DUCT INSULATION REQUIREMENTS

DUCTWORK INSULATION SCHEDULE						
LOCATION	SUPPLY	LINER/ WRAP	THICKNESS (")	DENSITY (LBS/FT3)	MINIMUM R-VALUE	NOTES
WITHIN 20 LINEAR FEET (OR AS NOTED) OF AIR HANDLING UNITS, ROOF TOP UNITS, FURNACES AND SIMILAR EQUIPMENT.	SUPPLY	LINER	1-1/2	1.5	R-6	
	RETURN	LINER	1-1/2	1.5	R-6	
DUCTWORK IN UNCONDITIONED SPACE (ENCLOSED BUT NOT WITHIN BLDG. THERMAL ENVELOPE, I.E. VENTILATED CRAWL SPACE/ ATTIC).	SUPPLY	WRAP	2	1.0	R-6	FSK VAPOR BARRIER
	RETURN	WRAP	2	1.0	R-6	FSK VAPOR BARRIER
UNTREATED OUTSIDE AIR	OA	WRAP	2	1.0	R-6	FSK VAPOR BARRIER
ALL OTHER SUPPLY	SUPPLY	WRAP OR LINER	2	1.0	R-6	FSK VAPOR BARRIER
			1-1/2	1.5	R-6	
RETURN BOOTS AT GRILLES, RETURN BOOTS CONNECTED TO EQUIPMENT, TRANSFER DUCTS AT FULL HEIGHT WALLS.	RETURN	LINER	1	1.5	N/A	
EXHAUST DUCT BETWEEN FAN AND OUTLET	EXHAUST	WRAP	2	1.0	R-6	FSK VAPOR BARRIER
ALL OTHER INTERIOR EXHAUST	EXHAUST	NONE	N/A	N/A	N/A	

NOTES:

1. THE INSTALLATION OF ALL INSULATION SHALL BE PERFORMED BY AN EXPERIENCED CRAFTSMAN IN A NEAT WORKMANSHIP-LIKE MANNER AND SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN PUBLISHED RECOMMENDATIONS FOR SERVICE INTENDED.
2. ALL MATERIALS OF INSULATION SHALL BE OF THE TYPE AND QUALITY AS MANUFACTURED BY ARMSTRONG, CERTAINTEED, OWENS-CORNING OR MANVILLE. ALL MATERIAL AND EQUIPMENT SPECIFIED TO BE INSULATED SHALL BE THOROUGHLY TESTED AND APPROVED PRIOR TO APPLYING THE INSULATION.
3. WRAPPED INSULATION ON DUCTWORK SHALL BE GLASS FIBER FLEXIBLE DUCT INSULATION, WITH UL APPROVED JACKET. SECURE WITH ADHESIVE APPLIED DIRECTLY TO THE DUCT IN 4 INCH WIDE STRIPS AROUND THE DUCT ON 12 INCH CENTERS AND TAPE ALL JOINTS.
4. ACOUSTICAL DUCT LINING SHALL BE OWENS-CORNING AEROFLEX COMPLYING WITH FIRE CLASSIFICATION REQUIREMENTS OF NFPA 90A AND 90B. ADHERE LINER TO DUCT WITH FIRE RESISTANT ADHESIVE AND WELDED PIN TYPE MECHANICAL FASTENERS AS INDICATED IN DETAIL AND PER SMACNA STANDARDS.
5. ACOUSTICALLY LINED DUCTWORK DIMENSIONS SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. SHEET METAL DIMENSIONS SHALL BE INCREASED TO ACCOMMODATE LINING THICKNESS.
6. WRAPPED INSULATION ON ROUND DUCTWORK SHALL BE GLASS FIBER WITH VAPOR BARRIER COMPLYING WITH FIRE CLASSIFICATION REQUIREMENTS OF NFPA 90A AND 90B.

COMMISSIONING NOTES:

1. ALL MECHANICAL SYSTEMS, EQUIPMENT, AND CONTROLS ARE REQUIRED TO BE COMMISSIONED. EACH MECHANICAL SYSTEM IS REQUIRED TO BE COMMISSIONED, REGARDLESS OF INDIVIDUAL CAPACITY.
2. REQUIRED COMMISSIONING SHALL INCLUDE A COMMISSIONING PLAN DEVELOPED BY THE CERTIFIED COMMISSIONING PROFESSIONAL, WHICH WILL INCLUDE:
   a. A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING THE PERSONNEL INTENDED TO ACCOMPLISH EACH OF THE ACTIVITIES.
   b. ROLES AND RESPONSIBILITIES OF THE COMMISSIONING TEAM, INCLUDING STATEMENT OF QUALIFICATIONS OF THE COMMISSIONING PROFESSIONAL.
   c. A SCHEDULE OF ACTIVITIES INCLUDING REVIEW OF SYSTEMS TESTING AND BALANCING, FUNCTIONAL PERFORMANCE TESTING, AND REVIEW OF THE PROJECT CLOSEOUT DOCUMENTATION.
   d. WHERE THE CERTIFIED COMMISSIONING PROFESSIONAL IS AN EMPLOYEE OF ONE OF THE REGISTERED DESIGN PROFESSIONALS OF RECORD OR AN EMPLOYEE OR SUBCONTRACTOR OF THE PROJECT CONTRACTOR, AN IN-HOUSE COMMISSIONING DISCLOSURE AND CONFLICT MANAGEMENT PLAN SHALL BE SUBMITTED WITH THE COMMISSIONING PLAN. THIS PLAN SHALL DISCLOSE THE CERTIFIED COMMISSIONING PROFESSIONAL'S CONTRACTUAL RELATIONSHIP WITH OTHER TEAM MEMBERS AND PROVIDE A CONFLICT MANAGEMENT PLAN DEMONSTRATING THAT THE CERTIFIED COMMISSIONING PROFESSIONAL IS FREE TO IDENTIFY ANY ISSUES DISCOVERED AND REPORT DIRECTLY TO THE OWNER.
   e. A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND A DESCRIPTION OF THE TESTS TO BE PERFORMED.
   f. FUNCTIONS TO BE TESTED.
   g. CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED.
   h. MEASURABLE CRITERIA FOR PERFORMANCE.
3. FUNCTIONAL PERFORMANCE TESTING SHALL BE PERFORMED ON ALL HVAC EQUIPMENT AND CONTROLS. TESTING SHALL LOOK FOR PROPER INSTALLATION AND OPERATION OF EACH SYSTEM AS WELL AS SYSTEM TO SYSTEM COMMUNICATIONS AS IT RELATES TO SEQUENCE OF OPERATIONS, REDUNDANT OR AUTOMATIC BACK UP, ALARMS, LOSS OF POWER, ETC.
4. PRELIMINARY COMMISSIONING REPORT SHALL BE PROVIDED TO THE OWNER OR OWNER'S AUTHORIZED AGENT. REPORT SHALL INDICATE CURRENT SCHEDULE, OUTSTANDING ISSUES, STATUS OF FUNCTIONAL PERFORMANCE TESTING, ETC.
5. THE FOLLOWING COMMISSIONING DOCUMENTATION SHALL BE PROVIDED TO THE OWNER OR OWNER'S AUTHORIZED AGENT WITHIN 90 DAYS OF RECEIVING CERTIFICATE OF OCCUPANCY:
   a. SUBMITTAL DATA
   b. MANUFACTURER O&M MANUALS
   c. CONTACT INFORMATION FOR SERVICE AGENCY
   d. MAINTENANCE AND SERVICE SCHEDULE
   e. SEQUENCE OF OPERATION W/ SETPOINTS

MECHANICAL LEGEND: (NOT ALL SYMBOLS WILL BE USED ON THESE DRAWINGS)

DUCT FITTINGS

- RECTANGULAR SUPPLY AIR DUCT UP
- RECTANGULAR SUPPLY AIR DUCT DOWN
- RECTANGULAR RETURN AIR DUCT UP
- RECTANGULAR RETURN AIR DUCT DOWN
- RECTANGULAR EXHAUST DUCT UP
- RECTANGULAR EXHAUST DUCT DOWN
- ROUND DUCT UP
- ROUND DUCT DOWN
- RECTANGULAR DUCT ELBOW WITH TURNING VANES
- RADIUS ELBOW, RECTANGULAR/ROUND DUCT
- DUCT TRANSITION
- FLEX CONNECTION
- FLEX DUCT
- CONICAL FITTING WITH VOLUME DAMPER
- CONICAL FITTING WITHOUT VOLUME DAMPER
- CONICAL FITTING WITH REMOTE VOLUME DAMPER ACTUATOR

AIR DEVICES

- SUPPLY AIR DIFFUSER
- RETURN AIR GRILLE
- EXHAUST AIR GRILLE
- SLOT DIFFUSER
- SIDEWALL GRILLE, REGISTER OR DIFFUSER

DAMPERS

- M
- S — SMOKE DAMPER
- FS — FIRE/SMOKE DAMPER
- F — FIRE DAMPER
- MANUAL DAMPER

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ADJ	ADJUSTABLE
AP	ACCESS PANEL
ACO	AUTOMATIC CHANGEOVER
CFM	CUBIC FEET PER MINUTE
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVATION
EQ	EQUIPMENT
(E)	EXISTING
IBC	INTERNATIONAL BUILDING CODE
IMC	INTERNATIONAL MECHANICAL CODE
IPC	INTERNATIONAL PLUMBING CODE
IFGC	INTERNATIONAL FUEL AND GAS CODE
IE	INVERT ELEVATION
GAL	GALLON
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MFR	MANUFACTURER
MOCP	MAXIMUM OVERCURRENT PROTECTION
(N)	NEW
(NL)	NEW LOCATION
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NIC	NOT IN CONTRACT
OA	OUTSIDE AIR
PC	PLUMBING CONTRACTOR
RPBP	REVERSE PRESSURE BACKFLOW PREVENTER
RE:	REFERENCE
(RL)	RELOCATE
RA	RETURN AIR
SA	SUPPLY AIR
TCC	TEMPERATURE CONTROL CONTRACTOR
(TYP)	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
W/O	WITHOUT

TAGS AND SYMBOLS

- XX-XXX — EQUIPMENT TAG
- RISER REFERENCE OR DIAGRAM CALLOUT
- SECTION HEAD CALLOUT
- GRD TAG: SR-1 500/16"ø — GRD TYPE; CFM; NECK SIZE
- DUCT TAG: 12x18 (1" LNR) — DIMENSIONS ARE SHEETMETAL DIMENSIONS; LINER THICKNESS (IF LINED); WIDTH OF DUCT; DEPTH OF DUCT
- REVISION TAG
- KEYNOTE TAG
- POINT OF CONNECTION
- UNDERCUT DOOR
- AIRFLOW ARROW
- SUPPLY ARROW
- EXISTING
- REMOVE EXISTING (DEMOLISH)
- THERMOSTAT
- TEMPERATURE TRANSMITTER
- HUMIDISTAT
- SENSOR
- CARBON MONOXIDE SENSOR
- CARBON DIOXIDE SENSOR

HVAC PIPING

	DIRECTION OF FLOW
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
RHS	RADIANT HEATING WATER SUPPLY
RHR	RADIANT HEATING WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
CA	COMPRESSED AIR
D	DRAIN

PIPE TAG

1 1/2" CW — PIPE DIAMETER; PIPING SYSTEM; SEE SPEC FOR PIPE SPECIFICATIONS

PIPING SYMBOLS

- BOTTOM PIPE CONNECTION
- PIPE UP
- PIPE DOWN
- PIPING CAP OR PLUG

VALVES

- BALL VALVE
- GATE VALVE
- GLOBE VALVE
- CHECK VALVE
- BALANCING VALVE
- PRESSURE REDUCING VALVE
- THREE WAY CONTROL VALVE
- AAV — AUTOMATIC AIR VENT
- MAV — MANUAL AIR VENT
- STRAINER
- UNION
- THERMOMETER
- METER
- PUMP
- PRESSURE GAUGE AND SHUT-OFF VALVE
- REVERSE PRESSURE BACKFLOW PREVENTER

GENERAL NOTES:

1. SUBCONTRACTORS FOR EACH TRADE ARE ADVISED THAT INFORMATION PERTINENT TO THEIR WORK MAY OCCUR IN OTHER PORTIONS OF THE CONTRACT DOCUMENTS. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, AND ADDITIONAL CONSULTANT'S DRAWINGS FOR ADDITIONAL GENERAL NOTES. ALL NOTES ARE TO BE REVIEWED AND APPLIED TO RELATED BUILDING COMPONENTS. NOTES APPEAR ON VARIOUS SHEETS FOR DIFFERENT SYSTEMS AND MATERIALS. SHEETS ARE TO BE REVIEWED AND NOTES ON ANY ONE SHEET ARE TO BE APPLIED ON RELATED DRAWINGS AND DETAILS.
2. THE MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS ARE OF EQUAL IMPORTANCE WITH THE ARCHITECTURAL DRAWINGS IN DEFINING THE WORK OF THE CONTRACT DOCUMENTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK WITH THE ARCHITECTURAL DRAWINGS BEFORE THE INSTALLATION OF ANY OF THE TRADE'S WORK. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DRAWINGS AND THE ENGINEERING DRAWINGS THAT WOULD CAUSE AN AWKWARD OR IMPROPER INSTALLATION, IT SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION FOR CLARIFICATION PRIOR TO INSTALLATION. ANY WORK INSTALLED IN CONFLICT WITH THE ARCHITECTURAL DRAWINGS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER OR ARCHITECT. CHANGES MUST BE APPROVED IN WRITING BY OWNER, TENANT, AND ARCHITECT BEFORE PROCEEDING. DEVIATIONS FROM THE HVAC PLANS ARE THE RESPONSIBILITY OF THE HVAC CONTRACTOR AND WILL NOT RESULT IN ADDITIONAL COSTS TO THE OWNER UNLESS WRITTEN CHANGE ORDERS ARE APPROVED BY THE OWNER.
3. IF ANY AMBIGUITIES SHOULD APPEAR IN THE CONTRACT DOCUMENTS, REQUEST CLARIFICATION FROM THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK. IF THE CONTRACTOR FAILS TO MAKE SUCH A REQUEST, NO EXCUSE WILL BE ENTERTAINED FOR FAILURE TO CARRY OUT THE WORK IN A MANNER SATISFACTORY TO THE ARCHITECT/ENGINEER.
4. SHOULD A CONFLICT OCCUR WITHIN THE CONTRACT DOCUMENTS OR BETWEEN TRADES, THE CONTRACTOR IS DEEMED TO HAVE ESTIMATED THE MORE EXPENSIVE WAY OF DOING THE WORK UNLESS A WRITTEN CLARIFICATION FROM THE ARCHITECT OR ENGINEER WAS REQUESTED AND OBTAINED BEFORE SUBMISSION OF PROPOSED METHODS OR MATERIALS. THE ARCHITECT OR ENGINEER SHALL BE THE SOLE JUDGE REGARDING INTERPRETATIONS OF CONFLICTS WITHIN CONTRACT DOCUMENTS.
5. ALL WORK TO BE PERFORMED TO STATE AND LOCAL CODES AND SMACNA GUIDELINES.
6. INSTALL UNITS ACCORDING TO MANUFACTURER'S GUIDELINES.
7. PROVIDE OWNER WITH OPERATION AND MAINTENANCE MANUALS AND SYSTEM SCHEMATICS.
8. CONTRACTOR TO CONFIRM VOLTAGES AND PHASES OF EQUIPMENT PRIOR TO INSTALLATION.
9. VERIFY DUCT LOCATIONS PRIOR TO FABRICATION. VERIFY LIMITED AREA FOR DUCTWORK AND OTHER APPURTENANCES.
10. INSTALL VOLUME CONTROL DAMPERS AS INDICATED ON PLANS.
11. MAINTAIN AT LEAST 10 FEET CLEARANCE FROM INTAKES OR WINDOWS ON ALL EXHAUST VENTS.
12. FLEXIBLE DUCTWORK SHALL BE RATED CLASS I, WHEN TESTED UNDER THE REQUIREMENTS OF UL 181. FLEXIBLE DUCT SHALL NOT EXCEED (6) FEET IN LENGTH. FLEX DUCT SHALL BE EQUAL TO CERTAINTEED "CERTAFLEX" G25 FLEXIBLE HOSE PREINSULATED WITH 1-1/2 INCH THICK FIBERGLASS INSULATION WITH POLYETHYLENE JACKET. HOSE SHALL BE POLYESTER WITH EMBEDDED HELICAL STEEL WIRE. AVOID UNNECESSARY TURNS AND SLACK.
13. DUCT WORK TO BE MINIMUM 24 GAUGE SHEET METAL (FIBROUS DUCT NOT ALLOWED).
14. COORDINATE WORK WITH GENERAL CONTRACTOR AND OWNER TO MAXIMIZE CEILING HEIGHT AND AVOID CONFLICTS.
15. TEST, ADJUST AND CALIBRATE CONTROL SYSTEMS AS REQUIRED. PROVIDE SCHEMATICS AND DESCRIPTION TO THE OWNER PRIOR TO INSTALLATION.
16. INSTALLER IS RESPONSIBLE FOR FINAL TEST AND BALANCING DURING TRAINING WEEK AND PROVIDING (1) COPY OF WRITTEN REPORT TO OWNER, (1) COPY TO MECHANICAL ENGINEER, AND (1) COPY TO MECHANICAL INSPECTOR AT TIME OF FINAL HEATING INSPECTION.
17. REPLACE ALL AIR FILTERS PRIOR TO TURNING SYSTEM OPERATIONS OVER TO OWNER.
18. HVAC CONTRACTOR RESPONSIBLE FOR A COMPLETE AND FULLY WORKING SYSTEM.
19. PROVIDE SHOP DRAWINGS TO THE ARCHITECT/ENGINEER FOR EQUIPMENT, FANS, REGISTERS ETC. PRIOR TO PROCUREMENT.
20. PROVIDE OWNER WITH COLOR CHOICES FOR SWITCHES AND OTHER APPURTENANCES WHERE APPLICABLE.
21. HANG AND SUPPORT MATERIALS SHALL BE INSTALLED TO THE LATEST EDITION OF THE ASHRAE HANDBOOK OF FUNDAMENTALS.
22. HVAC UNIT FLEXIBLE DUCT CONNECTIONS SHALL BE A MINIMUM OF 6 INCHES LONG AND HELD IN PLACE WITH HEAVY METAL BANDS, SECURELY ATTACHED TO PREVENT ANY LEAKAGE AT THE CONNECTION POINTS. FLEXIBLE CONNECTIONS SHALL BE FABRICATED FROM APPROVED FLAME PROOF FABRIC CONFORMING TO NFPA 90A. ASBESTOS CLOTH IS NOT ACCEPTABLE.
23. REFRIGERANT PIPING OTHER THAN PRECHARGED TUBING SETS FURNISHED BY AIR CONDITIONING MANUFACTURER SHALL BE TYPE "ACR" HARD DRAWN COPPER TUBING WITH WROUGHT COPPER FITTINGS. PIPING SHALL BE INSTALLED IN ACCORDANCE WITH ARI STANDARDS. USE EASY-FLO OR SAFETY SILVER BRAZING ALLOY TO MAKE JOINTS. RUN ALL HORIZONTAL LINES DEAD LEVEL TO ENSURE PROPER GAS RETURN TO COMPRESSOR.

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STAMP

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Public Storage

PUBLIC STORAGE
SEMINOLE COUNTY, FL

PS#28091

2431 Orange Blossom Trail
Apopka, FL

#	Date	Issue/Description
1	04/24/2020	SECOND SUBMITTAL

Project No:	PS000091
Drawn By:	PJM
Checked By:	ABT

MECHANICAL LEGEND AND NOTES

M0.01

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