

**2009 INTERNATIONAL ENERGY CONSERVATION CODE COMPLIANCE**

503.2.3 HVAC EQUIPMENT PERFORMANCE REQUIREMENTS. EQUIPMENT SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS OF TABLES 503.2.3 THROUGH 503.2.3(7), WHEN TESTED AND RATED IN ACCORDANCE WITH THE APPLICABLE TEST PROCEDURE. THE EFFICIENCY SHALL BE VERIFIED THROUGH DATA FURNISHED BY THE MANUFACTURER OR THROUGH CERTIFICATION UNDER AN APPROVED CERTIFICATION PROGRAM. WHERE MULTIPLE RATING CONDITIONS OR PERFORMANCE REQUIREMENTS ARE PROVIDED, THE EQUIPMENT SHALL SATISFY ALL STATED REQUIREMENTS.

503.2.7 DUCT AND PLENUM INSULATION AND SEALING: ALL SUPPLY AND RETURN AIR DUCTS AND PLENUMS SHALL BE INSULATED WITH A MINIMUM OF R-5 INSULATION WHEN LOCATED IN UNCONDITIONED SPACES WHEN LOCATED INSIDE THE BUILDING ENVELOPE AND OF R-8 INSULATION WHEN LOCATED OUTSIDE THE BUILDING ENVELOPE. WHEN LOCATED WITHIN A BUILDING ENVELOPE ASSEMBLY, THE DUCT OR PLENUM SHALL BE SEPARATED FROM THE BUILDING EXTERIOR OR UNCONDITIONED OR EXEMPT SPACES BY A MINIMUM OF R-8 INSULATION. ALL SUPPLY AIR DUCTS LOCATED WITHIN A RETURN AIR PLENUM SHALL BE INSULATED WITH A MINIMUM OF R-4.2 INSULATION.

503.2.4.3.1 THERMOSTATIC SETBACK CAPABILITIES. THERMOSTATIC SETBACK CONTROLS SHALL HAVE THE CAPABILITY TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

503.2.4.3.2 AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES. AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR AT LEAST 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE: A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

503.2.9 HVAC SYSTEM COMPLETION PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY, THE FOLLOWING SHALL BE COMPLETED:

503.2.9.1 AIR SYSTEM BALANCING. EACH SUPPLY AIR OUTLET AND ZONE TERMINAL DEVICE SHALL BE EQUIPPED WITH MEANS FOR AIR BALANCING IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 OF THE INTERNATIONAL MECHANICAL CODE. DISCHARGE DAMPERS ARE PROHIBITED ON CONSTANT VOLUME FANS AND VARIABLE VOLUME FANS WITH MOTORS 25 HP AND LARGER.

503.2.9.3 MANUALS THE CONSTRUCTION DOCUMENTS SHALL REQUIRE AN OPERATING AND MAINTENANCE MANUAL BE PROVIDED TO THE BUILDING OWNER BY THE MECHANICAL CONTRACTOR. THE MANUAL SHALL INCLUDE, AT LEAST, THE FOLLOWING:

1. EQUIPMENT CAPACITY (INPUT AND OUTPUT) AND REQUIRED MAINTENANCE ACTIVITIES.
2. EQUIPMENT OPERATION AND MAINTENANCE MANUALS.
3. HVAC SYSTEM CONTROL MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS. DESIRED OR FIELD-DETERMINED SET POINTS SHALL BE PERMANENTLY RECORDED ON CONTROL DRAWINGS, AT CONTROL DEVICES, OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS.
4. A COMPLETE WRITTEN NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE.

**HVAC PIPING LEGEND**

SYMBOL	ABBR.	DESCRIPTION
----		REFRIGERANT LINE SET
-----HWS	HWS	HOT WATER SUPPLY
-----HWR	HWR	HOT WATER RETURN
-----CWS	CWS	CHILLED WATER SUPPLY
-----CWR	CWR	CHILLED WATER RETURN
-----C	C	CONDENSER WATER SUPPLY
-----CR	CR	CONDENSER WATER RETURN
-----D	D	CONDENSATE OR EQUIPMENT DRAIN
-----RD	RD	REFRIGERANT DISCHARGE
-----RS	RS	REFRIGERANT SUCTION
-----G	G	NATURAL GAS
-----A	A	COMPRESSED AIR
-----HPS	HPS	HIGH PRESSURE STEAM
-----HPC	HPC	HIGH PRESSURE CONDENSATE
-----MPS	MPS	MEDIUM PRESSURE STEAM
-----MPC	MPC	MEDIUM PRESSURE CONDENSATE
-----LPS	LPS	LOW PRESSURE STEAM
-----LPC	LPC	LOW PRESSURE CONDENSATE
-----		ELBOW DOWN
-----		ELBOW UP
-----		TEE DOWN
-----		TEE UP
-----		STRAINER WITH BLOWOFF VALVE
-----		REDUCER
-----		BALL VALVE
-----		BUTTERFLY VALVE
-----		DIAPHRAGM VALVE
-----		GATE VALVE
-----		GLOBE VALVE
-----		ANGLE VALVE
-----		PLUG VALVE
-----		CHECK VALVE
-----	CBV	CALIBRATED BALANCING VALVE
-----		SOLENOID ACTUATOR
-----		MOTOR ACTUATOR
-----		PNEUMATIC ACTUATOR
-----	PRV	PRESSURE REGULATING VALVE
-----	PSV	PRESSURE RELIEF VALVE

**HVAC LEGEND**

SYMBOL	DESCRIPTION
	SUPPLY DIFFUSER - FOUR WAY THROW, U.N.O.
	SUPPLY DIFFUSER WITH ROUND CONNECTION - FOUR WAY THROW, U.N.O.
	RETURN GRILLE
	RETURN GRILLE WITH ROUND CONNECTION
	DUCT SIZE, FIRST FIGURE IS FOR SIDE SHOWN.
	TRANSITION, RECTANGULAR
	TRANSITION, SQUARE-TO-ROUND
	ELBOW WITH TURNING VANES
	BRANCH, NO SPLITTER
	SPIN-IN W/ MANUAL VOLUME DAMPER
	OPPOSED BLADE DAMPER
	PARALLEL BLADE DAMPER
	FIRE DAMPER, FD=FIRE, SD=SMOKE
	FLEX DUCT TO DIFFUSER
	POSITIVE PRESSURE DUCT
	NEGATIVE PRESSURE DUCT
	EXHAUST AIR DUCT
	THERMOSTAT WITH EQUIPMENT CONTROLLED
	CABINET EXHAUST FAN
	ROOF MOUNTED EXHAUST FAN
	AIR FLOW DIRECTION
	CONNECT NEW TO EXISTING
	AIR DEVICE CALLOUT - TOP LINE DENOTES CFM BOTTOM LINE DENOTES NECK SIZE - SEE SCHEDULES
	AIR DEVICE CALLOUT WITH QUANTITY - TOP LINE INDICATES CFM BOTTOM LINE INDICATES NECK SIZE
	VARIABLE AIR VOLUME BOX CALLOUT - 1 INDICATES AIR HANDLING UNIT SERVING - X INDICATES EQUIPMENT SERVED
	EQUIPMENT CALLOUT - SEE SCHEDULES
SA	SUPPLY AIR
RA	RETURN AIR
OA	OUTSIDE AIR
EX	EXHAUST

**MECHANICAL GENERAL NOTES**

- A NOT ALL EXISTING DUCTWORK, PIPING, AND ACCESSORIES ARE NECESSARILY SHOWN ON THIS DRAWING, BUT WHAT IS DEEMED NECESSARY TO SHOW INTENT OF WORK INVOLVED IN THIS PROJECT. REFER TO ALL PLANS, SECTIONS, DETAILS, SCHEDULES AND SPECIFICATIONS FOR COMPLETE SYSTEM REQUIREMENTS.
- B CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO ORDERING OR FABRICATION OF MATERIAL OR PERFORMING ANY NEW WORK. DEVIATIONS FROM CONDITIONS SHOWN IN THESE PLANS SHALL BE REPORTED TO THE PROJECT MANAGER IMMEDIATELY AND NO WORK SHALL BE PERFORMED IN THIS AREA UNTIL A RESOLUTION HAS BEEN ESTABLISHED. SITE CONDITIONS DIFFERING FROM THOSE SHOWN ON THESE PLANS WILL NOT BE GENERALLY CONSIDERED A BASIS FOR CONTRACT MODIFICATION AS THE CONTRACTOR SHALL TAKE INTO ACCOUNT WORST CASE SITE CONDITIONS WHEREVER POSSIBLE.
- C COORDINATE ALL PENETRATIONS OF FLOOR, ROOF, WALLS, ETC. WITH GENERAL CONTRACTOR. ALL PENETRATIONS THROUGH FIRE/SMOKE RATED CONSTRUCTION SHALL BE SEALED WITH A FIRE RATED CAULK EQUAL TO OR EXCEEDING THE CONSTRUCTION FIRE RATING.
- D ALL NEW MATERIALS IN THE RETURN AIR PLENUM SHALL HAVE A MAXIMUM FLAME SPREAD RATING OF 25 AND A MAXIMUM SMOKE DEVELOPED RATING OF 50 IN ACCORDANCE WITH SECTION 602.2.1 OF THE 2009 INTERNATIONAL MECHANICAL CODE.
- E FLEXIBLE AIR DUCTS SHALL CONFORM TO UL181 IN ACCORDANCE WITH SECTION 603.6 OF THE 2009 INTERNATIONAL MECHANICAL CODE. LENGTH OF FLEX DUCT SHALL NOT EXCEED 5 FT.
- F ALL MECHANICAL EQUIPMENT SHALL BE LABELED AS TO THE AREA(S) SERVED IN ACCORDANCE WITH SECTION 304.11 OF THE 2009 INTERNATIONAL MECHANICAL CODE.
- G PROVIDE ACCESS DOORS OR OTHER MEANS OF APPROVED ACCESS TO ALL FIRE AND FIRE/SMOKE DAMPERS. ACCESS DOORS SHALL BE LABELED ON THE ACCESS DOOR AND ON THE CEILING BELOW.
- H PROVIDE AND INSTALL A BALANCING DAMPER AT EACH BRANCH TAKEOFF FOR THE SUPPLY AND EXHAUST AIR SYSTEMS. PROVIDE AND INSTALL A BALANCING DAMPER AT EACH BRANCH TAKEOFF FOR THE RETURN AIR SYSTEM WHERE INDICATED. BALANCING DAMPERS LOCATED ABOVE GYPSUM BOARD OR OTHER INACCESSIBLE CEILINGS SHALL BE INSTALLED WITH A CONCEALED DAMPER REGULATOR AND COVER PLATE, PAINTED TO MATCH CEILING COLOR.
- I. MOUNT SPACE TEMPERATURE SENSORS, THERMOSTATS, AND REMOTE CONTROL DEVICES WITH CENTERLINE AT 48" A.F.F. UNLESS OTHERWISE INDICATED.
- J PROVIDE BALANCE REPORT TO INSPECTOR AT TIME OF HEATING FINAL IN ACCORDANCE WITH 2009 INTERNATIONAL MECHANICAL CODE. SUBMIT TO ARCHITECT FOR FINAL APPROVAL.
- K DUCTWORK SHALL BE SEALED IN ACCORDANCE WITH THE SPECIFICATIONS AND THE 2009 EDITION OF THE INTERNATIONAL ENERGY CONSERVATION CODE, SECTION 503.2.7.
- L DUCT SIZES SHOWN REPRESENT CLEAR INSIDE DIMENSIONS.
- M ALL RECTANGULAR DUCT ELBOWS OR CHANGES IN DIRECTION OF 45 DEGREES OR GREATER, OTHER THAN BRANCH CONNECTIONS SHALL INCLUDE DOUBLE THICKNESS AIRFOIL SHAPED TURNING VANES.
- N UNLESS NOTED OTHERWISE, DIFFUSER/GRILLEE/REGISTER NECK SIZE SHOWN ON DRAWINGS INDICATES SIZE OF DUCT TO DIFFUSER/GRILLEE/REGISTER.
- O COORDINATE FINAL LOCATION OF DUCTWORK, PIPING, DIFFUSERS, ETC. WITH ALL OTHER TRADES BEFORE FABRICATION OR INSTALLATION.
- P CONTRACTOR SHALL PROVIDE ALL REQUIRED OFFSETS, TRANSITIONS AND FITTINGS FOR DUCTWORK AND PIPING FOR COMPLETE SYSTEM.
- Q UNLESS NOTED OTHERWISE, PROVIDE BELL MOUTH SPIN-IN FITTING WITH A 2" STAND-OFF BRACKET AND LOCKING QUADRANT VOLUME DAMPER FOR ALL DIFFUSER CONNECTIONS.
- R COORDINATE LOCATION OF ALL WALL/CEILING MOUNTED DIFFUSERS AND GRILLEES WITH ALL TRADES AND GENERAL CONTRACTOR.
- S PROVIDE AND INSTALL 1/4" BIRDSCREEN ON OPENINGS FREELY COMMUNICATING WITH THE OUTDOORS.
- T FOR AIR HANDLING EQUIPMENT WITH A CAPACITY OF 2,000 CFM OR GREATER, A SMOKE DETECTOR SHALL BE INSTALLED IN THE RETURN AIR STREAM.
- U PROVIDE 115V MAINTENANCE RECEPTACLE WITHIN 25'-0" OF ROOF TOP EQUIPMENT.
- V BUILDING EXHAUST AND VENTS SHALL BE INSTALLED A MINIMUM OF 10'-0" FROM VENTILATION INTAKES.

REVISIONS		
NO.	DATE	DESCRIPTION
1	08/29/2012	ISSUED FOR BUILDING PERMIT SUBMITTAL TO PPRBD (OPERATIONS BUILDING)
2	08/15/2012	ISSUED FOR CONSTRUCTION PER PPRBD BUILDING PERMIT #135220 (OPERATIONS BLDG)

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**MECHANICAL NOTES AND LEGEND**

**HAROLD D. THOMPSON REGIONAL WATER RECLAMATION FACILITY**  
**LOWER FOUNTAIN METROPOLITAN SEWAGE DISPOSAL DISTRICT**

DRAWN: JE	<b>GMS, INC.</b> CONSULTING ENGINEERS 611 N. WEBER, SUITE 300 COLORADO SPRINGS, COLORADO 80903	SHEET <b>MOP-1A</b> OF -
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