MECHANICAL/PLUMBING SPECIFICATIONS

PART ONE - GENERAL

1. THE CONTRACTOR SHALL PROVIDE THE WORK SHOWN ON THE DRAWINGS AND SPECIFIED FOR THEIR INDIVIDUAL SECTIONS OF WORK. THE WORD "WORK" SHALL MEAN ALL LABOR, TRANSPORTATION, MATERIAL, EQUIPMENT, TOOLS, INSTALLATION, SUPERVISION AND ANY OTHER INCIDENTAL ITEMS OR SERVICES NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE COMPLETE SYSTEMS, WHICH SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY INDICATED OR NOTED.
2. ALL GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE CONSTRUCTION SPECIFICATIONS ARE MADE PART OF THIS SPECIFICATION AND HAVE THE SAME FORCE AND AFFECT AS IF COMPLETELY REPRODUCED.
3. THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL, MAKE ALL FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATING CONDITION.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE APPLICABLE INTERNATIONAL BUILDING CODE (IBC), UNIFORM MECHANICAL CODE (UMC), UNIFORM PLUMBING CODE (UPC), NATIONAL ELECTRIC CODES (NEC) AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING ALL FEES AND OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
6. THE CONTRACTOR SHALL CAREFULLY EXAMINE ALL CONTRACT DOCUMENTS. THE CONTRACTOR SHALL COORDINATE THE WORK WITH ALL OTHER TRADES INCLUDING, BUT NOT LIMITED TO, THE CONTRACT DOCUMENTS, SHOP DRAWINGS, ETC. FOR ALL GENERAL CONSTRUCTION, STRUCTURAL, MECHANICAL, ELECTRICAL AND SPECIALTY CONTRACTOR WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS PLANNED, WITHOUT INTERFERENCE WITH OTHER WORK, AND SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUTS NEEDED TO PREVENT CONFLICT WITH OTHER TRADES, TO PROVIDE ACCESS AND FOR THE PROPER EXECUTION OF THE WORK.
7. DRAWINGS ARE DIAGRAMMATIC AND SCHEMATIC IN NATURE, AND INDICATE THE TYPE, SIZE, ARRANGEMENT AND LOCATION OF MATERIALS AND EQUIPMENT. WORK INCLUDES CERTAIN COMPONENTS, APPURTENANCES AND RELATED SPECIALTIES THAT MAY NOT BE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY ITEMS TO COMPLETE THE WORK ACCORDING TO INDUSTRY STANDARDS. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS TO CALL OUT FOR FINISHED WORK, TESTED AND READY FOR OPERATION. DO NOT SCALE DRAWINGS. ARRANGEMENT OF EQUIPMENT AND ROUTING OF PIPES AND DUCTWORK, ETC. INDICATED ON DRAWINGS SHALL BE ROUTED PLUMB AND AT RIGHT ANGLES TO BUILDING CONSTRUCTION AND MAY REQUIRE MODIFICATION DUE TO UNFORESEEN CONDITIONS AND REQUIRE ON SITE REVISIONS DURING CONSTRUCTION. (SEE ALSO "BIDDING").
8. ALL WORK REQUIRED FOR IDENTICAL ITEMS SHOWN ON THE DRAWINGS SHALL BE PROVIDED, ALTHOUGH EACH SPECIFIC IDENTICAL ITEM MAY NOT BE SHOWN IN DETAIL.
9. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR ALL EQUIPMENT AND MATERIALS SPECIFIED HEREIN TO THE ENGINEER. THE ENGINEER SHALL REVIEW SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ENGINEERING FEES NECESSARY TO CHANGE PERMIT DOCUMENTS BASED ON ALTERNATE SUBMITTAL PACKAGES/EQUIPMENT SUBSTITUTIONS.
10. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER FOR CONSIDERATION PRIOR TO BIDDING. THE OWNER'S REPRESENTATIVE SHALL PREAPPROVE ANY PROPOSED SUBSTITUTION IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT OR MATERIALS WITH OTHER BUILDING TRADES, INCLUDING ALL ELECTRICAL, STRUCTURAL, OR ARCHITECTURAL ELEMENTS. THE CONTRACTOR SHALL IDENTIFY AND ANNOTATE ALL REVISED REQUIREMENTS PER BUILDING TRADE ON THE SHOP DRAWINGS. THE CONTRACTOR SHALL ALSO IDENTIFY ALL COST DEBITS OR CREDITS IN WRITING FOR THE PROPOSED CHANGES PER BUILDING TRADE.
11. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH FIVE (5) COMPLETE SETS OF AS-BUILT DOCUMENTS ACCURATELY SHOWING THE MATERIALS AND EQUIPMENT AS INSTALLED.
12. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE (1) YEAR FROM DATE OF ACCEPTANCE BY OWNER. REFRIGERATION COMPRESSORS SHALL BE GUARANTEED FOR A MINIMUM OF FIVE (5) YEARS FROM DATE OF OWNER'S ACCEPTANCE. IN ADDITION, THE CONTRACTOR SHALL GUARANTEE THAT THE INSTALLATION WHEN OPERATED IN ACCORDANCE WITH THE CONTRACTOR'S INSTRUCTIONS WILL DEVELOP CAPACITY AND CHARACTERISTICS AS SPECIFIED AND WILL FULFILL EACH AND EVERY REQUIREMENT OF THE DRAWINGS AND SPECIFICATIONS. SHOULD THE INSTALLATION IN ANY WAY FAIL TO DO SO, THE CONTRACTOR WILL, WITHOUT DELAY OR WITHOUT COST TO THE OWNER, PROVIDE WHATEVER ADDITIONAL EQUIPMENT, MATERIAL, AND LABOR REQUIRED TO CORRECT THE DEFICIENCY AND COMPLY WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.
13. CONTRACTOR SHALL CHECK AND VERIFY ALL SIZES, DIMENSIONS, AND CONDITIONS BEFORE STARTING ANY WORK. ANY DEVIATIONS OR PROBLEMS SHALL BE TRANSMITTED TO THE ENGINEER FOR REVIEW.
14. PROVIDE BASE AND COUNTER FLASHING FOR ITEMS PENETRATING THE ROOF OR EXTERIOR WALLS.
15. STARTERS AND CONTROLS FOR MOTORS, ETC. TO BE FURNISHED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO INSTALL THE AFOREMENTIONED ITEMS, AND FURNISH ALL POWER WIRING. ALL CONTROL AND INTERLOCKING WIRING SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
16. ALL WORK SHOWN IS NEW UNLESS NOTED OTHERWISE.

BIDDING

1. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL COMPARE THE WORK SPECIFIED IN THE CONTRACT DOCUMENTS WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL IDENTIFY AND NOTATE ALL WORK OR CONDITIONS THAT ARE DIFFERENT FROM THE CONTRACT DOCUMENTS OR THEIR INTENT. THE CONTRACTOR SHALL, UPON DISCOVERY, IMMEDIATELY NOTIFY AND REPORT, IN WRITING, ANY DISCREPANCIES TO THE ENGINEER. NO EXTRAS OR CHANGE ORDERS WILL BE ALLOWED FOR FAILURE TO PERFORM THE PRE-BID SITE VISIT.
2. BASE PROPOSAL ON MANUFACTURER NAMES LISTED UNLESS "OR EQUAL" IS INDICATED. PROVIDE SUBSTITUTION REQUESTS A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO BID DATE CLOSING TO ALLOW TIME FOR DUE CONSIDERATION OF PROPOSED ALTERNATE. DETERMINATION OF SUBSTITUTION OF EQUALITY RESTS SOLELY WITH THE ENGINEER.

PART TWO - PRODUCTS

HVAC EQUIPMENT

1. PROVIDE HVAC EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S "OWNER'S OPERATING AND MAINTENANCE MANUAL" TROUBLE-FREE PRIOR TO STARTING TEST AND BALANCE (TAB) WORK.

DUCTWORK

1. DUCTWORK SHALL BE ASTM A525 OR A527 GALVANIZED SHEET METAL LOCK-FORMING QUALITY HAVING ZINC COATING OF 1.25 OZ PER SQ. FT. FOR EACH SIDE PER ASTM A90 AND INSTALLED ACCORDING TO ASHRAE RECOMMENDATIONS, AND SMACNA DUCT CONSTRUCTION STANDARDS. DUCTWORK SYSTEMS SHALL BE (2" CLASSIFICATION SUPPLY, AND 1" CLASSIFICATION RETURN AND EXHAUST).
2. PROVIDE MANUAL VOLUME DAMPERS WITH LOCKING QUADRANTS AND IDENTIFYING RIBBONS AT DAMPER HANDLES FOR AIR BALANCING EACH BRANCH DUCT TAKE-OFF OR PIECE OF AIR DISTRIBUTION EQUIPMENT.
3. SEAL ALL DUCT PENETRATIONS THROUGH WALLS, FLOOR AND ROOF. SEAL ALL TRANSVERSE DUCT SEAMS WITH APPROVED MASTIC. DUCT TAPES SHALL NOT BE ALLOWED FOR RIGID DUCTWORK. SUPPLY AND RETURN DUCTWORK SHALL BE INSULATED WITH 1 1/2" THICK FLEXIBLE GLASS FIBER ANSI/ASTM C612: MAXIMUM 'K' VALUE OF 0.29 AT 75°F, WITH FOIL-KRAFT FLAME RESISTANT VAPOR BARRIER, 3/4 #/CUFT. DENSITY.
4. ALL DUCTWORK SIZES SHOWN ARE FREE AREA DIMENSIONS. EXHAUST DUCTWORK SHALL BE UNINSULATED. DUCTWORK INTERIOR BEHIND DEVICES SHALL BE PAINTED FLAT BLACK.
5. FLEXIBLE DUCTWORK WHERE INDICATED ON THE DRAWINGS SHALL BE INSULATED, WITH PLASTIC VAPOR BARRIER AT INTERIOR AND EXTERIOR, STEEL WIRE COIL REINFORCED. JOINTS SHALL BE BAND-CLAMPED AND TAPE SEALED TO MAINTAIN INTEGRITY OF VAPOR BARRIER. FLEXIBLE INSTALLATION SHALL BE SUPPORTED TO ELIMINATE SAGS. FLEXIBLE GLASS FIBER INSULATION SHALL HAVE A MAXIMUM 0.23 K VALUE AT 75°F.

MECHANICAL PRODUCTS

1. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2": MALLEABLE IRON, CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING. PIPE SIZES 2" TO 4": CARBON STEEL, ADJUSTABLE, CLEVIS. PIPE SIZES 6" AND OVER: ADJUSTABLE STEEL YOKE, CAST IRON ROLL, DOUBLE HANGER.
2. VALVES: PROVIDE THE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON VALVE BODIES AND BE BY SINGLE MANUFACTURER FOR SIMILAR TYPE. ACCEPTABLE MANUFACTURERS: MILWAUKEE, STOCKHAM, NIBCO, APOLLO.
3. PIPING: HYDRONIC WATER PIPING (ABOVE GROUND) - SCHEDULE 40 STEEL (ASTM A53), MALLEABLE IRON OR FORGED STEEL WELDED TYPE FITTINGS, SCREWED OR WELDED JOINTS; OR TYPE L HARD DRAWN COPPER TUBING (ASTM B88), CAST BRASS OR SOLDER WROUGHT COPPER FITTINGS, SOLDER GRADE 95TA JOINTS. PIPING OVER 2" SHALL BE STEEL WITH WELDED JOINTS. EQUIPMENT DRAIN OVERFLOWS SHALL BE TYPE M HARD DRAWN COPPER.
4. PIPE INSULATION: GLASS FIBER INSULATION WITH MAXIMUM K VALUE OF .27 AT 75 DEGREES F. MINIMUM THICKNESS SHALL BE 1" FOR PIPING LESS THAN 2". AND 2" HOT WATER/ 1 1/2" CHILLED WATER FOR PIPING 2" AND GREATER. OUTDOOR INSULATION THICKNESS SHALL BE DOUBLE INDOOR THICKNESS WITH A MAXIMUM THICKNESS OF 3". INTERIOR APPLICATIONS SHALL HAVE KRAFT REINFORCED FOIL VAPOR BARRIER WITH ONE PIECE PREMOLDED PVC JACKETS FOR FITTINGS. EXTERIOR APPLICATIONS SHALL HAVE 0.16 THICK ALUMINUM JACKETS. ACCEPTABLE MANUFACTURERS: OWENS CORNING, CERTAINTEED, JOHNS MANVILLE, KNAUF.
5. PACKAGED ELECTRIC/GAS ROOFTOP UNITS(HEAT PUMPS INCLUDED): UNIT SHALL BE COMPLETE WITH HERMETICALLY SEALED COMPRESSOR WITH HIGH AND LOW PRESSURE CUT-OFFS, COILS, HEATING SECTION, AIR COOLED CONDENSER, CONDENSER BLOWER OR FAN, AUTOMATIC CONTROLS, CONTROL PANEL WITH STARTERS AND DISCONNECT SWITCH, RELAYS, ETC. FOR SINGLE POINT POWER CONNECTION. UNITS SHALL BE FURNISHED WITH 2 SETS OF 1" THROWAWAY PLEATED 30% FILTERS. UNITS SHALL BE COMPLETELY FACTORY WIRED FOR TERMINAL CONNECTIONS OF THERMOSTAT WITH A FAN-AUTO/MANUAL SWITCH AND A SYSTEM HEAT/OFF/COOL/AUTO SWITCH. UNITS TO BE INSTALLED AS PER MANUFACTURER RECOMMENDATIONS, WITH MANUAL OUTSIDE AIR DAMPER, 12" ROOF CURB, ITEMS AS SCHEDULED AND ALL NECESSARY ACCESSORIES REQUIRED FOR EFFICIENT AND PROPER OPERATION. ACCEPTABLE MANUFACTURERS: TRANE, LENNOX, McQUAY, CARRIER.

AUTOMATIC TEMPERATURE CONTROLS

1. THE MECHANICAL CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS. THIS SYSTEM SHALL INCLUDE BUT NOT BE LIMITED TO: HEAT/OFF/COOL/AUTO - THERMOSTAT, AUTO/MANUAL - FAN, TRANSFORMERS AND ALL REQUIRED RELAYS, WIRING AND CONDUIT. THERMOSTAT SHALL BE 7 DAY PROGRAMMABLE WITH AUTOMATIC CHANGE OVER FROM HEATING TO COOLING AND VICE VERSA.
2. DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY THE MECHANICAL CONTRACTOR WHEN THE DUCT TYPE SMOKE DETECTOR IS REQUIRED TO BE PART OF THE DESIGN BUILD FIRE ALARM SYSTEM. WHEN NOT PART OF THE FIRE ALARM SYSTEM, THE DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND PROVIDED AT 24 VAC. DUCT MOUNTED SMOKE DETECTORS SHALL SHUT DOWN THE RESPECTIVE UNIT AND ALL ADDITIONAL UNITS IN A COMMON AREA IF THE SUMMATION OF THE AIRFLOWS EXCEED 2000 CFM TOTAL.

PLUMBING EQUIPMENT

1. PROVIDE PLUMBING EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S "OWNER'S OPERATING AND MAINTENANCE MANUAL" TROUBLE FREE AND CONFORMING TO THE ONE-YEAR WARRANTEE.

PLUMBING PRODUCTS

1. GAS PIPING: ABOVE GRADE SCHEDULE 40 BLACK IRON(ASME A-53), THREADED MALLEABLE FITTINGS INSIDE AND GALVANIZED FITTINGS AND PIPE WHERE EXPOSED, JOINT COMPOUND. PROVIDE ISOLATION VALVES AT ALL EQUIPMENT. BELOW GRADE GAS PIPING SHALL BE POLYETHYLENE (PE) GAS PIPING WITH BUTT FUSION JOINTS. PIPING SHALL BE LABELED GAS. GAS VALVE SHALL BE BRONZE BODY, BRONZE TAPERED PLUG, NON-LUBRICATED, TEFLON PACKING, THREADED ENDS.
2. PIPE INSULATION: ALL DOMESTIC COLD WATER PIPING (IN UNCONDITIONED SPACES ONLY) AND ALL DOMESTIC HOT WATER PIPING ABOVE GROUND SHALL BE INSULATED WITH 1" THICK FIBERGLASS PIPE INSULATION WITH ALL-SERVICE JACKET AND MAXIMUM K VALUE OF 0.27 AT 75°F. WHERE CLEARANCE LIMITATIONS PREVENT THE USE OF FIBERGLASS INSULATION, A MINIMUM 3/4" THICK CLOSED CELL NEOPRENE PIPE INSULATION MAY BE USED.
3. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2": MALLEABLE IRON, CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING. PIPE SIZES 2" TO 4": CARBON STEEL, ADJUSTABLE, CLEVIS. PIPE SIZES 6" AND OVER: ADJUSTABLE STEEL YOKE, CAST IRON ROLL, DOUBLE HANGER.
4. CONDENSATE DRAIN PIPING: TYPE "M" COPPER (ASTM B-88), WROUGHT FITTINGS (ASME B16.22), JOINTS: ANSI/ASTM B32, SOLDER, GRADE 95 TA, 0.2% MAX LEAD.

TEST AND BALANCE REPORT (TAB)

1. BALANCE ALL DUCTS, DIFFUSERS, AND GRILLES TO OBTAIN THE AIR QUANTITIES AS SHOWN ON PLANS. TEST AND BALANCE WORK SHALL BE PERFORMED BY AN INDEPENDENT, APPROVED, AND CERTIFIED AABC OR NEBB CONTRACTOR.
2. THE TEST AND AIR BALANCE (TAB) REPORT SHALL INCLUDE DESIGN AIR QUANTITIES AND AIR QUANTITIES AFTER ADJUSTMENTS. FURNISH OWNER'S REPRESENTATIVE WITH THREE (3) COPIES OF THE FINAL TAB REPORT.

NOTES

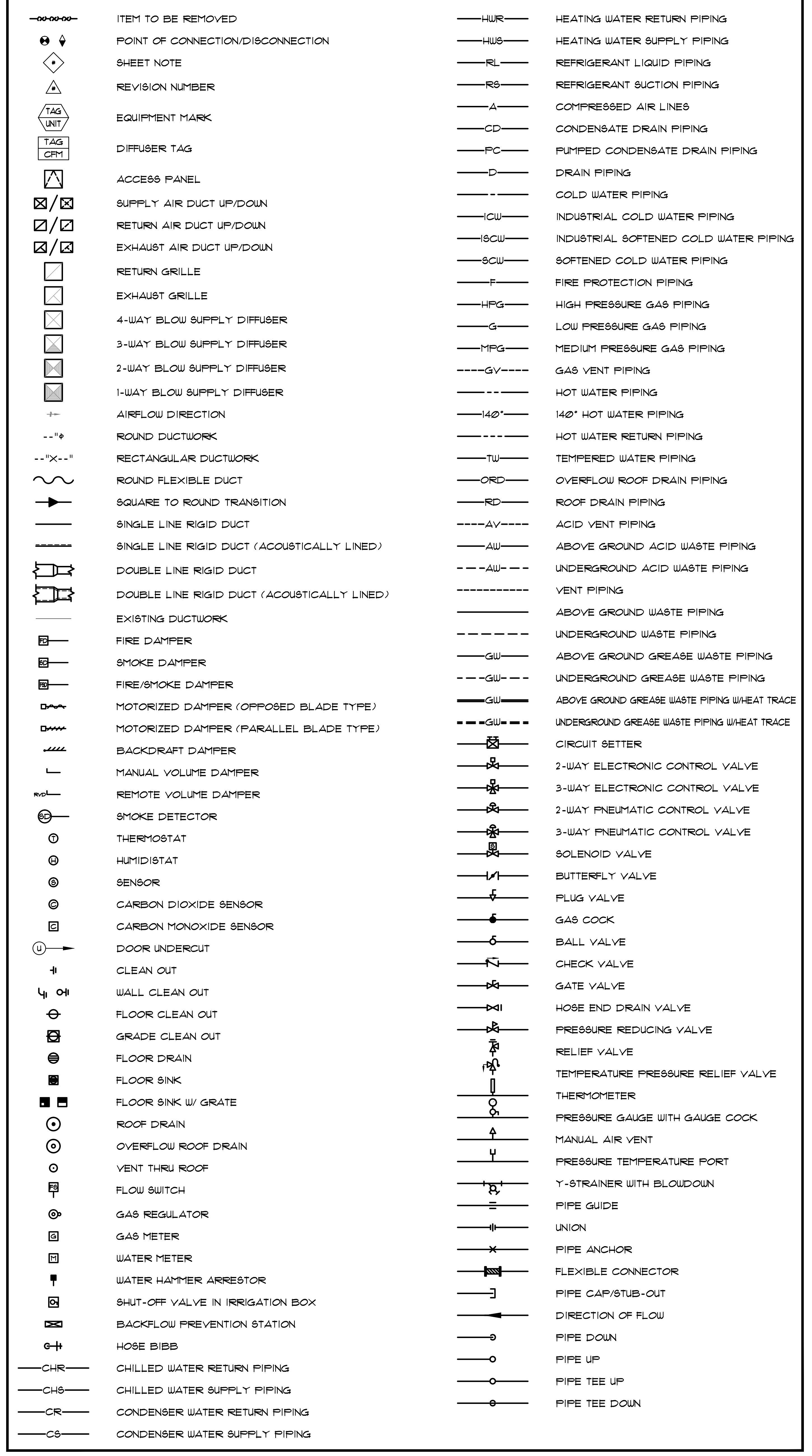
1. DIELECTRIC FITTINGS SHALL BE USED WHEREVER DISSIMILAR METALS ARE JOINED.
2. PROVIDE ACCESS PANELS IN CEILING TO ACCESS VOLUME DAMPERS WHERE REQUIRED.
3. PLUMBING FIXTURES: PROVIDE CHROME PLATED ANGLE STOPS WITH ESCUTCHEON PLATES AT PLUMBING FIXTURES. ALL PLUMBING FIXTURES SHALL COMPLY WITH LOCAL REGULATIONS AND ADOPTED WATER CONSERVATION CODES.
4. DISINFECT ALL POTABLE WATER SYSTEMS IN ACCORDANCE WITH PLUMBING CODE AND/OR, AWWA STANDARD. PROVIDE WRITTEN CONFIRMATION TO OWNERS REPRESENTATIVE THAT THIS WORK HAS BEEN COMPLETED.

PART THREE - EXECUTION

1. THE CONTRACTOR SHALL PROVIDE ALL SLEEVES, OPENINGS, CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THE WORK. CUTTING AND PATCHING SHALL BE DONE BY WORKMEN SKILLED IN THE TRADES REQUIRED AND PAID BY THE CONTRACTOR REQUIRING THE WORK COMPLETED.
2. THE CONTRACTOR SHALL PROVIDE ALL RIGGING, HANDLING OF MATERIALS AND EQUIPMENT, AND THE NECESSARY PROTECTION FOR MATERIALS AND EQUIPMENT.
3. THE CONTRACTOR WILL PROTECT THE WORK AND MATERIAL AGAINST DIRT, THEFT, INJURY OR DAMAGE UNTIL ACCEPTED BY OWNER. ALL WORK SHALL BE TURNED OVER TO OWNER CLEAN AND IN NEW CONDITION.
4. PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OR DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE FIRE RATING OF THE SEPARATION AREA AND U.L. LISTED.
5. EACH CONTRACTOR SHALL PROVIDE ALL FOUNDATIONS, HANGERS, AND SUPPORTS FOR ALL EQUIPMENT SUPPLIED AND/OR INSTALLED UNDER THEIR WORK. ANY EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS TO PIPING AND OR DUCTWORK IF APPLICABLE.
6. WHERE PIPES OR CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILINGS IN FINISHED AREAS, THEY SHALL BE FURNISHED WITH ESCUTCHEON PLATES (COLOR PER ARCHITECT AND/OR INTERIOR DESIGNER).
7. AT THE CONCLUSION OF THE JOB, EACH PIECE OF EQUIPMENT, VALVE, SWITCH, STARTER, PANEL, PIPE LINE, CONDUIT, DUCT, ETC., SHALL BE CLEARLY IDENTIFIED WHETHER EXPOSED OR CONCEALED, COVERED OR UNCOVERED, IN ACCORDANCE WITH OSHA AND ANSI REGULATIONS. IDENTIFY PIPES NEAR EACH VALVE WITH "BRANDY-PERMA' CODE PIPE TAPE" OR T. & B. WESTLINE "TEL-A-PIPE" INDICATING DIRECTION OF FLOW, SERVICE, ZONE, AND SIZE. TAPE SHALL BE APPLIED TO PIPE, CONDUIT, OR COVERING. VALVES, CONTROLS, AND DAMPERS SHALL BE IDENTIFIED BY 2-INCH LACQUERED BRASS TAGS WITH STAMPED LETTERS FASTENED WITH "S" HOOKS OR CHAINS. EQUIPMENT IS TO BE IDENTIFIED AS TO FUNCTION AND PURPOSE BY MEANS OF PERMANENTLY ATTACHED LAMINATED ENGRAVED PHENOLIC NAMEPLATES WITH BEVELED EDGES, AND WHITE LETTERS ON BLACK BACKGROUND. (NO ADHESIVE LABELS ALLOWED).
8. AT THE CONCLUSION OF THE WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE BALANCED, ADJUSTED, AND TESTED TO PROVIDE A QUIET-OPERATING, STABLE, AND SAFELY OPERATING SYSTEM(S). DEMONSTRATE OPERATION OF ALL SYSTEMS TO THE OWNER'S DESIGNATED REPRESENTATIVE. THE TEST AND BALANCE WORK SHALL BE PERFORMED IN ACCORDANCE WITH NEBB OR AABC STANDARDS, BY INDEPENDENT, APPROVED, AND CERTIFIED TEST AND BALANCE PERSONNEL.
9. THE MECHANICAL/PLUMBING CONTRACTOR IS RESPONSIBLE FOR RETAINING AND PAYING FOR THE DESIGN SERVICES OF A STRUCTURAL ENGINEER TO CREATE THE DESIGN AND INSTALLATION DRAWINGS FOR MECHANICAL/PLUMBING SYSTEMS SEISMIC RESTRAINT SUPPORT, PER THE PROJECT BUILDING CODE. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT MECHANICAL SYSTEMS SHOP DRAWINGS BASED UPON MULTI DISCIPLINE COORDINATION. INCLUDED WITH THE SHOP DRAWING SUBMISSION SHALL BE SEISMIC RESTRAINT DRAWINGS NOTING WHERE SEISMIC SUPPORT IS REQUIRED. FOR EACH AREA NOTED NEEDING SEISMIC SUPPORT FOR THE MECHANICAL SYSTEMS, THERE SHALL BE A SEISMIC DRAWING DETAILING THE REQUIRED SUPPORT. THE SEISMIC SUPPORT DRAWINGS SHALL BE SIGNED AND SEALED BY A REGISTERED STRUCTURAL ENGINEER IN THE SAME STATE AS THE PROJECT. IN ADDITION TO THE PROJECT DESIGN TEAM REVIEW, THE SEISMIC SUPPORT DRAWINGS WILL BE ISSUED TO THE LOCAL BUILDING DEPARTMENT FOR REVIEW AS PART OF A DEFERRED SUBMITTAL FOR THE BUILDING DOCUMENTS. COMMENCEMENT OF CONSTRUCTION PRIOR TO BUILDING DEPARTMENT REVIEW IS AT THE CONTRACTOR'S RISK.
10. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF GRILLES, REGISTERS AND DIFFUSERS.
11. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2" - 6'-0" MAX SPACING, 3/8" ROD DIAMETER; PIPE SIZES 2" TO 3" - 10'-0" MAX SPACING, 1/2" ROD DIAMETER; PIPE SIZES 4 TO 6"-10'-0" MAX SPACING, 5/8" ROD DIAMETER. DAMPERS.
12. WATER PROOFING AND FLASHING OF PIPE PENETRATIONS THROUGH EXTERIOR WALL AND ROOF SHALL BE BY THIS CONTRACTOR. PLUMBING CONTRACTOR SHALL COORDINATE LOCATIONS AND METHODS WITH GENERAL CONTRACTOR PRIOR TO CONSTRUCTION OF ROOF DECK.
13. CONTRACTOR SHALL OBTAIN FROM THE ARCHITECT THE EXACT LOCATION OF EQUIPMENT, PLUMBING FIXTURES, FLOOR DRAINS AND ANY OTHER APPARATUS SPECIFIED IN THESE DRAWINGS.
14. PROVIDE CLEAN OUTS IN SANITARY, WASTE AND DRAIN LINES AS SHOWN AND AS REQUIRED BY LOCAL CODE. ALL CLEANOUTS SHALL BE READILY ACCESSIBLE.
15. PROVIDE BALANCE VALVE FOR HOT WATER RETURN SYSTEM AS REQUIRED.
16. PROVIDE PRESSURE REDUCING VALVE IN SYSTEM AS REQUIRED.
17. PROVIDE HEAT TRAPS (INTEGRAL OR EXTERNAL) FOR ALL WATER HEATING EQUIPMENT.
18. PROVIDE A NON-VENTED TRAP ON ALL INDIRECT WASTE PIPING FIVE (5) TO FIFTEEN (15) FEET IN DEVELOPED LENGTH. INDIRECT WASTE PIPING WITH ANGLES AND CHANGES OF DIRECTION SHALL BE BE PROVIDED WITH CLEANOUTS.
19. WHERE A SINK IN A BAR, SODA FOUNTAIN, OR COUNTER HAS IN INDIRECT WASTE, THE DEVELOPED LENGTH FROM THE SINK OUTLET SHALL NOT EXCEED FIVE (5) FEET.

MECHANICAL/PLUMBING SYMBOL LIST

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.



	ITEM TO BE REMOVED
	POINT OF CONNECTION/DISCONNECTION
	SHEET NOTE
	REVISION NUMBER
TAG UNIT	EQUIPMENT MARK
TAG CFM	DIFFUSER TAG
	ACCESS PANEL
☒/☒	SUPPLY AIR DUCT UP/DOWN
	RETURN AIR DUCT UP/DOWN
	EXHAUST AIR DUCT UP/DOWN
	RETURN GRILLE
	EXHAUST GRILLE
	4-WAY BLOW SUPPLY DIFFUSER
	3-WAY BLOW SUPPLY DIFFUSER
	2-WAY BLOW SUPPLY DIFFUSER
	1-WAY BLOW SUPPLY DIFFUSER
	AIRFLOW DIRECTION
--"ø	ROUND DUCTWORK
--"X--"	RECTANGULAR DUCTWORK
	ROUND FLEXIBLE DUCT
	SQUARE TO ROUND TRANSITION
	SINGLE LINE RIGID DUCT
	SINGLE LINE RIGID DUCT (ACOUSTICALLY LINED)
	DOUBLE LINE RIGID DUCT
	DOUBLE LINE RIGID DUCT (ACOUSTICALLY LINED)
	EXISTING DUCTWORK
FD	FIRE DAMPER
SD	SMOKE DAMPER
FSD	FIRE/SMOKE DAMPER
	MOTORIZED DAMPER (OPPOSED BLADE TYPE)
	MOTORIZED DAMPER (PARALLEL BLADE TYPE)
	BACKDRAFT DAMPER
	MANUAL VOLUME DAMPER
RVD	REMOTE VOLUME DAMPER
SD	SMOKE DETECTOR
T	THERMOSTAT
H	HUMIDISTAT
S	SENSOR
C	CARBON DIOXIDE SENSOR
C	CARBON MONOXIDE SENSOR
U	DOOR UNDERCUT
	CLEAN OUT
	WALL CLEAN OUT
	FLOOR CLEAN OUT
	GRADE CLEAN OUT
	FLOOR DRAIN
	FLOOR SINK
	FLOOR SINK W/ GRATE
	ROOF DRAIN
	OVERFLOW ROOF DRAIN
	VENT THRU ROOF
FS	FLOW SWITCH
	GAS REGULATOR
G	GAS METER
M	WATER METER
	WATER HAMMER ARRESTOR
	SHUT-OFF VALVE IN IRRIGATION BOX
	BACKFLOW PREVENTION STATION
	HOSE BIBB
—CHR—	CHILLED WATER RETURN PIPING
—CHS—	CHILLED WATER SUPPLY PIPING
—CR—	CONDENSER WATER RETURN PIPING
—CS—	CONDENSER WATER SUPPLY PIPING
—HWR—	HEATING WATER RETURN PIPING
—HWS—	HEATING WATER SUPPLY PIPING
—RL—	REFRIGERANT LIQUID PIPING
—RS—	REFRIGERANT SUCTION PIPING
—A—	COMPRESSED AIR LINES
—CD—	CONDENSATE DRAIN PIPING
—PC—	PUMPED CONDENSATE DRAIN PIPING
—D—	DRAIN PIPING
—-—	COLD WATER PIPING
—ICW—	INDUSTRIAL COLD WATER PIPING
—ISCW—	INDUSTRIAL SOFTENED COLD WATER PIPING
—SCW—	SOFTENED COLD WATER PIPING
—F—	FIRE PROTECTION PIPING
—HPG—	HIGH PRESSURE GAS PIPING
—G—	LOW PRESSURE GAS PIPING
—MPG—	MEDIUM PRESSURE GAS PIPING
----GV----	GAS VENT PIPING
—--—	HOT WATER PIPING
—140°—	140° HOT WATER PIPING
—---—	HOT WATER RETURN PIPING
—TW—	TEMPERED WATER PIPING
—ORD—	OVERFLOW ROOF DRAIN PIPING
—RD—	ROOF DRAIN PIPING
----AV----	ACID VENT PIPING
—AW—	ABOVE GROUND ACID WASTE PIPING
---AW---	UNDERGROUND ACID WASTE PIPING
-----------	VENT PIPING
———	ABOVE GROUND WASTE PIPING
– – – –	UNDERGROUND WASTE PIPING
—GW—	ABOVE GROUND GREASE WASTE PIPING
---GW---	UNDERGROUND GREASE WASTE PIPING
═GW═	ABOVE GROUND GREASE WASTE PIPING W/HEAT TRACE
▬ ▬GW▬ ▬	UNDERGROUND GREASE WASTE PIPING W/HEAT TRACE
	CIRCUIT SETTER
	2-WAY ELECTRONIC CONTROL VALVE
	3-WAY ELECTRONIC CONTROL VALVE
	2-WAY PNEUMATIC CONTROL VALVE
	3-WAY PNEUMATIC CONTROL VALVE
S	SOLENOID VALVE
	BUTTERFLY VALVE
	PLUG VALVE
	GAS COCK
	BALL VALVE
	CHECK VALVE
	GATE VALVE
	HOSE END DRAIN VALVE
	PRESSURE REDUCING VALVE
	RELIEF VALVE
	TEMPERATURE PRESSURE RELIEF VALVE
	THERMOMETER
	PRESSURE GAUGE WITH GAUGE COCK
	MANUAL AIR VENT
	PRESSURE TEMPERATURE PORT
	Y-STRAINER WITH BLOWDOWN
	PIPE GUIDE
	UNION
	PIPE ANCHOR
	FLEXIBLE CONNECTOR
	PIPE CAP/STUB-OUT
	DIRECTION OF FLOW
	PIPE DOWN
	PIPE UP
	PIPE TEE UP
	PIPE TEE DOWN

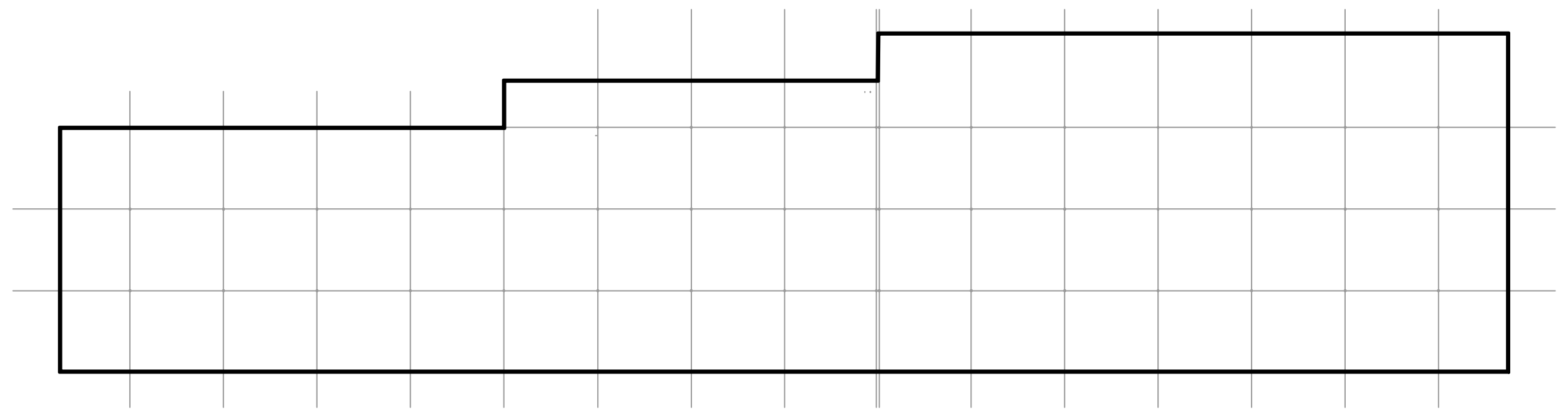
MECHANICAL/PLUMBING ABBREVIATIONS

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL ABBREVIATIONS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

AABC	AMERICAN AIR BALANCE COUNCIL
ACD	AUTOMATIC CONTROL DAMPER
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
AV	ACID VENT
AW	ACID WASTE
BFD	BACKFLOW PREVENTION DEVICE
BHP	BRAKE HORSE POWER
BTUH	BRITISH THERMAL UNIT PER HOUR
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
CHAR	CHARACTERISTICS
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CO	CLEANOUT
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
CW	COLD WATER
D	DRAIN
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DIA	DIAMETER
DN	DOWN
DX	DIRECT EXPANSION
(E)	EXISTING TO REMAIN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EER	ENERGY EFFICIENCY RATIO
EFF	EFFICIENCY
ELEC	ELECTRICAL
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
°F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FSD	FIRE/SMOKE DAMPER
G	GAS
GA	GAGE OR GAUGE
GAL	GALLONS
GCO	GRADE CLEANOUT
GI	GREASE INTERCEPTOR
GPF	GALLONS PER FLUSH
GPM	GALLONS PER MINUTE
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
GW	GREASE WASTE
HD	HEAD
HP	HORSEPOWER
HPG	HIGH PRESSURE GAS
HR	HOUR
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
HW	HOT WATER
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
IBC	INTERNATIONAL BUILDING CODE
IE	INVERT ELEVATION
IMC	INTERNATIONAL MECHANICAL CODE
IPC	INTERNATIONAL PLUMBING CODE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	ONE THOUSAND BTUH
MCA	MINIMUM CIRCUIT AMPS
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MPG	MEDIUM PRESSURE GAS
MVD	MANUAL VOLUME DAMPER
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
NEC	NATIONAL ELECTRIC CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OED	OPEN END DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
PD	PRESSURE DROP
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
(R)	EXISTING TO BE RELOCATED
RA	RETURN AIR
RH	RELATIVE HUMIDITY
RL/S	REFRIGERANT LIQUID/SUCTION
RPM	REVOLUTIONS PER MINUTE
RPPA	REDUCED PRESSURE PRINCIPAL ASSEMBLY
RVD	REMOTE VOLUME DAMPER
SA	SUPPLY AIR
SD	SMOKE DAMPER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SOI	SAND OIL INTERCEPTOR
"SP	STATIC PRESSURE (INCHES OF)
SPECS	SPECIFICATIONS
SQ	SQUARE
SQFT	SQUARE FEET
SS	STAINLESS STEEL
T	TEMPERATURE
TAB	TEST AND BALANCE WORK AND REPORT
TSP	TOTAL STATIC PRESSURE
TW	TEMPERED WATER
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UMC	UNIFORM MECHANICAL CODE
UON	UNLESS OTHERWISE NOTED
UPC	UNIFORM PLUMBING CODE
V	VENT
V/PH/HZ	VOLTAGE/PHASE/HERTZ
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
WB	WET BULB TEMPERATURE
WCO	WALL CLEANOUT
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
(X)	EXISTING TO BE REMOVED

DRAWING INDEX

SHEET NUMBER	SHEET TITLE	PERMIT ISSUE DATE: 08.22.2012	1 OWNER'S REVISION 09.17.2013	* **	* **	* **
MP0.0	MECHANICAL PLUMBING SYMBOL LIST AND ABBREVIATIONS	●	●			
MP0.1	MECHANICAL IECC COMPLIANCE REPORT	●				
MP0.2	MECHANICAL DETAILS AND SCHEDULES	●				
MP0.3	GAS ISOMETRIC	●	●			
MD5.0	MECHANICAL DEMOLITION ROOF PLAN	●				
MD5.1	MECHANICAL DEMOLITION ROOF PLAN	●				
M5.0	MECHANICAL PLAN	●				
M5.1	MECHANICAL PLAN	●				
P5.0	PLUMBING PLAN	●	●			
P5.1	PLUMBING PLAN	●	●			
	TOTAL	10	4			



A
MP0.0
MECHANICAL OVERVIEW PLAN
1/64" = 1'-0"

NORTH

REVISIONS	BY
1 OWNER'S REVISION 09.17.2013	MSA

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PROJECT:
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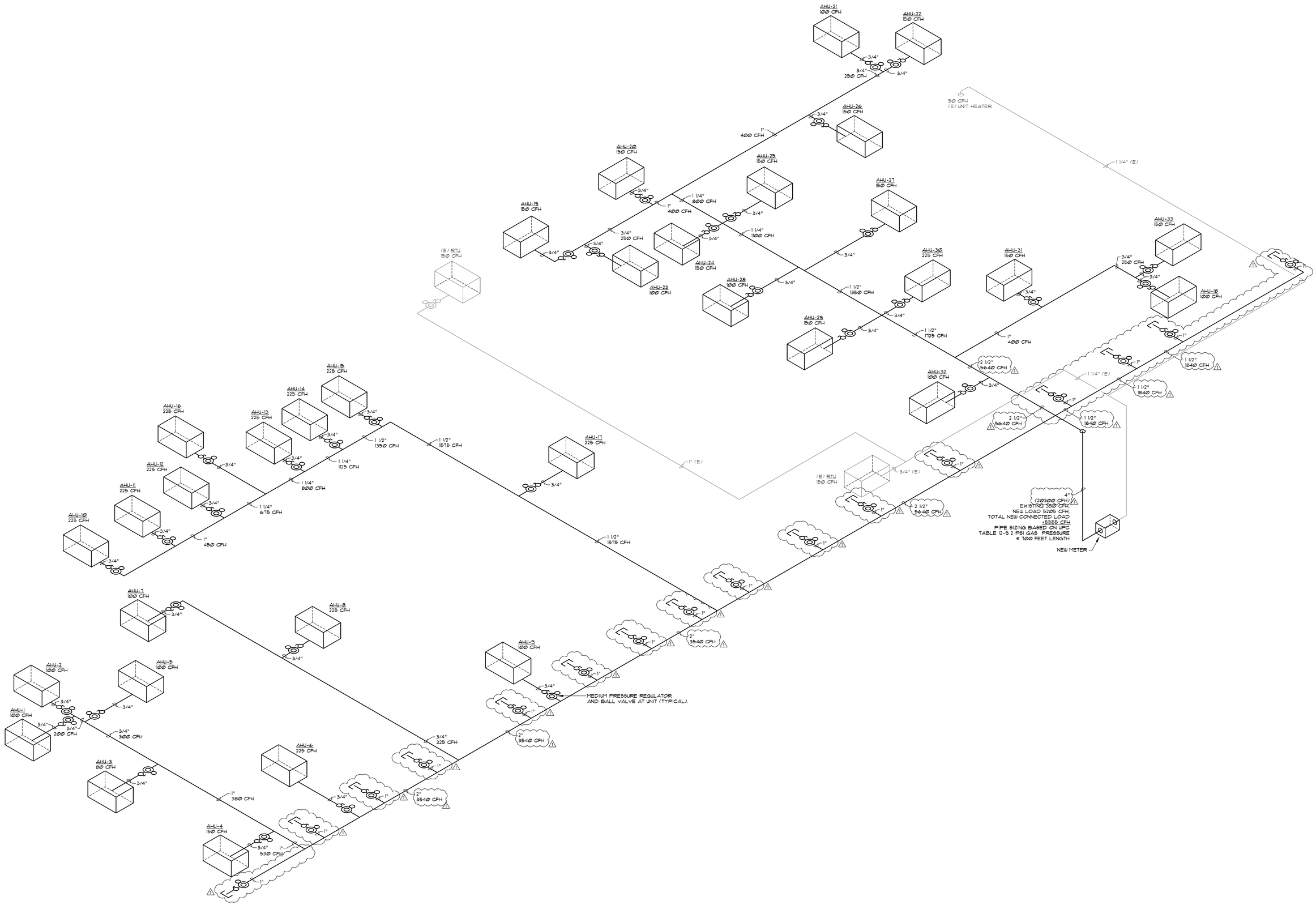
TULSA, OKLAHOMA

SHEET TITLE:
MECHANICAL PLUMBING
SYMBOL LIST AND
ABBREVIATIONS

DRAWN
MSA
CHECKED
PE
DATE
08.22.2012
SCALE
AS NOTED
JOB NO.
L12221
SHEET
MP0.0



A
MP0.3
GAS ISOMETRIC
NTS

NORTH

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SHEET TITLE:
GAS ISOMETRIC

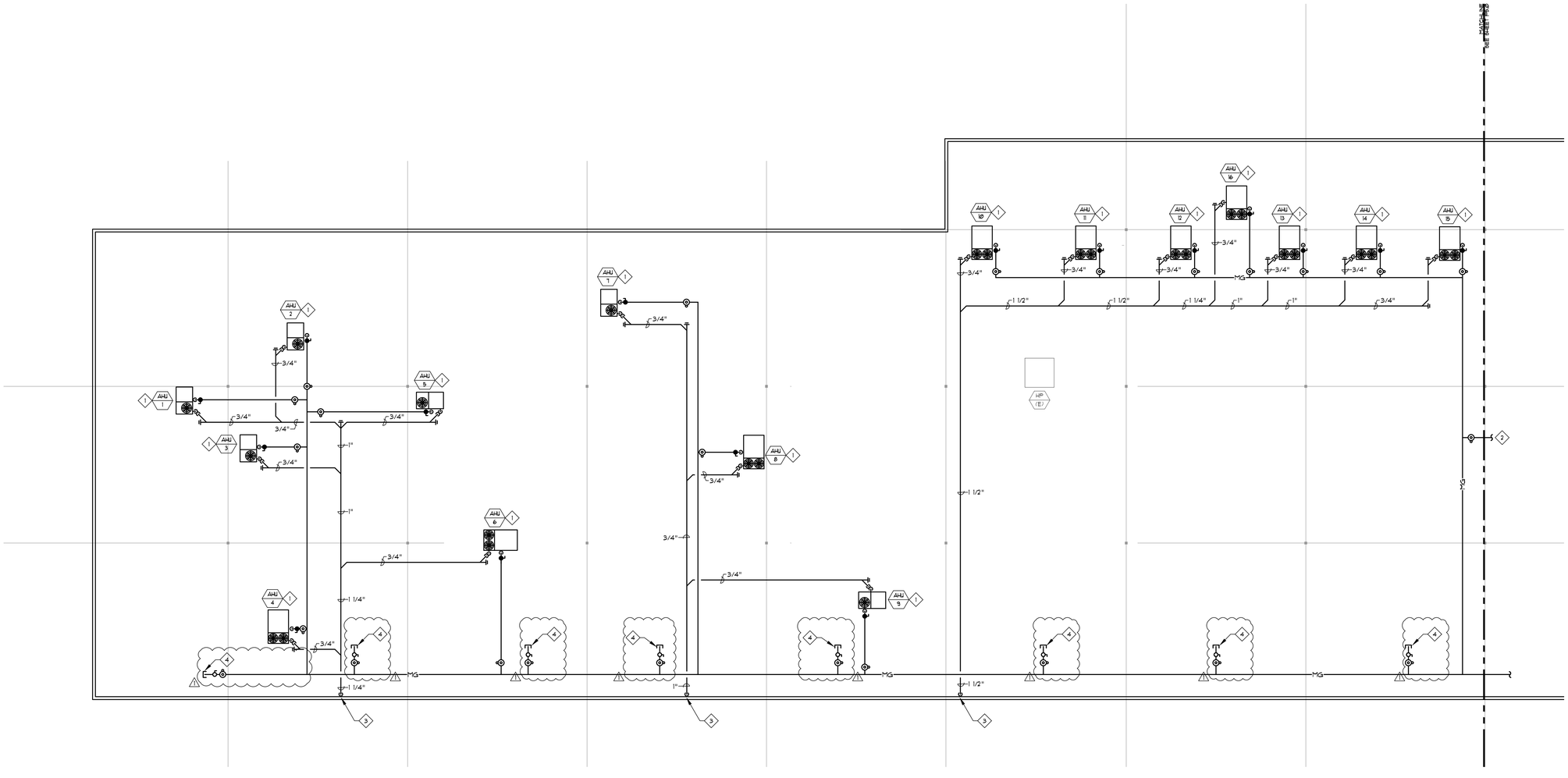
DRAWN	MSA
CHECKED	PE
DATE	08.22.2012
SCALE	AS NOTED
JOB NO.	L12221
SHEET	MP0.3

GENERAL NOTES:

1. THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL PLUMBING ROUGH-IN LOCATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FIXTURES AND EQUIPMENT LOCATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
4. ALL SANITARY DRAINAGE PIPING SHALL BE SLOPED AT 1/4" PER FOOT.
5. PLUMBING CONTRACTOR SHALL COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES PRIOR TO COMMENCING WORK.
6. REFER TO THE PLUMBING DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.
7. CONTRACTOR TO PROVIDE BLOCKS FOR GAS PIPING AND CONDENSATE PIPING AS REQUIRED. NO WOOD BLOCKS

SHEET NOTES:

1. RUN 3/4" CONDENSATE LINE TO NEAREST RD/ORD. FIELD VERIFY EXACT LOCATION, COORDINATE ROUTING WITH ALL OTHER TRADES AND EXISTING CONDITIONS.
2. REFER TO SHEET A/P5.0 FOR CONTINUATION.
3. ROUTE CONDENSATE DRAIN TO ROOF DRAINS.
4. 1" STUB FOR FUTURE. (160 CFH)



A P5.0 PLUMBING PLAN
3/32" = 1'-0"

NORTH

REVISIONS	BY
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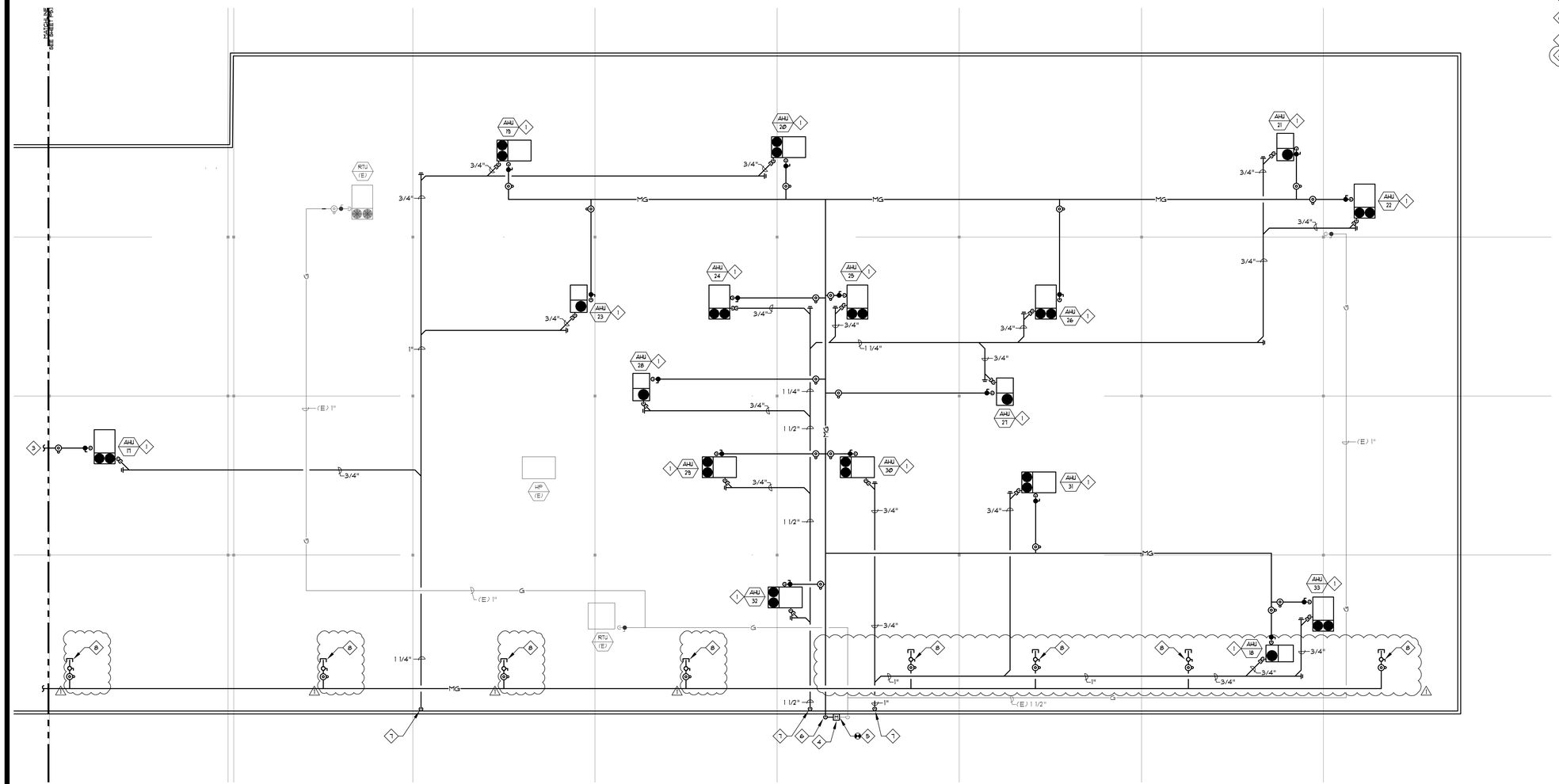
SHEET TITLE:
PLUMBING PLAN

DRAWN	MSA
CHECKED	PE
DATE	08.22.2012
SCALE	AS NOTED
JOB NO.	L12221
SHEET	P5.0



GENERAL NOTES:

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5. PLUMBING CONTRACTOR SHALL COORDINATE ROUTING OF PIPING WITH ALL OTHER TRADES PRIOR TO COMMENCING WORK.
6. REFER TO THE PLUMBING DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.
7. CONTRACTOR TO PROVIDE BLOCKS FOR GAS PIPING AND CONDENSATE PIPING AS REQUIRED. NO WOOD BLOCKS.

SHEET NOTES:

1. RUN 3/4" CONDENSATE LINE TO NEAREST RD/ORD. FIELD VERIFY EXACT LOCATION, COORDINATE ROUTING WITH ALL OTHER TRADES AND EXISTING CONDITIONS.
2. CONNECT NEW 1/2" MEDIUM PRESSURE GAS LINE TO EXISTING LINE. FIELD VERIFY EXACT LOCATION AND SIZE.
3. REFER TO SHEET A/P5.0 FOR CONTINUATION.
4. NEW GAS METER LOCATION. COORDINATE EXACT LOCATION WITH OWNER AND ARCHITECT. GAS METER TO BE INSTALLED PRIOR TO DISCONNECTION AND DEMO OF EXISTING GAS METER.
5. CONNECT NEW 2 1/2" GAS LINE AND EXISTING GAS LINE TO NEW METER. COORDINATE EXACT LOCATION WITH OWNER AND ARCHITECT.
6. RUN NEW 2 1/2" GAS LINE UP TO ROOF. COORDINATE ROUTING WITH EXISTING CONDITIONS.REFER TO SHEET A/P5.0 FOR CONTINUATION.
7. ROUTE CONDENSATE DRAIN TO ROOF DRAINS.
8. 1" STUB FOR FUTURE. (160 CFH)

A P5.1 PLUMBING PLAN
3/32" = 1'-0"

NORTH

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PROJECT:
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TULSA, OKLAHOMA

SHEET TITLE:
PLUMBING PLAN

DRAWN	MSA
CHECKED	PE
DATE	08.22.2012
SCALE	AS NOTED
JOB NO.	L12221
SHEET	P5.1