUENCE OF OPERATIONS IN SPECIFICAITONS.

ION GENERATOR REQUIREMENTS:

PROVIDE RTU'S WITH AN NEEDLE POINT ION GENERATOR AS MANUFACTURED BY GLOBAL PLASMA SOLUTIONS INDICATED BELOW
MODEL # GPS-FC48-AC 120V COMPATIBLE
INSTALL (1) PER 4,000 CFM

ION FILTER NOTES:

1. UL-2998 AND UL 867 COMPLIANCE
2. PROVIDE WITH INTEGRAL BAS ALARM CONTACTS.
3. AUTO CLEANING
4. INSTALL AT SUPPLY FAN INLET
5. MAGNETIC BASE MOUNTED TO FAN INLET

SUBSTITUTED EQUIPMENT (NON-SPECIFIED) THAT EXCEEDS THE WEIGHT SHOWN IN THE RTU SCHEDULE SHALL BE REQUIRED TO OBTAIN A STRUCTURAL EVALUATION AND APPROVAL LETTER FROM THE BELOW STRUCTURAL ENGINEER.

BENNETT AND PLESS STRUCTURAL ENGINEERING
P: 704-710-6721

ACCESSORIES:

A - PERMANENT METAL FILTER FRAMES WITH REPLACEABLE FILTERS
B - VARIABLE SPEED SUPPLY FAN(S)
C - HORIZONTAL DRAW THRU
D - FLAT FILTER SECTION
E - 2" MERV-10 FILTERS
F1 - INSTALL ROOF CURB ADAPTOR ATOP EX YORK CURB (FIELD VERIFY)
F2 - DEMOLISH EX YORK CURB INSTALL NEW CURB RE-ROOF AS NECESSARY
G - SINGLE WALL EXTERIOR CABINET CONSTRUCTION
H - REPLACE EX CO2 SENSOR WITH NEW FOR DEMAND LIMITING CONTROL (BY BAS)
I - INTERNAL VIBRATION ISOLATION
J - STAINLESS STEEL COOLING COIL DRAIN PAN
K - CONDENSER COIL HAIL GUARDS
L - SINGLE POINT ELECTRICAL CONNECTION WITH NON FUSED DISCONNECT AND POWERED CONVENIENCE OUTLET
M - POWER EXHAUST
N - COMPARATIVE ENTHALPY ECONOMIZER
O - LOW AMBIENT CONTROLS
P - GPS NEEDLE POINT ION GENERATOR (SEE NOTE THIS PAGE)
Q - PROVIDE NEW TEMPERATURE SPACE SENSOR (WITH PROTECTIVE CAGE) LOCATE IN SAME LOCATION AS EXISTING, FIELD VERIFY (BY BAS)
R - REPLACE EX DUCT STATIC PRESSURE SENSOR WITH NEW (BY BAS)

PACKAGED TERMINAL HEAT PUMP (W/ AUX ELEC HEAT)

THIS PTHP REQUIRES A ENLARGED EXTERIOR WALL OPENING FOR NEW 42"x46" WALL SLEEVE.

SYMBOL	NOMINAL TONNAGE	CFM	OA CFM	COOLING CAPACITY TC (BTUH)	SHC (BTUH)	EFFICIENCY EER	IEER	AUXILARY ELEC HEATING CAPACITY BTUH	KW	VOLTAGE/PH	HP HEATING CAPACITY BTUH (47°F)	BTUH (10°F)	EFFICIENCY COP	HSPF	FAN HP	ELECTRICAL DATA MCA	FUSE	VOLTAGE	MANUFACTURER BARD MODEL	WEIGHT	REFRIG. TYPE	UNIT TYPE
PTHP-1	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-2	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-3	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-4	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-5	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-6	3.5	1,300	200	43,000	31,000	11.3	--	26,000	10	280V/1Φ	38,000	21,000	3.5	-	1/2	83	90	208V-1Φ	Q43HFDA10VP4XXR	747 LBS.	R-454B	TOP DUCTED
PTHP-7	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-8	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED
PTHP-9	3.0	1,200	170	35,000	26,000	11.0	--	26,000	10	280V/1Φ	32,000	17,000	3.4	-	1/2	81	90	208V-1Φ	Q36HFDA10VP4XXR	687 LBS.	R-454B	TOP DUCTED

NOTES:

1. COOLING CAPACITY @ 95° AMBIENT, 80/67 ENTERING AIR
2. ALL UNITS SHALL BE UL LISTED AND ASHRAE 90.1 COMPLIANT.
3. PROVIDE UNITS WITH METAL FILTER RACKS W/REPLACEABLE FILTER MEDIA (MERV-8), FACTORY INSTALLED HEATER, UL LABEL, SINGLE POINT ELEC CONNECTION, DEHUMIDIFICATION (HGRH), ECM SUPPLY FAN MOTOR, CONDENSATE DRAIN KIT, GRAY FINISH 10" HEIGHT TRIM KIT DRAW SIDE TRIM EXTENSION KIT, WALL SLEEVE, BAKED ENAMEL FINISH EXTERIOR LOUVER, DOOR MOUNTED THERMISTAT SUPPLIED BY UNIT MANUFACTURER INTEGRATED INTO EXISTING BAS VIA ALC. REFER TO POINTS LIST BELOW
4. MANUFACTURER SHALL PROVIDE FACTORY START UP FOR ALL UNITS. START UP TECHNICIAN SHALL BE AN EMPLOYEE OF THE MANUFACTURER OR A FACTORY CERTIFIED TECHNICIAN.
5. PROVIDE EACH UNIT WITH AN AIR CLEANING SYSTEM EQUAL TO NEEDLE POINT BI-POLAR IONIZATION SYSTEM MOUNTED ON THE ENTERING SIDE OF THE COOLING COIL. EQUAL TO GLOBAL PLASMA SOLUTIONS GPS-FC36-AC.
6. UNIT SHALL HAVE AN INDOOR OPERATING SOUND LEVEL THAT WILL NOT EXCEED 42.7 DBA MEASURED FROM 10' FROM THE UNIT IN ACCORDANCE WITH ANSI S12.60 MIXED AIR SOUND RATING.
7. PROVIDE UNITS WITH 5 YEAR PARTS AND LABOR WARRANTY.
8. INTEGRATE PTHP'S WITH AREA CEILING SMOKE DETECTION SYSTEM (INSTALLED BY ELECTRICAL CONTRACTOR). THE SMOKE DETECTION SYSTEM SHALL BE FURNISHED AND WIRED FOR UNIT SHUT DOWN AND FIRE ALARM INTERFACE BY THE ELECTRICAL CONTRACTOR.

ION GENERATOR REQUIREMENTS:

PROVIDE RTU'S WITH AN NEEDLE POINT ION GENERATOR AS MANUFACTURED BY GLOBAL PLASMA SOLUTIONS INDICATED BELOW
MODEL # GPS-FC48-AC 120V COMPATIBLE
INSTALL (1) PER 4,000 CFM

ION FILTER NOTES:

1. UL-2998 AND UL 867 COMPLIANCE
2. PROVIDE WITH INTEGRAL BAS ALARM CONTACTS.
3. AUTO CLEANING
4. INSTALL AT SUPPLY FAN INLET
5. MAGNETIC BASE MOUNTED TO FAN INLET

INPUT/OUTPUT SUMMARY (PTHP ONLY)

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS: ANALOG MEASURED: TEMPERATURE	PRESSURE	RH	AIR FLOW	WATT/KW	WATT/KWH	CO2	FR'TZ	PPM	VOLTS	AMPS	CALC.: SETPOINT ADJ.	ENTHALPY	RUN TIME	EFFICIENCY	BINARY: STATUS	FILTER	SMOKE	AIR FLOW	METER	OVER-RIDE	OUTPUTS: DIGITAL: OFF-ON	OFF-AUTO-ON	OPEN-CLOSE	ANALOG: DMPR. POS.	VALVE POS.	STEP CONTROL	SYSTEM FEATURES: ALARMS: HI ANALOG	LO ANALOG	HI BINARY	LO BINARY	PROOF	PROGRAMS: TIME SCHEDULING	DEMAND LIMITING	RESET SCHED.	START/STOP OPT.	EQUIPT. LIST OPT.	SMOKE CNT.	TREND	ALARM INSTRUCT.	MAIN. WK. ORD.	GENERAL: COLOR GRAPHIC	OVERRIDE	SUPPLMENT. NOTES
PACKAGED HEAT PUMP																																						X		X		
Supply Fan																						X																					
Status																X														X													
Discharge Temp	X																																									
Setpoint Adjust												X																															
Space Temp	X																											X													
Space Humidity (RH%)		X																										X													

1. Space Humidity (RH%)

REV #	DATE	DESCRIPTION
1	11-10-26	ADDENDUM

MECHANICAL • ELECTRICAL • PLUMBING
FIRE PROTECTION • TECHOLOGY DESIGN
optima engineering
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NORTH CAROLINA LICENSE NUMBER C-0910

SEAL:

NORTH CAROLINA PROFESSIONAL SEAL 027956 ENGINEER STEVEN R. DALEY
10-23-26

RANDOLF MIDDLE SCHOOL
ROOFTOP UNIT REPLACEMENT
4400 WATER OAK RD, CHARLOTTE, NC 28211

DATE: 10-23-26
PROJECT #: 22-0254
DRAWN BY: JMF
DESIGNED BY: JMF
CHECKED BY: SRD

SHEET TITLE:
MECHANICAL SCHEDULES, AND DETAILS

DWG #:
M102

SHEET NO: 3 OF 5