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LOUVER SCHEDULE

MARK	SERVICE	SIZE	FREE	CFM	FPM	ELECT	CONTROL	COLOR	MODEL NO./DESCRIPTION	NOTES
LV-5A	CTE BUILDING OUTSIDE AIR	48x36	6.11	3,125	511	120 V	BMS	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-5B	CTE BUILDING OUTSIDE AIR	48x30	5.26	2,600	495	120 V	BMS	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-AG	AGRICULTURE LAB EXHAUST AIR	18x18	0.96	1,200	1,250	N/A	N/A	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-AM	AUTOMOTIVE LAB INTAKE AIR	30x48	5.22	2,600	499	120 V	INTERLOCK WITH EF-C	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-WA	WELDING LAB INTAKE AIR	72x42	11.15	8,400	754	120 V	INTERLOCK WITH PANEL	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-WB	WELDING LAB EXHAUST AIR	42X36	5.28	8,400	1591	N/A	N/A	BY ARCH	RUSKIN ELF375DXH	1-4,6
LV-BR	BOILER ROOM COMBUSTION AIR	72x18	4.21	–	–	N/A	N/A	BY ARCH	RUSKIN ELF375DXH	1-4,6

3

NOTES:
(1) LOUVERS AND DAMPERS MEETING OR EXCEEDING SPECIFIED DATA, MANUFACTURED BY VENT PRODUCTS, NCA OR CESCO
(2) PROVIDE EXTENDED SILL, CLIP ANGLES, & INSECT SCREEN.
(3) SEE DETAILS
(4) PROVIDE FACTORY FINISH AS SPECIFIED – (2) COLORS SELECTED BY ARCHITECT.
(5) INSTALL HI/LO COMBUSTION AIR & VENTILATION LOUVERS PER NCSBC VOL. VI.
(6) PROVIDE WITH MANUFACTURERS B.D.D.

O/A = OUTSIDE AIR
FREE = EFFECTIVE FREE AREA (SQ. FT.)
SIZE = WIDTH x HEIGHT (INCHES)
BMS = INDEXED BY BUILDING MANAGEMENT SYSTEM
C.D. = CONTROL DAMPER by EMS Cont'r
B.D.D. = BACKDRAFT DAMPER
ELECT/CONT'L = ELECTRICAL / CONTROL
COLOR NO. 1 = BRICK COLOR
COLOR NO. 2 = EIFS COLOR

AIR-COOLER LIQUID CHILLER

UNIT	CAP	IPLV	GPM	MIN. FLOW	LWT	EWT	MFR/MODEL NO.	WEIGHT	ELECT	COMP 1 RLA	COMP 1 LRA	COMP 2 RLA	COMP 2 LRA	COMP 3 RLA	COMP 3 LRA	COMP 4 RLA	COMP 4 LRA	MCA	FUSE	NOTES
CH-1	69	16.19	118	93	42	56	TRANE/CGAM070	5700	460V/3PH	25	155	33	215	33	215	25	155	147	200	1-10

NOTES:
(1) REFERENCE SPECIFICATION SECTIONS 15682 FOR EQUIPMENT AND ACCESSORIES.
(2) SEE ALSO EQUIPMENT INSTALLATION DETAILS FOR ACCESSORIES, OPTIONS, ETC.
(3) PROVIDE WIDE AMBIENT OPERATION OPTION, FACTORY MOUNTED DISCONNECT, ACROSS THE LINE STARTER, MANUF. ISOLATION MOUNTS, HAIL GUARD, AND SINGLE POINT POWER CONNECTION.
(4) M.C. SHALL PROVIDE HEAT TAPE ON ALL EXPOSED EXTERIOR HYDRONIC PIPE AND TRACER WIRE ON ALL UNDERGROUND HYDRONIC PIPE.
(5) NUMBER OF CONDENSER FANS PER CHILLER IS 10.
(6) PROVIDE WITH LOUVERED SKIRT TO PROTECT COMPRESSORS.
(7) PROVIDE UNIT WITH INSULATED COMPRESSOR SOUND DEADENING OPTION.
(8) PROVIDE CHILLERS WITH FACTORY CHILLER CONTROLS WITH BACNET CARD TO CONNECT TO EXISTING CONTROL SYSTEM-(?? CONTROLS)
(9) BUILDING LOOP SIDE OF THE HEAT EXCHANGER DESIGN TEMPERATURES ARE 42F CHWS AND 56F CHWR.
(10) SCHEDULED INFORMATION BASED ON TRANE, YORK AND CARRIER SHALL BE EQUALS.

ABBREVIATIONS:
CAP = CAPACITY @ LWT (tons)
EER = ENERGY EFFICIENCY RATIO
LWT = LEAVING WATER TEMP (°F)
EWT = ENTERING WATER TEMP. (°F)
kW = POWER INPUT (WATTS X 1000)
RLA = RATED LOAD AMPS
COMP = CHILLER COMPRESSOR
MCA = MAX CIRCUIT AMPACITY

NCBC VENTILATION CALCULATIONS

OCCUPANCY TYPE	SQ. FT.	O.A. PER SQ. FT.	# OF OCCUPANTS	O.A. PER PERSON	TOTAL O.A. CFM
CLASSROOM	10,300	–	120	7.5	900
CTE LAB	14,560	0.18	100	10	3,620
CORRIDOR	2,740	0.06	–	–	165
BATHROOM	950	–	–	–	0
TOTAL REQUIRED FOR BUILDING					4,685
TOTAL PROVIDED FOR BUILDING					5,700 **

** VENTILATION IS SET TO PROVIDE BUILDING WITH POSITIVE PRESSURE.

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

METHOD OF COMPLIANCE:

PRESCRIPTIVE ☒ ENERGY COST BUDGET ☐

CLIMATE ZONE: IBC – 4A (BERTIE CO.)

THERMAL ZONE
WINTER DRY BULB: 22.0°F
SUMMER DRY BULB: 95.0°F

INTERIOR DESIGN CONDITIONS
WINTER DRY BULB: 70°F
SUMMER DRY BULB: 75°F
RELATIVE HUMIDITY: 50%

BUILDING HEATING LOAD: 588.8 MBH

BUILDING COOLING LOAD: 1019.6 MBH

MECHANICAL SPACE CONDITIONING SYSTEM
UNITARY
DESCRIPTION OF UNIT: AIR COOLED CHILLER
HEATING EFFICIENCY: EXISTING TO REMAIN
COOLING EFFICIENCY: SEE SCHEDULE
HEAT OUTPUT OF UNIT: SEE SCHEDULE
COOLING OUTPUT OF UNIT: SEE SCHEDULE
BOILER
TOTAL BOILER OUTPUT: EXISTING TO REMAIN (If oversized, state reason)
(Over-sized for standard unit sizes and morning warm-up. multi-unit allows for staging)
CHILLER
TOTAL CHILLER OUTPUT: 553.2 MBH (If oversized, state reason)

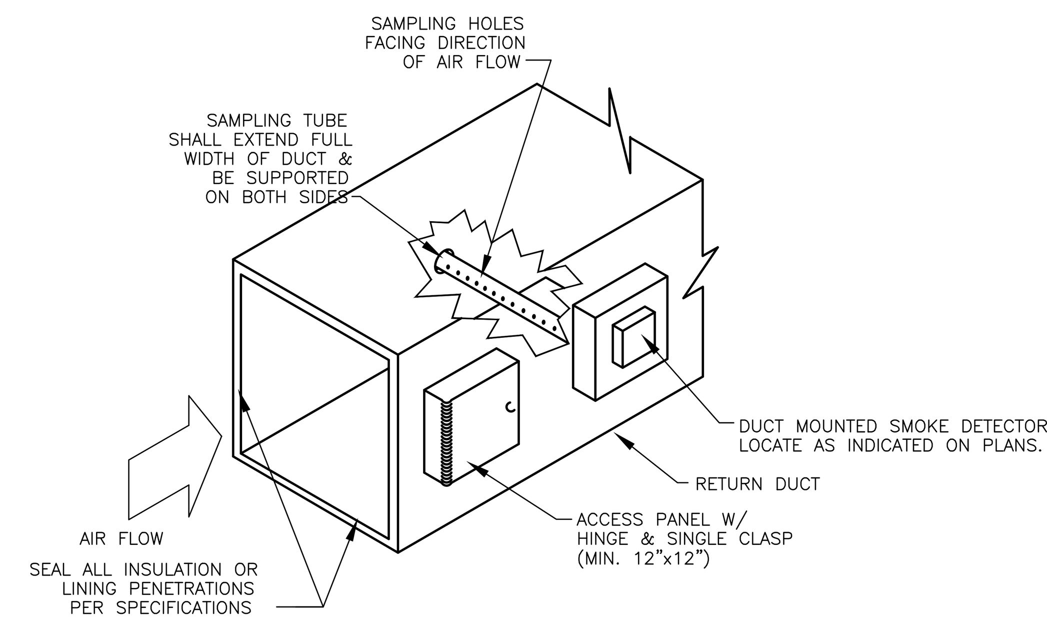
LIST EQUIPMENT EFFICIENCIES

EQUIPMENT SCHEDULES WITH MOTORS (Not used for mechanical systems)
MOTOR HORSEPOWER:
NUMBER OF PHASES:
MINIMUM EFFICIENCY:
MOTOR TYPE:
OF POLES:

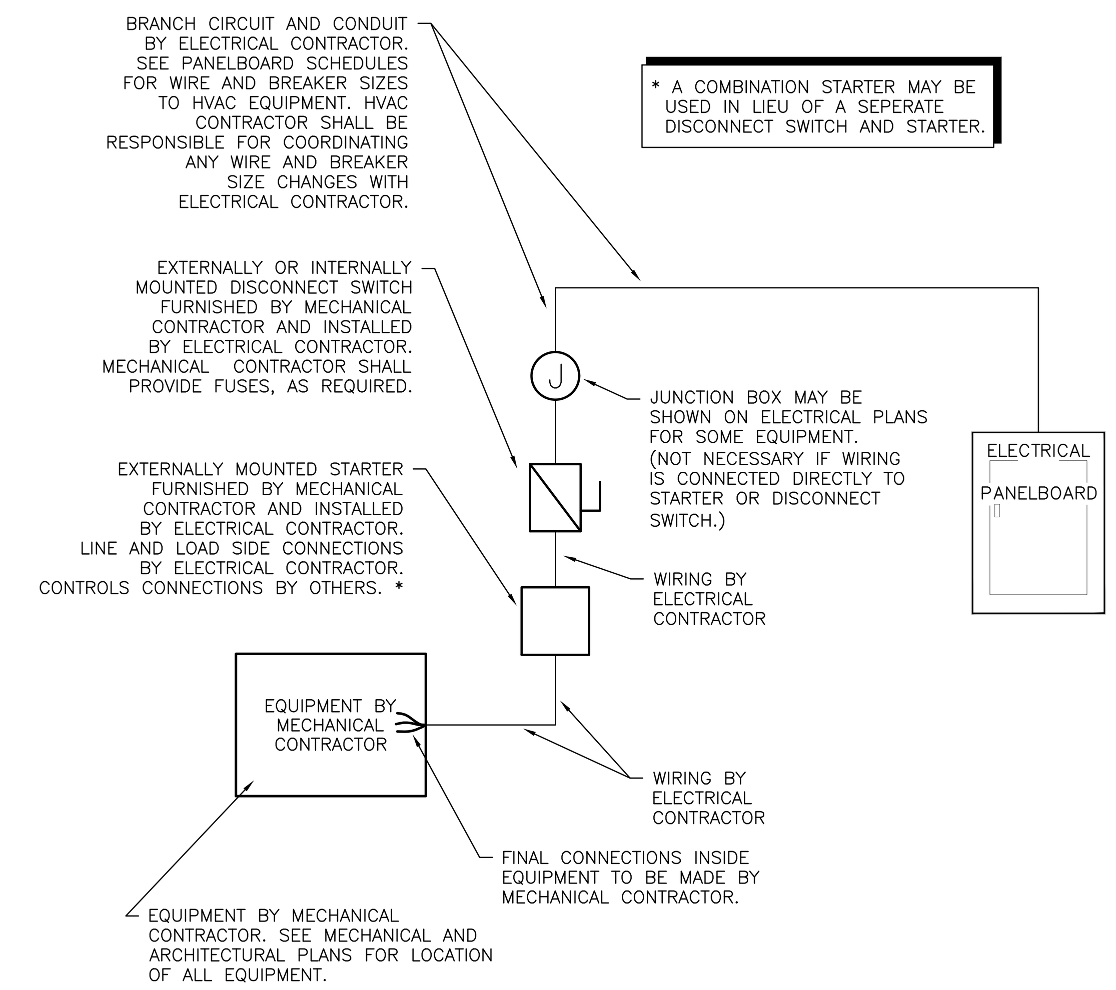
DESIGNER STATEMENT:

To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems and equipment requirements of the 2012 North Carolina energy conservation code.

SIGNED: D. Wilson Pou
NAME: D. WILSON POU, P.E.
TITLE: PRESIDENT



002.1 DUCT MOUNTED SMOKE DETECTOR DETAIL
SCALE: N.T.S.



002.4 MECHANICAL EQUIPMENT ELECTRICAL CONNECTION DETAIL
SCALE: N.T.S.

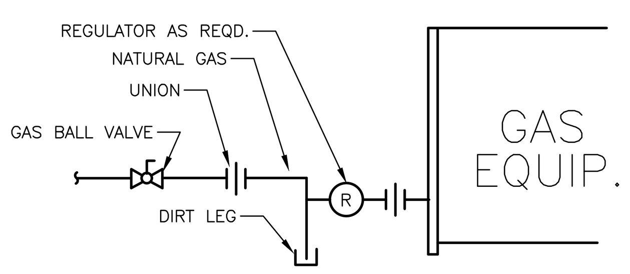
PUMP SCHEDULE

TAG	TYPE	SERVICE	GPM	HEAD	% EFF	HP	RPM	MIN. FLOW	ELECT	FLA	CONTROL	MFR/MODEL	NOTES
CWP-1	END SUCTION CENTRIFUGAL	CW SYSTEM PUMP	62	55	55.2	2.0	1750	32	480V/3PH	3.4	VAR. SPEED	B&G e-1510 1.25BC	1-4
CWP-2	END SUCTION CENTRIFUGAL	CW SYSTEM PUMP	62	55	55.2	2.0	1750	32	480V/3PH	3.4	VAR. SPEED	B&G e-1510 1.25BC	1-4
HWP-1	END SUCTION CENTRIFUGAL	HW SYSTEM PUMP	36	50	59.4	1.5	1800	20	480V/3PH	3.0	VAR. SPEED	B&G e-1510 1.25AD-es	1-4
HWP-2	END SUCTION CENTRIFUGAL	HW SYSTEM PUMP	36	50	59.4	1.5	1800	20	480V/3PH	3.0	VAR. SPEED	B&G e-1510 1.25AD-es	1-4
CHP-1	END SUCTION CENTRIFUGAL	CHILLER 1	118	25	77.1	1.5	1750	118	480V/3PH	3.0	CHILLER ON	B&G e-1510 2AD-es	1-4

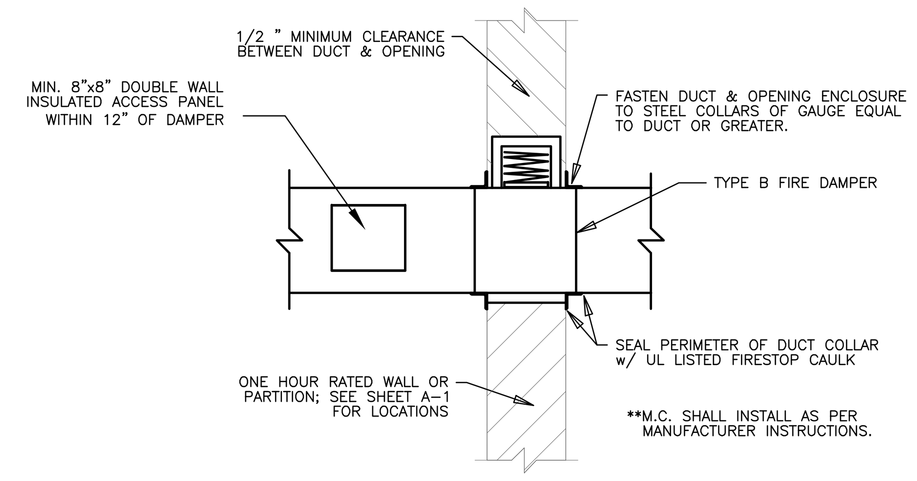
NOTES:
(1) REFERENCE SPECIFICATION SECTION 15750.
(2) IMPELLER SIZING RESPONSIBILITY OF PUMP MANUFACTURER
(3) SYSTEM PUMPS SHALL OPERATE IN LEAD/LAG ROTATION
(4) MAXIMUM HP INDICATED

ABBREVIATIONS:
HEAD= FRICTION LOSS (ft)
EFF = MIN. PUMP EFFICIENCY (%)
GPM = FLOW RATE
FLA = PUMP MOTOR FULL LOAD AMPS

* PROVIDE COPPER TUBING TO VENT REGULATOR AS REQUIRED



002.2 GAS PIPING SCHEMATIC
SCALE: N.T.S.



002.3 1 HOUR WALL DUCT PENETRATION
SCALE: N.T.S.

BOILER SCHEDULE

MARK	OUT	IN	VENT	EWT	LWT	WT	MFR/NODEL	ELECT	FUEL	NOTES
B-1	989	1,000	6"	120	150	535	RIELLO/AR-1000	120V / 10A	NATURAL	1-7,9

NOTES:
(1) REFERENCE SPECIFICATIONS SECTION 15550
(2) PROVIDE LP/NATURAL GAS COMBINATION FUEL BURNER & BURNER CONTROLS AS SPECIFIED
(3) PROVIDE OUTDOOR RESET SEQUENCING CONTROLLER AS SPECIFIED
(4) BOILERS SHALL BE SUPPLIED W/ ALL SAFETIES & CUT-OFFS REQUIRED BY CODE & NC DEPT. OF LABOR REGULATIONS
(5) PROVIDE BOILERS W/ OUTSIDE AIR AMBIENT TEMP. SETBACK
(6) PROVIDE BOILERS W/ PACKAGED BOILER STAGING CONTROL FROM MFG. ALTERNATE LEAD/LAG ON A WEEKLY BASIS.
(7) PROVIDE BOILER WITH PRIMARY LOOP PUMP, INTERNAL TO THE BOILER. EQUALS MAY PROVIDE EXTERNAL PUMP.
(8) M.C. SHALL REFER TO PLUMBING DRAWING FOR CONNECTING BACK TO DOMESTIC WATER. BOILER SHALL HAVE DOMESTIC WATER PRIORITY SCHEDULING AND PROVIDED WITH DOMESTIC HOT WATER HEATING PACKAGE AND 1000 GAL STORAGE TANK.
(9) BOILERS SHALL BE PROVIDED WITH BACNET CARDS TO BE CONNECTED TO BUILDING MANAGEMENT SYSTEM.

ABBREVIATIONS:
OUT = NET I-B-R RATED OUTPUT (MBtuH)
IN = NATURAL GAS/PROPANE INPUT (MBtuH)
EWT = ENTERING WATER TEMP (°F)
LWT = LEAVING WATER TEMP (°F)
WT = WEIGHT (LBS.)

GAS SIZING CALCULATIONS

EQUIPMENT LIST	MBH	QUANTITY	TOTAL MBH
B-1	1,000	1	1,000
GWH	199	1	199
TOTAL CONNECTED =			1,199
LENGTH OF GAS LINE = 200 FT.			
TYPE OF GAS SERVICE = NATURAL GAS OR PROPANE			
GAS PRESSURE = 2 PSI			
SIZE OF GAS SERVICE REQUIRED = 1.25			

NOTE: ENGINEER SHALL BE NOTIFIED PRIOR TO INSTALLATION OF GAS PIPE IF ANY ONE OF THE ABOVE CALCULATIONS DIFFER FROM THE ACTUAL INSTALLATION REQUIREMENTS. ENGINEER SHALL HAVE OPPORTUNITY TO REVIEW ACTUAL INSTALLATION CONDITIONS AND RE-SIZE GAS SERVICE IF REQUIRED.

ELECTRIC UNIT HEATER SCHEDULE

TAG(S)	SERVICE	HEAT	BTUH	CFM	MFR / MODEL NO.	ELECT	NOTES	WEIGHT
UH-1	SPRINKLER 532	3.3 KW	11,200	400	MARKEL NO. P3PUH03CA1	480V/3PH/4.0A	1-3	36 LBS

NOTES:
(1) PROVIDE MFR'S DISCONNECT AND LOW VOLTAGE THERMOSTAT – SEE INSTALLATION DETAIL, SHEET M-001
(2) UL LISTED HYDRONIC HEATERS MEETING OR EXCEEDING SPECIFICATIONS MANUFACTURED BY STERLING SHALL BE CONSIDERED EQUAL
(3) M.C. SHALL PROVIDE HORIZONTAL CEILING BRACKET WITH DUST SHIELD

EXHAUST FAN VENTILATOR SCHEDULE

MARK	CFM	RPM	S.P.	ELECTRICAL	CONTROLS	MODEL NO./DESCRIPTION	NOTES
EF-A	100	848	0.125	115V / 0.6A	LOCAL	GREENHECK NO. SP-A110 PREMIUM CEILING FAN	1,2,3,7
EF-B	300	898	0.25	115V / 1.7A	EMS	GREENHECK NO. SP-A410 PREMIUM CEILING FAN	1,2,4,7
EF-C	2600	860	0.15	115V / 2.7A	LOCAL	GREENHECK NO. SE1-20-428-C6 PREMIUM SIDE WALL PROP FAN	1,2,5,6,7
EF-D	250	1350	0.125	115V / 0.2A	LOCAL	GREENHECK NO. SE1-08-424-G PREMIUM SIDE WALL PROP FAN	1,2,5,6,7
EF-G	50	848	0.125	115V / 0.6A	LOCAL	GREENHECK NO. CSP-A110 PREMIUM IN-LINE FAN	1,2,3,7
EF-H	100	848	0.125	115V / 0.6A	LOCAL	GREENHECK NO. CSP-A110 PREMIUM IN-LINE FAN	1,2,3,7

NOTES:
(1) MODEL NUMBERS NOTED ARE GREENHECK EQUIPMENT, UNLESS OTHERWISE NOTED. EXHAUST FANS MEETING OR EXCEEDING PERFORMANCE DATA MANUFACTURED BY COOK OR CARNES ARE ACCEPTABLE SUBSTITUTES. ALL FANS SHALL HAVE UL LISTED LABELS AND OPTIONAL MOTOR COVERS.
(2) FURNISH AND INSTALL MFR'S SPEED CONTROLLER OR EQUIVALENT & ALL ACCESSORIES INDICATED ON DETAILS
(3) FURNISH AND INSTALL 10"x3" HOODED WALL CAP WITH INTEGRAL FLASHING, BDD, AND BIRD SCREEN, GREENHECK MODEL NO. WC OR EQUIVALENT.
(4) FURNISH AND INSTALL 18"x8" HOODED WALL CAP WITH INTEGRAL FLASHING, BDD, AND BIRD SCREEN, GREENHECK MODEL NO. WC OR EQUIVALENT.
(5) SEE LOUVER SCHEDULE.
(6) PROVIDE MANUFACTURER'S WALL MOUNT HOUSING w/ OSHA APPROVED MOTOR GUARD, INSTALLATION COLLAR, AND BDD
(7) SEE INSTALLATION DETAIL; SEE ALSO CONTROL SEQUENCE IN SPECIFICATIONS

ABBREVIATIONS:
BDD: BACK DRAFT DAMPER
DPST: DOUBLE POLE SINGLE THROW SWITCH BY E.C.
CFM: AIR FLOW (cu ft/min)
NC : NOISE CRITERIA (sones)
EMS: ENERGY MANAGMENT SYSTEM

RETURN FLEX DUCT SCHEDULE

CFM	SIZE (DIA.)
0 – 100	6"
101 – 200	8"
201 – 400	10"
401 – 700	12"
701 – 1000	14"
1001 – 1600	16"
OVER 1600	NOT USED

FLEX SUPPLY DUCT SCHEDULE

CFM	SIZE (DIA.)
0 – 60	5"
61 – 130	6"
131 – 250	8"
251 – 450	10"
451 – 750	12"

ACCESS DOOR SCHEDULE

DUCT SIZE	ACCESS DOOR
UP TO 16" WIDE	12" x 12"
17" TO 22"	16" x 16"
24" & UP	18" x 18"
LOUVER ACCESS	36" x 24"
REFER TO SPECIFICATIONS SECTION 15800	

AIR DISTRIBUTION SCHEDULE

MARK	FACE SIZE	NECK SIZE	MFR/MODEL	CFM/FPM	NC	REMARKS
A	24"x24"	9"x9"/10"ø	PRICE/AMD	300/500	<25	LAY-IN CEILING DIFFUSER WITH 4-WAY DEFLECTION; ALUMINUM CONSTRUCTION
AG	24"x24"	9"x9"/10"ø	PRICE/AMD	275/500	<25	SURFACE MOUNTED CEILING DIFFUSER WITH 4-WAY DEFLECTION; ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.
B	24"x24"	6"x6"/8"ø	PRICE/AMD	200/500	<20	LAY-IN CEILING DIFFUSER WITH 4-WAY DEFLECTION; ALUMINUM CONSTRUCTION
BG	24"x24"	6"x6"/8"ø	PRICE/AMD	200/500	<20	SURFACE MOUNTED CEILING DIFFUSER WITH 4-WAY DEFLECTION; ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.
C	12"x12"	6"x6"/6"ø	PRICE/AMD	100/500	<20	LAY-IN CEILING DIFFUSER WITH 4-WAY DEFLECTION; ALUMINUM CONSTRUCTION
D	8"x27"	6"x24"	PRICE/AHCD1D	500/500	<25	DUCT MOUNTED DRUM LOUVER WITH OPPOSED BLADE DAMPER AND POLE OPERATOR; ALUMINUM CONSTRUCTION
G	3.5"x24"	10"ø	PRICE/LBNH26B	300/700	<30	SURFACE MOUNTED CEILING DIFFUSER WITH ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.
DC	36"x36"	34"x34"	PRICE/151	6000/700	<30	SURFACE MOUNTED, SIDEWALL INDUSTRIAL LOUVERED FACE SUPPLY GRILLE, ALUMINUM CONSTRUCTION W/ LOCKING ADJUSTABLE BLADES @ 1-1/2" O.C. BLADES SHALL BE HORIZONTAL (PARALLEL W/ FINISHED FLOOR) AND SHALL BE SET TO 30° TOWARDS THE CEILING.
R1	24"x24"	12"x12"	PRICE/80TB	550/650	<20	LAY-IN EGG CRATE FACE RETURN WITH BLADES @ 1/2" O.C. ALUMINUM CONSTRUCTION
R1G	24"x24"	12"x12"	PRICE/80DAL	550/650	<20	SURFACE MOUNTED EGG CRATE FACE RETURN WITH BLADES @ 1/2" O.C. ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.
R2	24"x24"	22"x22"	PRICE/80TB	2000/700	<20	LAY-IN EGG CRATE FACE RETURN WITH BLADES @ 1/2" O.C. ALUMINUM CONSTRUCTION
R2G	24"x24"	22"x22"	PRICE/80DAL	2000/700	<20	SURFACE MOUNTED EGG CRATE FACE RETURN WITH BLADES @ 1/2" O.C. ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.
R3	26"x18"	18"x18"	PRICE/635D	1800/600	<20	SIDEWALL REGISTER WITH BLADES @ 1/2" O.C. ALUMINUM CONSTRUCTION. PROVIDE WITH INTEGRAL DAMPER.

NOTES:
(1) ALL FINISHES TO BE WHITE EXCEPT WHERE NOTED.
(2) KRUEGER, METAL*AIRE, TUTTLE & BAILEY, TITUS & CARNES ARE CONSIDERED EQUIVALENTS.
(3) PROVIDE SQUARE TO ROUND TRANSITIONS WHERE REQUIRED.
(4) PROVIDE WHITE FINISH FASTENERS AS REQUIRED.
(5) PROVIDE MANUFACTURER'S LEVER OPERATED GRILLE MOUNTED DAMPER FOR ALL SUPPLY GRILLES/DIFFUSERS THAT ARE INDICATED TO BE PROVIDED WITH INTEGRAL DAMPER.
(6) PROVIDE 2" FOIL FACED INSULATION OVER ALL SUPPLY REGISTER BACKS.
(7) M.C. SHALL PROVIDE RADIATION DAMPERS WHERE REQUIRED.
(8) VALUES LISTED ARE MAXIMUM VALUES.
(9) PROVIDE INSECT SCREEN FOR TYPE "XS".
* CONTRACTOR TO PROVIDE AND INSTALL RADIATION DAMPER AND THERMAL BLANKET. PROVIDE RETURN GRILLES WITH OPTIONAL STEEL FRAME.

ABBREVIATIONS:
BDD: BACK DRAFT DAMPER
OBD: OPPOSED BLADE DAMPER
FPM: VELOCITY (ft/min)
NC : NOISE CRITERIA

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No.	Date	Revision
3	04/03/25	ADDENDUM # 3
2	03/20/25	ADDENDUM # 2
1	03/10/25	ADDENDUM # 1

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HITE ASSOCIATES, P.C. ARCHITECTURAL CORPORATION CERTIFICATE NUMBER 418 REGISTERED STATE OF NORTH CAROLINA GREENVILLE

NEW CTE BUILDING FOR
Bertie High School
716 US 13 North / NCDPS Unit 080 - School 312
Windsor / Bertie County / North Carolina

Project No. 22351
Date: March 2025
Drawing no. M 002

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