

WSHP-1 Outdoor Air Calculation				
ZONE LEVEL				
Zones served by system	Sales	Cashwrap Storage rooms	Stock Storage rooms	
Space type				
Az	Area	3548	49	594
Pz	Population	54	1	1
Rp	chmperson	7.5	0	0
Ra	chmsr	0.12	0.12	0.12
PzRp		405	0	0
AzRa		425.76	5.88	71.28
Ez		1	1	1
Vol		831	6	71
Vp		3750	20	230
Vpzn		3750	20	230
Zp		0.22	0.29	0.31
SYSTEM LEVEL				
Pa		55		
D		0.98		
Vou		901		
Xs		0.23	Not used in calculation	
SYSTEM EFFICIENCY				
Max Zp		0.31		
Ev		0.84		
Vol		1072	Percent outdoor air intake	27%

OUTSIDE AIR CALCULATIONS

NTS
00D-M0401-M00-OACA
M
09/13/15

DESIGN WEATHER PARAMETERS

City Name	West Palm Beach
Location	Florida
Latitude	26.7 Deg
Longitude	80.1 Deg
Elevation	20.0 F
Summer Design Dry-Bulb	78.0 F
Summer Coincident Wet-Bulb	78.0 F
Summer Daily Range	13.1 F
Winter Design Dry-Bulb	43.0 F
Winter Design Wet-Bulb	36.1 F
Atmospheric Cleaness Number	0.90
Average Ground Reflectance	0.20
Sol Conductivity	0.800 BTU/(hr-ft ² -F)
Local Time Zone (GMT +/- N hours)	5.0 hours
Consider Daylight Savings Time	No
Simulation Weather Data	none/NA
Current Data is	2001 ASHRAE Handbook
Design Cooling Months	January to December

HVAC LOAD CALCULATIONS

Air System Name	Block	Number of zones	1
Equipment Class	SPL1-AHU	Floor Area	4259.0 ft ²
Air System Type	SZCAV	Location	West Palm Beach, Florida

Sizing Calculation Information	
Calculation Months	Jan to Dec
Sizing Data	Calculated
Zone CFM Sizing	Sum of space airflow rates
Space CFM Sizing	Individual peak space loads

Central Cooling Coil Sizing Data	
Total coil load	12.9 Tons
Total coil load	154.3 MBH
Sensible coil load	92.3 MBH
Coil CFM at Jun 1500	4000 CFM
Max block CFM	4000 CFM
Sum of peak zone CFM	4000 CFM
Sensible heat ratio	0.588
RPTon	331.2
BTU/(hr-ft ²)	36.2
Water flow @ 10.0 F rise	N/A
Load occurs at	Jun 1500
OA DB / WB	90.0 F / 78.0 F
Entering DB / WB	77.9 / 68.2 F
Leaving DB / WB	56.5 / 55.7 F
Coil ADP	54.1 F
Bypass Factor	0.100
Resulting RH	60 %
Design supply temp	58.4 F
Zone T-stat Check	1 of 1 OK
Max zone temperature deviation	0.0 F

Central Heating Coil Sizing Data	
Max coil load	31.5 MBH
Coil CFM at Jan 0600	4000 CFM
Max coil CFM	4000 CFM
Water flow @ 20.0 F drop	N/A
Load occurs at	Jan 0600
BTU/(hr-ft ²)	7.4
Ent. DB / Lvg DB	59.1 / 66.4 F

Supply Fan Sizing Data	
Actual max CFM	4000 CFM
Standard CFM	3997 CFM
Actual max CFM/ft ²	0.94 CFM/ft ²
Fan motor BHP	0.00 BHP
Fan motor kW	0.00 kW
Fan static	0.00 in wg

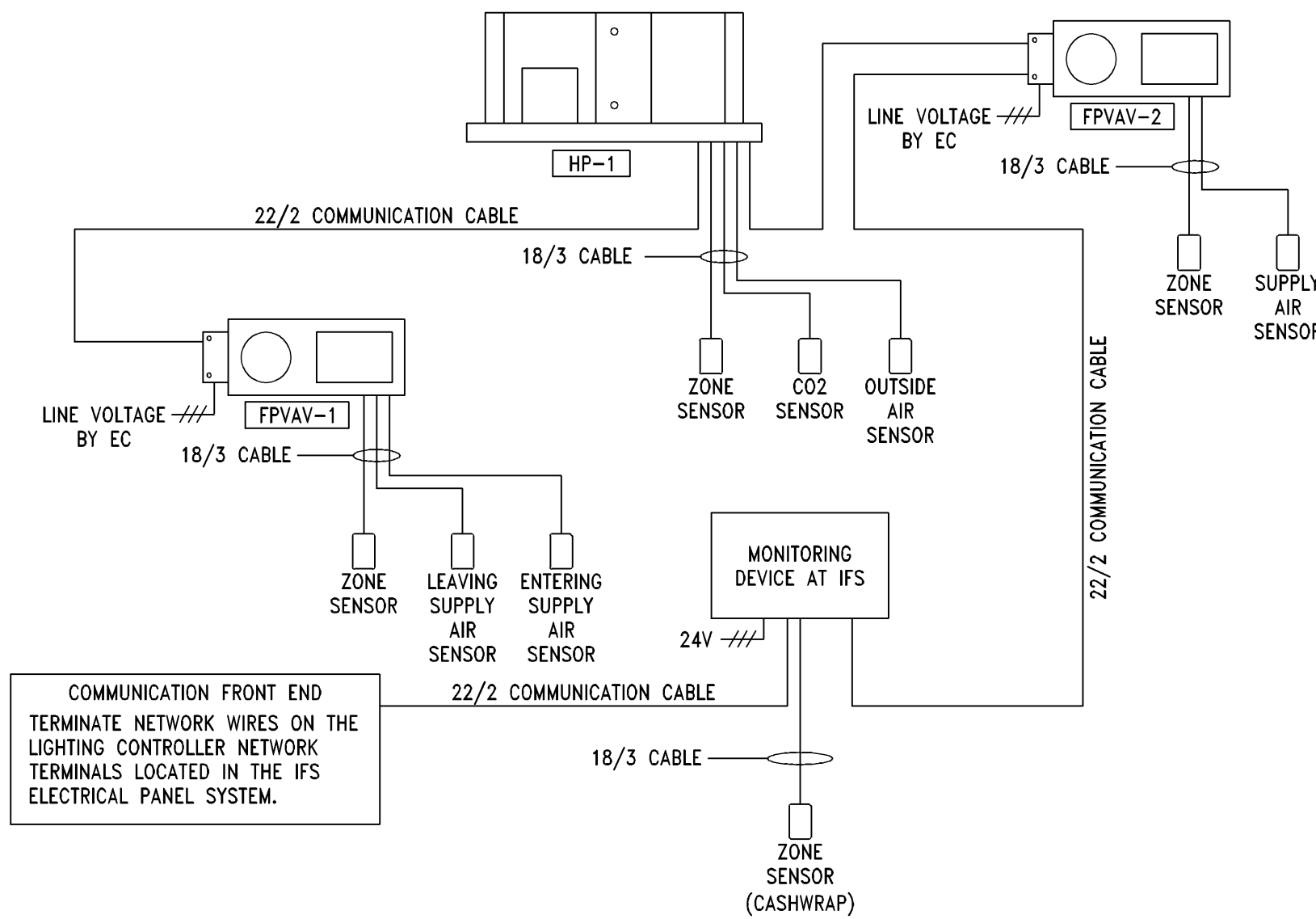
Outdoor Ventilation Air Data	
Design airflow CFM	1075 CFM
CFM/ft ²	0.25 CFM/ft ²
CFM/person	9.11 CFM/person

DESIGN COOLING				DESIGN HEATING			
COOLING DATA AT Jun 1500				HEATING DATA AT DES 1100			
COOLING OA DB / WB				HEATING OA DB / WB			
90.0 F / 78.0 F				43.0 F / 36.1 F			
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)	
Window & Skylight Solar Loads	0 ft ²	0	-	0 ft ²	0	-	-
Wall Transmission	0 ft ²	0	-	0 ft ²	0	-	-
Roof Transmission	0 ft ²	0	-	0 ft ²	0	-	-
Window Transmission	0 ft ²	0	-	0 ft ²	0	-	-
Skylight Transmission	0 ft ²	0	-	0 ft ²	0	-	-
Door Loads	0 ft ²	0	-	0 ft ²	0	-	-
Floor Transmission	4216 ft ²	0	-	4216 ft ²	0	-	-
Partitions	0 ft ²	0	-	0 ft ²	0	-	-
Ceiling	0 ft ²	0	-	0 ft ²	0	-	-
Overhead Lighting	3028 W	8873	-	0	0	-	-
Task Lighting	3560 W	11194	-	0	0	-	-
Electric Equipment	2660 W	8504	-	0	0	-	-
People	118	23372	24178	0	0	-	-
Utilization	-	0	-	0	0	-	-
Miscellaneous	-	4300	0	-	0	-	-
Safety Factor	0% / 0%	0	0	25%	0	0	0
>> Total Zone Loads	-	86243	24178	-	0	0	0
Zone Conditioning	-	61120	24178	-	0	0	-
Plenum Wall Load	0%	0	-	0	0	-	-
Plenum Roof Load	0%	0	-	0	0	-	-
Plenum Lighting Load	0%	0	-	0	0	-	-
Return Fan Load	4000 CFM	0	-	4000 CFM	0	-	-
Ventilation Load	1075 CFM	19232	37785	1075 CFM	31324	0	0
Supply Fan Load	4000 CFM	0	-	4000 CFM	0	-	-
Space Fan Coil Fans	0%	0	-	0	0	-	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-	-
>> Total System Loads	-	80362	61964	-	31324	0	0
Central Cooling Coil	-	92345	61964	-	0	0	0
Central Heating Coil	-	-11893	-	-	31324	-	0
>> Total Conditioning	-	80362	61964	-	31324	-	0
Key:	Positive values are ckg loads			Positive values are htg loads			
	Negative values are htg loads			Negative values are ckg loads			

HVAC LOAD CALCULATIONS

NTS
00D-M0401-J00-LOAD
J
08/11/11

WATER SOURCE HEAT PUMP NETWORK WIRING AND SEQUENCE



NOTES:

- (1) ALL WIRE SHALL BE 18/3 UNLESS OTHERWISE INDICATED.
- (2) NUMBER OF CABLES FURNISHED BY HVAC MANUFACTURER IS INDICATED BY NUMBER OF TICK MARKS ACROSS THE LINE.
- (3) PURPLE 22/2 WIRE IS PROVIDED BY HVAC SUPPLIER AND IS PLENUM RATED.
- (4) SCHEMATIC IS FOR REFERENCE ONLY. AT TIME OF CONSTRUCTION, THE HVAC SUPPLIER WILL PROVIDE A COMPLETE DIAGRAM FOR INSTALLATION. SEE RESPONSIBILITY SCHEDULES, THIS SHEET, FOR A LIST OF ALL COMPONENTS AND SENSORS REQUIRING FIELD INSTALLATION.

WATER SOURCE HEAT PUMP (WSHP) SEQUENCE OF OPERATIONS

MANUFACTURER SHALL FURNISH AND/OR INSTALL ALL NECESSARY CONTROL DEVICES TO ACCOMPLISH THE FOLLOWING SEQUENCE OF OPERATION (REFER TO RESPONSIBILITY SCHEDULE FOR FIELD INSTALLATION REQUIREMENTS):

DURING OCCUPIED HOURS THE SUPPLY FANS SHALL OPERATE CONTINUOUSLY, AND THE OUTSIDE AIR DAMPER SHALL OPEN TO THE MINIMUM SCHEDULED POSITION (ADJUSTABLE). WHEN THE SPACE TEMPERATURE IS 1°F ABOVE COOLING SETPOINT, COOLING SHALL BE ENERGIZED IN STAGES (WHERE APPLICABLE) UNTIL 1°F BELOW SETPOINT IS ACHIEVED. IF THE SPACE TEMPERATURE FALLS 1°F BELOW THE HEATING SETPOINT, THE REVERSING VALVE AND HEATPUMP HEATING SHALL BE ENERGIZED UNTIL THE SPACE TEMPERATURE RISES 1°F ABOVE THE HEATING SETPOINT, ELECTRIC HEAT AND FANS SHALL BE DEENERGIZED. DURING DEFROST CYCLE, HEATPUMP HEATING SHALL DEENERGIZE AND AUXILIARY ELECTRIC HEAT SHALL BE ENERGIZED IN STAGES (WHERE APPLICABLE).

DURING UNOCCUPIED HOURS, THE SUPPLY FANS SHALL BE DEENERGIZED. IF THE SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE FANS SHALL ENERGIZE, AND THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED. COOLING SHALL BE ENERGIZED. WHEN THE SPACE TEMPERATURE FALLS 1°F BELOW THE COOLING SETPOINT, COOLING AND FANS SHALL BE DEENERGIZED. IF THE SPACE TEMPERATURE FALLS 1°F BELOW THE HEATING SETPOINT, THE FANS SHALL OPERATE, AND THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED. THE REVERSING VALVE AND HEATPUMP HEATING SHALL BE ENERGIZED UNTIL THE SPACE TEMPERATURE RISES 1°F ABOVE THE HEATING SETPOINT, ELECTRIC HEAT AND FANS SHALL BE DEENERGIZED. DURING DEFROST CYCLE, HEATPUMP HEATING SHALL DEENERGIZE AND AUXILIARY ELECTRIC HEAT SHALL BE ENERGIZED IN STAGES (WHERE APPLICABLE).

A MANUFACTURER PROVIDED OR FIELD INSTALLED PAN OVERFLOW SWITCH WILL DISABLE ALL FANS, COOLING, HEATING, AND CLOSE OUTDOOR AIR DAMPER IF HIGH WATER IS SENSED IN THE PAN.

A FIELD INSTALLED CO2 SENSOR SHALL MODULATE THE OUTDOOR AIR DAMPER DURING OCCUPIED OPERATION BETWEEN SCHEDULED OA FLOW CFM AND MIN SCHEDULED OA FLOW TO MAINTAIN A CO2 CONCENTRATION BETWEEN 1000PPM AND 500PPM.

A DUCT MOUNTED SMOKE DETECTOR SHALL DEENERGIZE THE SUPPLY FAN AND CLOSE THE OUTDOOR AIR DAMPER WHEN ACTIVATED.

SETPOINTS:

OCCUPIED HEATING: 70°F COOLING: 74°F
UNOCCUPIED HEATING: 60°F COOLING: 85°F

FAN POWERED VAV (FPVAV) SEQUENCE OF OPERATIONS

MANUFACTURER SHALL FURNISH AND/OR INSTALL ALL NECESSARY CONTROL DEVICES TO ACCOMPLISH THE FOLLOWING SEQUENCE OF OPERATION (REFER TO RESPONSIBILITY SCHEDULE FOR FIELD INSTALLATION REQUIREMENTS):

DURING OCCUPIED HOURS THE VARIABLE AIR VOLUME TERMINAL UNIT FAN SHALL BE ENERGIZED AND DAMPER SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE.

IF THE SPACE TEMPERATURE DROPS ONE DEGREE BELOW SETPOINT AND THE DAMPER IS AT MINIMUM POSITION, THE UNIT'S ELECTRIC HEAT SHALL ENERGIZE (WHERE APPLICABLE). THE HEAT WILL REMAIN ON UNTIL THE SPACE TEMPERATURE IS SATISFIED.

THE TERMINAL UNIT DAMPER SHALL FULLY CLOSE AND THE FAN SHALL DEENERGIZE UPON A SIGNAL FROM THE FIRE ALARM SYSTEM.

DURING THE UNOCCUPIED SCHEDULE, THE DAMPER SHALL CLOSE AND FAN/HEATER WILL DEENERGIZE. THE DAMPER SHALL OPEN AND THE FAN SHALL ENERGIZE IF UNOCCUPIED COOLING SETPOINT IS REACHED, THE FAN AND HEATER SHALL ENABLE IF UNOCCUPIED TEMPERATURE IS 2°F BELOW UNOCCUPIED SETPOINT. FAN AND HEATER SHALL STOP WHEN SETPOINT IS REACHED.

WATER SOURCE HEAT PUMP RESPONSIBILITY SCHEDULE

ITEM	FURNISHED BY		INSTALLED OR PERFORMED BY			RE-USE EXISTING	N/A	REMARKS
	LS&C	LANDLORD	CONTR.	LANDLORD	CONTR.	OTHER		
WATER SOURCE HEAT PUMP	AC			MC				
DISCONNECT SWITCH			EC	EC				
BAS CONTROLLER	AC			AC				
ELECTRIC OPERATED DAMPER & ACTUATORS AND 0-10 VOLT ADAPTER	AC			MC				SHIPPED SEPERATELY
FLEXIBLE HOSE "U" WITH "CIRCUIT" SETTERS, SHUTOFF VALVES, STRAINER, ETC.	AC			MC				SHIPPED SEPERATELY
FAN PROVING SWITCH	AC			AC				
WATER FLOW SWITCH	AC			MC				
SPACE TEMPERATURE SENSOR	AC			MC				
PRIMARY CONDENSATE PAN OVERFLOW SWITCH	AC			AC				
SECONDARY CONDENSATE PAN OVERFLOW SWITCH							●	
LEAVING WATER TEMPERATURE SENSOR	AC			AC				
CONDENSER WATER LOOP TEMPERATURE SENSOR	AC			MC				ONE PER PROJECT
OUTSIDE AIR TEMPERATURE SENSOR	AC			MC				ONE PER PROJECT
CARBON DIOXIDE SENSOR	AC			MC				
SINGLE ZONE VAV FAN	AC			AC				
WATER SOURCE HEAT PUMP COMMISSIONING	AC			AC				CALL HVAC EQUIPMENT SUPPLIER
MONITOR ONLY DEVICES WITH ANALOG INPUTS AND COMMUNICATION CAPABILITY	AC			MC				
CONTROL TRANSFORMERS		MC		MC				AS REQUIRED FOR MONITORING DEVICES

NETWORK WIRING AND SEQUENCE

NTS
00D-M0401-E07-SCHD
E
08/07/14

NOTE TO CONTRACTOR

ITEM(S) NOT SHOWN ON ANY OF THE RESPONSIBILITY SCHEDULES ARE THE RESPONSIBILITY OF THE CONTRACTOR.

LOCAL AREA REQUIREMENTS

YES	NO	1. SMOKE EVACUATION	YES	NO	5. SPECIAL CURB HEIGHT REQUIREMENTS
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. CARBON DIOXIDE MONITORING	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. TEN MILE COASTAL PROXIMITY
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. HURRICANE ZONE	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. OTHERS, I.E. METHANE, CARBON MONOXIDE, SOUND SENSITIVE, ETC. DESCRIPTION. . .
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. SEISMIC ZONE			

ABBREVIATIONS, RESPONSIBILITY SCHEDULES

AC	HVAC EQUIPMENT SUPPLIER	GC	GENERAL CONTRACTOR
AHJ	AUTHORITY HAVING JURISDICTION	LC	LANDLORD CONTRACTOR
BAS	BUILDING AUTOMATION SYSTEM	LD	LIGHTING PACKAGE DISTRIBUTOR
EC	ELECTRICAL CONTRACTOR	LL	LANDLORD
FAC	FIRE ALARM CONTRACTOR	LS&C	LIMITED STORE DESIGN & CONSTRUCTION
		MC	MECHANICAL CONTRACTOR

FAN POWERED VARIABLE AIR VOLUME (FPVAV) & VARIABLE AIR VOLUME (VAV) BOX RESPONSIBILITY SCHEDULE

ITEM	FURNISHED BY		INSTALLED OR PERFORMED BY			RE-USE EXISTING	N/A	REMARKS
	LS&C	LANDLORD	CONTR.	LANDLORD	CONTR.	OTHER		
SERIES ARRANGEMENT FAN POWERED VAV BOX (WITH HEAT AND NO HEAT OPTIONS)	AC			MC				
NON-FAN POWERED VAV BOX							●	
FAN POWERED BOX ELECTRICAL DISCONNECT	AC			AC				
NON-FAN POWERED BOX ELECTRICAL DISCONNECT							●	
BAS CONTROLLER WITH INTEGRATED ACTUATOR	AC			AC				
SUPPLY AIR TEMPERATURE SENSOR	AC			MC				
SPACE TEMPERATURE SENSORS	AC			MC				
TERMINAL UNIT COMMISSIONING	AC			AC				CALL HVAC EQUIPMENT SUPPLIER
LANDLORD UNIT CONTROLLER							●	
LANDLORD SPACE TEMPERATURE SENSOR/THERMOSTAT							●	
ADDITIONAL LANDLORD CONTROL SYSTEM COMPONENTS							●	

HVAC RESPONSIBILITY SCHEDULE

ITEM	FURNISHED BY			INSTALLED OR PERFORMED BY			RE-USE EXISTING	N/A	REMARKS
	LS&C	LANDLORD	CONTR.	LANDLORD	CONTR.	OTHER			
ROOFING CUT & PATCH, INSULATED TOE KICK & CURB LEVELING.								●	HIRE LANDLORD APPROVED ROOFING CONTRACTOR
DUCT SMOKE DETECTOR			FAC		MC				POWER WIRING PROVIDED BY FAC
SMOKE SYSTEM ACCESSORIES, ETC.			MC		MC				UNLESS FACTORY INSTALLED
DIFFUSERS AND GRILLES	LD				MC				
DIFFUSERS/GRILLES FIRE DAMPERS								●	
WALL FIRE DAMPERS								●	
COMBINATION FIRE/SMOKE DAMPERS								●	
LOW PRESSURE DUCTWORK			MC		MC				
RECTANGULAR TO ROUND DUCT ADAPTER			MC		MC				
HIGH/MEDIUM PRESSURE DUCTWORK								●	
DUCT SUPPORTS			MC		MC				
SEISMIC BRACING								●	
DUCT HEATER(S)								●	
UNIT HEATER(S)								●	
TOILET EXHAUST FAN(S) WITH TOGGLE DISCONNECT SWITCH	LD				MC				
TOILET EXHAUST DUCTWORK WALL OR ROOF CAP								●	
PIPING AND PIPING APPURTENANCES (CIRCUIT SETTERS, ETC.)			MC		MC				
BALANCE CONTRACTOR REPORT			GC						AABC OR NEBB CERTIFIED
AS-BUILT DRAWINGS			MC						
TEMPERATURE CONTROL SYSTEM COMPONENTS	AC				MC				
TEMPERATURE CONTROL SYSTEM WIRE	AC				MC				FINAL CONN. BY MC
YOUNG REGULATOR W/ BOWDEN CABLE			MC		MC				
LOCKING QUADRANT VOLUME DAMPER			MC		MC				
PNEUMATIC TUBING								●	
FIRE ALARM SHUTDOWN RELAY			FAC		FAC				WHERE APPLICABLE FOR FIRE ALARM SYSTEMS
RELIEF AIR DAMPER AND ACTUATOR								●	
RELIEF AIR FAN OR RETURN AIR FAN								●	
SMOKE EVACUATION								●	
OUTSIDE AIR INTAKE HOOD/LOUVER WITH DAMPER								●	
OUTSIDE AIR INTAKE DAMPER ACTUATOR								●	
RELIEF AIR HOOD OR LOUVER WITH COUNTER-BALANCED BACKDRAFT DAMPER								●	
ECONOMIZER DAMPER								●	
ECONOMIZER DAMPER ACTUATOR								●	
OUTSIDE AIR DAMPER			MC		MC				
OUTSIDE AIR DAMPER ACTUATOR			MC		MC				PROVIDE 120V MODULATING DAMPER ACTUATOR CAPABLE OF RECEIVING C-10VDC SIGNAL FOR MODULATION