

GENERAL NOTES

MECHANICAL/PLUMBING WORK CONSISTS OF ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICES NECESSARY FOR AND INCIDENTAL TO THE EXECUTION AND COMPLETION OF THE SYSTEMS AS INDICATED ON THESE DRAWINGS.

SUBMITTAL REQUIREMENTS:

• WITHIN 15 DAYS OF CONTRACT AWARD, THE MECHANICAL/PLUMBING CONTRACTOR SHALL SUBMIT COMPLETE APPLICABLE PRODUCT, EQUIPMENT, AND MATERIAL INFORMATION. NO PRODUCT, EQUIPMENT, OR MATERIAL SHALL BE ORDERED OR INSTALLED UNTIL SUBMITTALS ARE APPROVED BY THE MECHANICAL ENGINEER. ANY ITEM NOT INCLUDED IN THE SUBMITTAL SHALL BE PROVIDED WITHOUT SUBSTITUTION. SUBMITTAL INFORMATION SHALL INCLUDE: MANUFACTURER'S NAME AND CATALOGUE NUMBERS, DIMENSIONS, CAPACITIES, PERFORMANCE CURVES, AND ALL OTHER CHARACTERISTICS AND ACCESSORIES AS LISTED IN THE CONTRACT DOCUMENTS. THE INFORMATION SHALL BE CURRENT MANUFACTURER'S SUBMITTALS AND BROCHURES.

• SUBMITTALS FOR ANY EQUIPMENT SUBSTITUTED AS EQUIVALENT TO THE SCHEDULED EQUIPMENT SHALL INCLUDE TABULATED COMPARISON DATA SO AS TO CLEARLY DEMONSTRATE EQUIVALENCY. THIS DATA SHALL SPECIFICALLY INCLUDE COMPARISONS BETWEEN SCHEDULED AND PROPOSED EQUIPMENT IN THE FOLLOWING AREAS:
WEIGHT (INCLUDING CURBS AND ACCESSORIES) DIMENSIONS
ELECTRICAL AND GAS REQUIREMENTS (VOLTAGE, PHASE, FULL LOAD AMPS & BTU) SOUND LEVELS (WHERE APPLICABLE)
PERFORMANCE (EFFICIENCIES, HEATING, COOLING, AIR FLOW, STATIC PRESS.)

• THREE COPIES OF CLOSE OUT SUBMITTALS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF SYSTEM START-UP AND BALANCING. CLOSE-OUT SUBMITTALS SHALL INCLUDE THE FOLLOWING TEST REPORTS: HVAC EQUIPMENT OPERATING DATA AND AIR BALANCE, VALVES, THERMOMETERS, PRESSURE GAUGES, WATER METERS, WATER FEEDERS, AIR VENTS, TRAP PRIMERS, VACUUM BREAKERS, AND ALL OTHER APPLICABLE MECHANICAL/PLUMBING SYSTEM COMPONENTS.

• ALL WORK INDICATED ON THESE PLANS SHALL BE DONE IN COMPLIANCE WITH CURRENT STATE AND LOCAL CODES AND ALL APPLICABLE CALIFORNIA TITLE-24 REQUIREMENTS. IN THE EVENT OF CONFLICT BETWEEN CODES, THE MORE RESTRICTIVE REQUIREMENTS SHALL BE EXERCISED.

• NOTHING IN THESE DRAWINGS AND/OR SPECIFICATIONS SHALL BE INTERPRETED TO CONFLICT WITH ANY CITY OR STATE LAW, REGULATION, CODE, ORDINANCE, RULING, OR FIRE UNDERWRITER'S REQUIREMENT APPLICABLE TO THIS CLASS OF WORK.

• CONSTRUCTION AND/OR ENGINEERING COSTS RESULTING FROM PRODUCT SUBSTITUTIONS SHALL BE PAID BY THE MECHANICAL/PLUMBING CONTRACTOR. APPROVAL OF SUBSTITUTED PRODUCTS DOES NOT NEGATE THIS OBLIGATION.

• THE MECHANICAL/PLUMBING CONTRACTOR SHALL COORDINATE THE INSTALLATION OF AIR TERMINALS WITH THE REFLECTED CEILING PLAN, AND VERIFY CORRECT LOCATION OF EQUIPMENT, PIPING, AND PLUMBING SERVICES BEFORE PROCEEDING WITH INSTALLATION.

• ALL LOCATIONS OF DUCTWORK, EQUIPMENT AND PIPING ARE SHOWN DIAGRAMMATICALLY. THE MECHANICAL/PLUMBING CONTRACTOR SHALL ADHERE TO LOCATIONS INDICATED ON THE DRAWINGS AS CLOSELY AS POSSIBLE, VARYING PIPE RUNS AS REQUIRED TO MEET STRUCTURAL AND OTHER INTERFERENCES AS REQUIRED BY THE PROJECT.

• THE MECHANICAL/PLUMBING CONTRACTOR SHALL PROVIDE ACCESS PANELS WHERE REQUIRED FOR ALL PLUMBING-RELATED EQUIPMENT, ACCESSORIES, AND CONTROLS.

• DUCT DIMENSIONS SHOWN ARE INTERNAL.

• ALL EQUIPMENT SHALL BE FURNISHED AND INSTALLED WITH AT LEAST THE MANUFACTURER'S MINIMUM RECOMMENDED CLEARANCE ALLOWANCE FOR SUFFICIENT ACCESS TO CONTROLS, FILTERS, ELECTRIC MOTORS, ETC. FOR MAINTENANCE AND PROPER OPERATION.

• ALL MECHANICAL/PLUMBING DUCTING, PIPING, AND EQUIPMENT SHALL BE PROVIDED WITH SEISMIC RESTRAINING SERVICES AS REQUIRED BY LOCAL BUILDING CODES.

• THE WORK UNDER THIS SECTION SHALL BE IN COOPERATION WITH THE WORK OF OTHER TRADES TO PREVENT CONFLICT OR INTERFERENCE AND TO AID RAPID COMPLETION OF THE OVERALL PROJECT.

• THE MECHANICAL/PLUMBING CONTRACTOR SHALL GUARANTEE THAT THE SYSTEMS INSTALLED ARE IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS, AND WILL WARRANT ALL EQUIPMENT, MATERIALS, AND LABOR FURNISHED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION. THE MECHANICAL/PLUMBING CONTRACTOR SHALL REPAIR OR REPLACE ANY EQUIPMENT OR MATERIAL, WHICH IS DEFECTIVE OR IMPROPERLY INSTALLED. IN ADDITION, THE MECHANICAL/PLUMBING CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO THE BUILDINGS AND ITS CONTENTS OR OTHER EQUIPMENT, CAUSED BY DEFECTS OR IMPROPER INSTALLATION OF EQUIPMENT OR MATERIALS INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS. IN THE EVENT OF FAILURE TO COMPLY WITH THE ABOVE-MENTIONED CONDITIONS WITHIN TEN (10) DAYS AFTER BEING NOTIFIED IN WRITING, THE MECHANICAL/PLUMBING CONTRACTOR SHALL COLLECTIVELY OR SEPARATELY AUTHORIZE THE OWNER TO PROCEED TO HAVE SAID DEFECTS REPAIRED AND MADE GOOD AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR WILL HONOR AND PAY THE SAID COSTS AND CHARGES ON DEMAND.

• BY JVA MECHANICAL ENGINEERING ALL COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS RESERVED THESE DOCUMENTS AS ORIGINAL AND UNPUBLISHED WORK PRODUCT OF JVA MECHANICAL ENGINEERING AND THIS WORK SHALL NOT BE COPIED, DISCLOSED, OR USED IN CONNECTION WITH ANY WORK PROJECT OTHER THAN THE SPECIFIC PROJECT FOR WHICH IT HAS BEEN PREPARED OR ASSIGNED TO ANY THIRD PARTY WITHOUT FIRST OBTAINING THE EXPRESS WRITTEN CONSENT OF JVA MECHANICAL ENGINEERING VISUAL CONTACT WITH THIS DOCUMENT SHALL CONSTITUTE EVIDENCE OF ACCEPTANCE OF THESE RESTRICTIONS AND CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS OF THE JOB UPON DISCOVERY OF ANY VARIATION, DISCREPANCY, OR OMISSIONS, PLEASE NOTIFY JVA MECHANICAL ENGINEERING AND PRIOR TO PROCEEDING WITH RELATED WORK, OBTAIN WRITTEN RESOLUTION FROM JVA MECHANICAL ENGINEERING

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MECHANICAL/PLUMBING: THE WORK UNDER THIS SECTION INCLUDES EVERYTHING NECESSARY FOR AND INCIDENTAL TO EXECUTING AND COMPLETING THE MECHANICAL/PLUMBING WORK, EXCEPT AS HEREINAFTER SPECIFICALLY EXCLUDED. WORK INCLUDED SHALL BE AS INDICATED ON THE DRAWINGS COMPLETELY INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- MECHANICAL EQUIPMENT
- AIR DISTRIBUTION
- CONTROLS
- START UP AND BALANCE
- SANITARY SOIL, WASTE, AND VENT SYSTEMS
- GAS PIPING
- CONDENSATE PIPING
- DOMESTIC WATER SYSTEMS
- PLUMBING FIXTURES AND EQUIPMENT
- REQUIRED SUPPORTS AND BLOCKING

RELATED WORK: THE FOLLOWING WORK SHALL NOT BE FURNISHED UNDER THIS SECTION OF THE SPECIFICATIONS BUT WILL BE INCLUDED IN OTHER SPECIFICATIONS SECTIONS:

- CUTTING, PATCHING, AND FURRING
- CONDUIT AND LINE VOLTAGE ELECTRICAL
- FINAL PAINTING
- ROOFING
- CONCRETE PLACEMENT

RIGID ROUND DUCTWORK AND FITTINGS:

• ALL RIGID ROUND DUCTWORK SHALL BE UNITED SHEET METAL SPIRAL LOCKSEAM DUCT, OR APPROVED EQUAL, MANUFACTURED FROM GALVANIZED STEEL MEETING THE ASTM A-527-71. ALL DUCT GAUGES SHALL CONFORM WITH TABLE 6-8, CMC 2007

• ALL FITTINGS SHALL BE MANUFACTURER AS SEPARATE FITTINGS. NO BRANCH TAPS WILL BE ALLOWED.

FLEXIBLE DUCT:

• FLEXIBLE AIR DUCTS SHALL BE THERMAFLEX M-KF(R=8.0), OR APPROVED EQUAL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS. CONNECTIONS AND SUPPORTS SHALL BE IN ACCORDANCE WITH THE 2007 CMC.

RECTANGULAR DUCTWORK:

• ALL RECTANGULAR DUCTWORK, FITTINGS, AND ACCESSORIES SHALL BE FABRICATED AND INSTALLED IN STRICT ACCORDANCE TO THE SMOGNA "HVAC DUCT CONSTRUCTION STANDARDS" HANDBOOK, AND SHALL BE PRIME GRADE GALVANIZED STEEL SHEETS OF LOCK FORM QUALITY.

INTERIOR DUCTWORK SEALING:

• PROVIDE COMPLETE SEALING OF ALL DUCT CONNECTIONS WITH "UNI-MASTIC 181" FIBER REINFORCED DUCT SEALER BY MCGILL AIRSEAL PRODUCTS.

DUCT INSULATION:

• EXTERNAL DUCT INSULATION SHALL BE APPLIED TO ALL HEATING AND/OR COOLING DUCTS NOT INTERNALLY INSULATED AND NOT WITHIN CONDITIONED SPACES. MANVILLE MICROLITE FSX 1-1/2" R-SERIES, ALUMINUM FOIL REINFORCED WITH FIBERGLASS, SCORM LAMINATED TO U/L RATED KRAFT, WITH R=4.8, SHALL BE USED OR APPROVED EQUAL. CIRCUMFERENTIAL AND LONGITUDINAL SEAMS SHALL BE LAPPED MINIMUM OF 2" AND SECURED WITH 3" WIDE PRESSURE SENSITIVE FOIL VAPOR BARRIER TAPE. FURTHER ATTACH INSULATION TO THE DUCTWORK BY SPIRALING WIRE AT 12" CENTERS ITS ENTIRE LENGTH. THE FINISHED PRODUCT SHALL BE VAPOR-PROOF AND FREE OF SAGS.

• INTERNAL DUCT INSULATION SHALL BE APPLIED TO ALL HEATING AND/OR COOLING DUCTS AS SHOWN ON THE DRAWING. PROCEDURE MUST COMPLY WITH THE RECOMMENDATIONS AND WHERE "SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION'S DUCT LINER APPLICATIONS" STANDARD, SECOND EDITION. INSULATION SHALL BE FIBERGLASS 1" THICK INTERRUPTIONS AND ADHERED WITH 100% COVERAGE OF ADHESIVE. ALL EXPOSED EDGES SHALL BE COVERED WITH ADHESIVE. METAL FASTENERS SHALL BE USED IN ADDITION TO ADHESIVE.

CONTROLS:

• THERMOSTATS SHALL BE AS INDICATED ON PLANS AND MOUNTED AT 48" ABOVE FINISHED FLOOR. ALL LOW VOLTAGE WIRE, WIRING, AND CONNECTIONS ARE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. ALL THERMOSTATS SHALL BE PROGRAMMED TO PROVIDE ADEQUATE SETBACK DURING NON-OCCUPIED HOURS, AND FOR EVAPORATOR FANS TO RUN CONTINUOUSLY DURING OCCUPIED HOURS.

EXECUTION (MECHANICAL):

• BENDING OR FORGING OF DUCTWORK IS NOT ALLOWED. USE FITTINGS FOR ALL OFFSETS OR CHANGES IN ALIGNMENT OF DUCTING.

• DUCTING SHALL BE FIRMLY HELD IN PLACE BY ADJUSTABLE HANGERS AND SUPPORTS. ALL HANGERS AND SUPPORTS SHALL BE OF DESIGN WEIGHT. SUPPORT WEIGHT OF THE DUCT, INSULATION, AND PREVENT SAGGING. MAKESHIFT DEVICES ARE NOT ACCEPTABLE. PLUMBER'S TAPE IS NOT APPROVED.

• WHERE APPLICATIONS ARE NOT SPECIFICALLY COVERED IN THIS SECTION, FOLLOW MANUFACTURER'S INSTRUCTIONS. ALL DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT FOR APPROVAL BEFORE STARTING WORK.

• ALL EXPOSED DUCTWORK, TAPS AND REGISTERS SHALL BE LEVEL, STRAIGHT AND FREE OF DEFECTS. ALL DAMPERS AND REGISTERS MUST BE INSTALLED AS TO NOT WHISTLE OR RATTLE.

• ALL FLEXIBLE DUCTWORK MUST BE RUN AS STRAIGHT AS POSSIBLE WITHOUT TIGHT BENDS. USE AN ELBOW ANYWHERE A 2' RADIUS CANNOT BE ACHIEVED.

• TESTING AND BALANCING SHALL BE PERFORMED FOLLOWING AABC OR NEBB BALANCE CRITERIA. THE FOLLOWING INFORMATION SHALL BE SUBMITTED TO THE MECHANICAL ENGINEER:
VOLTAGE (RATED AND ACTUAL)
FAN SPEEDS (RATED AND ACTUAL)
MOTOR CURRENT (RATED AND ACTUAL)

AIR QUANTITIES AT OUTLETS AND INLETS (RATED)
AIR QUANTITIES AT OUTLETS AND INLETS ADJUSTED TO WITHIN 10% OF DESIGN SUPPLY AIR EXTERNAL STATIC PRESSURE ("W.G.)
RETURN AIR EXTERNAL STATIC PRESSURE ("W.G.)
TOTAL SUPPLY AIR CFM
TOTAL RETURN AIR CFM
TOTAL OUTSIDE AIR CFM
EQUIPMENT NAMEPLATE DATA

SPECIFICATIONS

PLUMBING FITTINGS AND PIPING:

• SOIL, WASTE, STORM DRAIN, AND VENT: ABOVE AND BELOW GRADE: PLASTIC ABS OR PVC PIPE AND FITTINGS WITH SOLVENT JOINTS.

• DOMESTIC WATER PIPING: ABOVE GRADE: TYPE 1" COPPER TUBING HARD DRAWN WITH WROUGHT COPPER SOLDER FITTINGS. SOLDER WITH 95 - 5 TIN-ANTIMONY SOLDER.
CONDENSATE AND DRAIN PIPING: TYPE 1" COPPER TUBING HARD DRAWN WITH WROUGHT COPPER SOLDER FITTINGS. SOLDER WITH 95 - 5 TIN-ANTIMONY SOLDER.

• GAS PIPING ABOVE GRADE: SCHEDULE 40 BLACK MALLEABLE IRON THREADED PIPE AND FITTINGS

PLUMBING FIXTURES:

• PLUMBING FIXTURES SHALL BE AS PER PLUMBING FIXTURE SCHEDULES-SEE PLANS

PIPING SPECIALTIES:

• SHUT-OFF VALVES (WATER): APOLLO, OR EQUIVALENT, FULL PORT BALL VALVE.

• SUPPLIES: ANGLE TYPE WITH TEE HANDLE STOP AND RIGID RISERS: "SPEEDWAY," R1700-S SERIES, ROBERT ML-600 SERIES OR EQUAL. P-TRAPS: CHROME PLATED BRASS 17 GAUGE WITH CP TUBING DRAIN TO WALL AND CLEAN-OUT PLUG, TRAP ARMS UNDER LAVATORIES, SINK, AND ESCUTCHEON AT WALL ALSO TO BE CHROME-PLATE

• FLOOR CLEANOUTS (FCO/COTG): J. R. SMITH #4810 COVER WITH U.P.C. BRONZE PLUG.

• WALL CLEANOUTS (WCO): TERRI, PRIME-COATED WITH U.P.C. BRONZE PLUG IN "NO-HUB" TEST-TEE.

• SHUT-OFF VALVES (GAS): CRANE #1128, OR EQUIVALENT (2" AND SMALLER).

PIPING HANGERS, SUPPORTS, AND ACCESS PANELS:

• PROVIDE HANGER SPECIFIED HEREIN, EQUIVALENT MODELS BY ELEN, FEE & MASON OR KIN-LINE ARE ACCEPTABLE.

• ADJUSTABLE HANGERS WITH MINIMUM 3/8" RODS, UPPER ATTACHMENTS: B-LINE #B3690. PROVIDE SHIELDS AT INSULATED PIPING.

• TRAPEZE HANGERS: B-LINE #B22 WITH PIPE CLAMPS AND GUIDES AS REQUIRED.

• RISER CLAMPS: B-LINE #B3373.

• OFFSET PIPE CLAMPS: B-LINE #B3148.

• WATER PIPE ISOLATION: INCLUDE WITH HANGERS, 1/4" FELT OR APPROVED EQUIVALENT.

• ACCESS PANEL FOR VALVES: MILCOR PAINTED STEEL SIZE AS REQUIRED FOR EASY ACCESS MINIMUM SIZE 12" X 12".

PIPING INSULATION:

• DOMESTIC HOT WATER PIPING: ENGINEERED POLYMER FOAM INSULATION (EPI) 3/4" WALL 'MCOA' OR EQUIVALENT.

• LAVATORY TRAPS AND H. W. SUPPLIES: PROWRAP, PROTECTIVE KIT BY MCGUIRE OR EQUIVALENT.

EXCAVATION AND BACKFILL:

• EXECUTE ALL EXCAVATION TO GRADES TO ACCOMMODATE ELEVATIONS INDICATED AND WHERE INVERT ELEVATIONS ARE NOT INDICATED, PROVIDE MINIMUM COVERAGE FOR ANY PIPING UNDER BUILDING SLAB (TOP OF PIPE TO UNDERSIDE OF SLAB) OF 18 INCHES.

• EXCAVATION FOR PIPE SHALL BE CUT A MINIMUM OF SIX INCHES BELOW THE REQUIRED GRADE. A SIX-INCH BED OF SAND OR OTHER APPROVED MATERIAL SHALL BE THEN PLACED AND PROPERLY COMPACTED TO PROVIDE AN ACCURATE GRADE AND UNIFORM BEARING THROUGHOUT THE LENGTH OF THE PIPE.

• SAND USED SHALL BE WASHED RIVER SAND NORMALLY USED FOR BACKFILL PURPOSES, FREE OF CLOUDS OR LUMPS OF CLAY, ROCK, DEBRIS, AND RUBBISH.

• BACKFILLING SHALL NOT BE PLACED UNTIL THE WORK HAS BEEN INSPECTED, TESTED, AND APPROVED.

• BACKFILL TO POINT 12 INCHES ABOVE TOP OF PIPING WITH FINE EARTH (EXCAVATED MATERIAL MAY BE USED) FREE OF EXCESSIVE AMOUNTS OF CLAY, DEBRIS, RUBBISH, ROCKS, OR CLOUDS, AS APPROVED BY THE ARCHITECT. BACKFILL ABOVE 12 INCHES FROM TOP OF PIPING MAY BE WITH EXCAVATED MATERIAL. APPLY BACKFILL BY HAND IN 6-INCH DEEP LAYERS THE FULL WIDTH OF THE TRENCH. MOISTEN EACH LAYER (DO NOT FLOOD OR PUDDLE), AND HAND TAMP TO MINIMUM 90 PERCENT COMPACTION BEFORE PROCEEDING WITH THE NEXT LAYER OF BACKFILL.

• CLOUDS OR LUMPS ONE INCH IN SIZE OR LARGER WILL NOT BE PERMITTED IN THE BACKFILL. IF THE EXCAVATED MATERIAL IS NOT SUITABLE, ADEQUATE MATERIAL SHALL BE PROVIDED BY HAULING IN FROM OTHER LOCATIONS.

• SURPLUS EARTH OR MATERIAL REMAINING AFTER BACKFILLING SHALL BE REMOVED FROM THE SITE AS INDICATED IN SECTION ENTITLED "EARTHWORK."

• DO NOT EXCAVATE UNDER OR NEAR FOUNDATIONS OR FOOTINGS EXCEPT IN MANNER PERMITTED AND APPROVED BY THE ARCHITECT. DO NOT BACKFILL UNTIL INSTALLED PIPING HAS BEEN SUCCESSFULLY TESTED AND APPROVED FOR BACKFILL BY THE JURISDICTIONAL INSPECTOR AND THE ARCHITECT.

• PROVIDE SLEEVES AT ALL PIPE PENETRATIONS OF FOOTING AND FOUNDATIONS.

EXECUTION (PLUMBING):

• SOIL, WASTE AND VENT PIPING IS TO BE ASSEMBLED, CONNECTED, AND SUPPORTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ENCASE BELOW GRADE SOIL, WASTE, AND VENT PIPING IN SCHEDULE 40 ALL AROUND PIPE WRAP PENETRATIONS OF CONCRETE SLAB WITH FOAMED PLASTIC SLEEVING MATERIAL. ALL SOIL, WASTE, AND VENT PIPING SHALL HAVE A SMOOTH AND UNIFORM INVERT, AND BACK-FILLED SO AS NOT TO DISTURB THE PIPE OR JOINTING.

• JOINTS IN COPPER TUBING SHALL BE MADE BY FIRST THOROUGHLY CLEANING THE SURFACE OF THE PIPE AND FITTINGS, APPLYING A COPPERIZED FLUX AND SWEAT WITH 95 - 5 TIN ANTIMONY SOLDER OR EQUIVALENT LEAD-FREE SOLDER.

• FLUSH OUT ALL WATER MAINS, CONDENSATE DRAINS, SANITARY, AND STORM PIPING WITH WATER SO AS TO OBTAIN FREE FLOW.

• ALL PIPING, EXCEPT WHERE NOTED OTHERWISE ON PLANS, SHALL BE CONCEALED IN WALLS OR ABOVE CEILINGS. COORDINATE PIPING LOCATION WITH DUCTWORK AND CONDUIT.

• BENDING OR FORCING OF PIPE IS NOT ALLOWED. USE FITTINGS FOR ALL OFFSETS OR CHANGES IN ALIGNMENT OF PIPING.

• CLEANOUTS SHALL BE ACCESSIBLE IN ALL CASES AND SHALL BE BROUGHT TO SURFACE ON 1/2" BRANCHES. ALL CLEANOUTS SHALL BE PROVIDED WITH REMOVABLE FLOOR OR WALL PLATES.

• PIPING SHALL BE FIRMLY HELD IN PLACE BY ADJUSTABLE HANGERS, SUPPORTS, AND PIPE RESTS. ALL HANGERS AND SUPPORTS SHALL BE OF DESIGN WHICH WILL SUPPORT WEIGHT OF PIPE, FLUID, INSULATION, AND PREVENT SAGGING. MAKESHIFT DEVICES ARE NOT ACCEPTABLE. PLUMBER'S TAPE IS NOT APPROVED.

• PIPING SHALL BE ISOLATED FROM ALL DIRECT CONTACT WITH THE STRUCTURE BY THE USE OF MANUFACTURED HANGER ISOLATORS AND STUD ISOLATION DEVICES.

• INSTALL ALL FIXTURES AND EQUIPMENT PER MANUFACTURER'S ROUGH-IN AND INSTALLATION INSTRUCTIONS. INSTALL HANDICAPPED FIXTURES PER TITLE 24 AND A.D.A. REQUIREMENTS. PROVIDE 17 GAUGE CHROME PLATED P-TRAPS, ANGLE STOPS AND FLEXIBLE RISERS, SUPPORT PLATES, ETC., AS REQUIRED.

• PROVIDE FIRE STOPPING AND SLEEVES FOR PIPING PENETRATIONS OF FIRE-RATED WALLS, FLOORS, AND CEILINGS. METHOD OF SLEEVING AND FIRE STOPPING SHALL BE APPROVED BY FIRE MARSHALL.

PLUMBING TEST AND ADJUSTMENTS:

• ALL WORK SHALL BE COMPLETELY INSTALLED, SANITIZED, AND TESTED AS REQUIRED BY LOCAL CODE AND THE STATE ORDINANCES AND STATE SAFETY ORDERS, AND SHALL BE LEAK-TIGHT BEFORE INSPECTION IS REQUESTED. ALL TESTS SHALL BE REPEATED UPON REQUEST TO THE SATISFACTION OF THOSE MAKING THE INSPECTION.

HVAC LEGEND

SYMBOL	DESCRIPTION	ABBREV.	SYMBOL	DESCRIPTION	ABBREV.	SYMBOL	DESCRIPTION	ABBREV.
	SUPPLY AIR DIFFUSER	SA		RECTANGULAR DUCT	-		VOLUME DAMPER	VD
	RETURN AIR GRILLE	RA		LINED RECTANGULAR DUCT	-		FIRE DAMPER	FD
	EXHAUST AIR GRILLE	EA		RIGID ROUND DUCT	-		SMOKE DETECTOR	SD
	CEILING EXHAUST FAN	CEF		FLEXIBLE ROUND DUCT	-		FLEXIBLE CONNECTION	FC
	SIDEWALL GRILLE, REGISTER, OR LOUVER	-		POINT OF CONNECTION OR DISCONNECTION	POC/POD		THERMOSTAT SENSOR	-
	GRILLE, DIFFUSER, REGISTER, OR LOUVER TAG	-		DIAMETER	DIA		EQUIPMENT OR DUCTWORK TO BE REMOVED	-

HVAC ABBREVIATIONS

ABV	ABOVE	EDB	ENTERING DRY BULB	MER	MECHANICAL EQUIPMENT ROOM	SA	SUPPLY AIR
A/C	AIR CONDITIONING, CONDITIONER	EER	ENERGY EFFICIENCY RATIO	MFR	MANUFACTURER	SA	STATIC PRESSURE
ACC	ACCESS DOOR	ELC	ELECTRICAL	NEW	NEW	SEER	SEASONAL ENERGY EFFICIENCY RATIO
AFF	ABOVE FINISH FLOOR	ESP	EXTERNAL STATIC PRESSURE	N/A	NOT APPLICABLE	SHT	SHEET
ALUM	ALUMINUM	EWB	ENTERING WET BULB	NFA	NET FREE AREA	SQ	SQUARE
APD	AIR PRESSURE DROP	FA	FACE AREA	NIC	NOT IN CONTRACT	SSE	STEADY STATE EFFICIENCY
ARCH	ARCHITECTURAL, ARCHITECT	FAU	FORCED AIR UNIT	NO	NUMBER	TA	TRANSFER AIR
BLDG	BUILDING	FC	FLEXIBLE CONNECTION	NON	NOMINAL	TBR	TO BE REMOVED
BTU	BRITISH THERMAL UNIT	FCU	FAN COIL UNIT	NTS	NOT TO SCALE	TEMP	TEMPERATURE
BTUH	BTU PER HOUR	FD	FIRE DAMPER	OA	OUTSIDE AIR	TYP	TYPICAL
CAF	CAPACITY	FLA	FULL LOAD AMPS	OAI	OUTSIDE AIR INTAKE	UL	UNDERWRITER'S LABORATORIES
CFD	CEILING FIRE DAMPER	FF	FEET PER MINUTE	OPD	OPPOSED BLADE DAMPER	UNLESS OTHERWISE NOTED	
CFM	CUBIC FEET PER MINUTE	FSD	COMBINATION FIRE/SMOKE DAMPER	OD	OUTSIDE DIAMETER	UTR	UP THROUGH ROOF
CONN	CONNECTION	GALV	U.S. GAUGE (OR GAGE)	OPER	OPERATING	VD	VOLUME DAMPER
CSE	CALIFORNIA SEASONAL EFFICIENCY	CSM	GALVANIZED SHEET METAL	OSA	OFFICE OF STATE ARCHITECT	W/	WITH
CTE	CAP TO EXISTING	CC	GENERAL CONTRACTOR	PC	PLUMBING CONTRACTOR	W/O	WITHOUT
CU	CONDENSING UNIT	GPM	GALLONS PER MINUTE	PUM	PLUMBING	WB	WET BULB
DET	DETAIL	PDC	POINT OF CONNECTION	POC	POINT OF CONNECTION	WC	WATER GAUGE
DI	DIAMETER	HP	HORSEPOWER	POD	POINT OF DISCONNECTION	WMS	WIRE MESH SCREEN
DN	DOWN	HR	HOUR, HOURS	PRESS	PRESSURE	WT	WEIGHT
DN	DOWN	HVAC	HEATING, VENTILATING, AIR CONDITIONING	PS	POUNDS PER SQUARE INCH	WF	WALL FIRE DAMPER
DWG	DRAWING	ID	INSIDE DIAMETER	RA	RETURN AIR	(X2)	TYPICAL OF 2
(E)	EXISTING	LBS	POUNDS	REVIS	REVISION		
EA	EXHAUST AIR	LBS	BTU PER HOUR (THOUSANDS)	RND	ROUND		
EC	ELECTRICAL CONTRACTOR	MC	MECHANICAL CONTRACTOR	RPM	REVOLUTIONS PER MINUTE		

PLUMBING LEGEND

SYMBOL	DESCRIPTION	ABB.	SYMBOL	DESCRIPTION	ABB.	SYMBOL	DESCRIPTION	ABB.
	SOIL, WASTE, OR SEWER	W		PIPE CONNECTION	-		POINT OF CONNECTION/DIS.	POC/POD
	GREASE WASTE	GW		CAPPED OR PLUGGED PIPE	-		FIXTURE GAS SUPPLY	-
	STORM/OVERFLOW DRAIN	SD/OD		PIPE OR EQUIP. T.B.R.	-		WATER HAMMER ARRESTOR	WHA
	VENT	V		HOSE BIB	HB		GATE VALVE	-
	CONDENSATE DRAIN	COND		RECESSED HOSE BIB	RHB		BALL VALVE	-
	COLD WATER	CW		FIRE RISER	-		GLOBE VALVE	-
	COLD WATER TRAP PRIMER	-		FIRE DEPARTMENT CONNECTION	FDC		GAS COCK	-
	HOT WATER SUPPLY	HW		FLOOR CLEAN OUT	FCO		CHECK VALVE	-
	HOT WATER RECIRCULATION	HWR		CLEAN OUT TO GRADE	COTG		DOUBLE CHECK VALVE	-
	GAS LINE	G		WALL CLEAN OUT	WCO		VALVE IN RISER	-