

GENERAL ABBREVIATIONS

Table of general abbreviations including AT (ADD), APVD (APPROVED), BC (BOLT CIRCLE), BLDG (BUILDING), BTWLD (BUTT WELD), CB (CATCH BASIN), CLG (COOLING), DET (DETAIL), DS (DOWNSPOUT), DWG (DRAWING), ECC (ECCENTRIC), ENGR (ENGINEER), EXP (EXPANSION), EXPJT (EXPANSION JOINT), EXST (EXISTING), FD (FLOOR DRAIN), FDN (FOUNDATION), FEC (FIRE EXTINGUISHER CABINET), FEV/FEXT (FIRE EXTINGUISHER), FHC (FIRE HOSE CABINET), FHR (FIRE HOSE RACK), FL (FLOOR), FLEX (FLEXIBLE), FLX (FLEXIBLE CONNECTION), FP (FIRE PROTECTION), FPT (FEMALE PIPE THREAD), FUT (FUTURE), FW (FIELD WELD), GRL (GRILLE), GRIG (GRATING), HD & V (HEADER DRAINS & VENTS), HDR (HEADER), HTG (HEATING), HYDR (HYDRAULIC), I & C (INSTRUMENTATION AND CONTROL), INJ (INJECTION), INSUL (INSULATION), ISO (ISOMETRIC), JC (JANITOR'S CLOSET), JS (JANITOR'S SINK), LATL (LATERAL), LAV (LAVATORY), MECH (MECHANICAL), MFR (MANUFACTURER), MISC (MISCELLANEOUS), MOD (MODIFICATION), MS (MOP SINK), MTD (MOUNTED), NC (NORMALLY CLOSED), NIC (NOT IN CONTRACT), NO (NORMALLY OPEN), NOZ (NOZZLE), OED (OPEN-END DUCT), OPNG (OPENING), OS&Y (OUTSIDE SCREW AND YOKE), P & ID (PIPING & INSTRUMENTATION DIAGRAM), PLMB (PLUMBING), PNEU (PNEUMATIC), PRELIM (PRELIMINARY), RECIP (RECIPROCATING), RECIRC (RECIRCULATING), REINF (REINFORCING), RESTR (RESTRAINT), REV (REVISION), SCHED (SCHEDULE), SH (SHOWER), SHRD (SHOWER DRAIN), SIM (SIMILAR), SNBR (SNUBBER), SPEC (SPECIFICATION), SS (SERVICE SINK), ST (STORAGE TANK), STD (STANDARD), STR (STRAINER), SUCT (SUCTION), SWLD (SOCKET WELD), SYMM (SYMMETRICAL), T (TANK), TBM (TEMPORARY BENCHMARK), TD (TRENCH DRAIN), TURB (TURBINE), TYP (TURBINE), UC (UNDERCUT), UON (UNLESS OTHERWISE NOTED), UR (URINAL), US (UTILITY SINK), VTD (VENTED), WP (WORKING POINT), W/O (WITHOUT).

EQUIPMENT ABBREVIATIONS

Table of equipment abbreviations including AB (AREATION BASIN), AC (AIR COMPRESSOR), AD (ACCESS DOOR), AF (AIR FILTER), AHU (AIR HANDLING UNIT), AR (AIR RELEASE), AVS (AUTOMATIC VALVE STATION), A/C (AIR CONDITIONING UNIT), B (BLOWER), BA (SODA ASH BIN ACTIVATOR), BC (BRIDGE CRANE), BDD (BACKDRAFT DAMPER), BDP (BASIN DRAIN PUMP), BG (SODA ASH BIN GATE), BLR (BOILER), BNR (BURNER), C (CENTRIFUGE), CBD (CENTRIFUGE BACKDRIVE), CC (COOLING COIL), CD (CLARIFIER DRIVE UNIT), CDU (CONDENSING UNIT), CG (CANAL GATE), CFP (CENTRIFUGE FEED PUMP), CH (CEILING HEATER), CL (CHLORINATOR), COIL (COIL), CP (CONTROL PANEL), CP (COMPRESSOR), CPRSR (CONDENSER RECIRCULATING PUMP), CRP (CAKE TANK), CT (CHILLED WATER PUMP), DAP (DEFOAMING AGENT PUMP), DEAR (DEAERATOR), DF (DRINKING FOUNTAIN), DM (DAMPER MOTOR), DMPR (DAMPER), DOS (DISSOLVED OXYGEN SENSOR), DX (DIRECT EXPANSION COIL), EC (EVAPORATIVE COOLER), EF (EXHAUST FAN), ENG (ENGINE), EOD (ELECTRICALLY OPERATED DAMPER), EQPT (EQUIPMENT), ERV (EXHAUST ROOF VENTILATOR), ESEW (EMERGENCY SHOWER & EYE WASH), ET (EXPANSION TANK), EVAP (EVAPORATOR), EW (EYE WASH), FDM (FIRE DAMPER), FDP (FLOOR DRAIN PUMP), FHY (FIRE HYDRANT), FIH (FILTERED INTAKE HOOD), FLT (FILTER), GEN (GENERATOR), GR (SLUDGE GRINDER), H (HOIST), HB (HOSE BIB), HC (HEATING COIL), HEX (HEAT EXCHANGER), HRLP (HEAT LOOP RECIRCULATING PUMP), HVAC (HEATING, VENTILATING & AIR CONDITIONING), HYD (HYDRANT), INCIN (INCINERATOR), L (LOUVER), LD (COMBINATION LOUVER-DAMPER), M (MOTOR OR MIXER), MAR (MANUAL AIR RELEASE), MCC (MOTOR CONTROL CENTER), MH (MANHOLE), MP (METERING PUMP), MS (MOTOR STARTER), MXR (MIXER), NIP (NITRIFICATION INFLUENT PUMP), OCF (ODOR CONTROL FAN), OCU (ODOR CONTROL UNIT), P (PUMP), PB OR PSB (PRIMARY SEDIMENTATION BASIN), PF (POLYMER FEEDER), PRS (PRESSURE REDUCING STATION), PRV (PRESSURE-REDUCING VALVE), PS (PUMPING STATION), PSG (PRIMARY SLUDGE GRINDER), PSP (PRIMARY SLUDGE PUMP), PT (PRESSURE TRANSMITTER), PWC (PACKAGED WATER CHILLER), RASP (RETURN ACTIVATED SLUDGE PUMP), RG (RETURN GRILLE), RH (RELIEF HOOD (EXHAUST)), RMF (RAPID MIX - FLOCCULATION), RSPD (ROTATING SCUM PIPE DRIVE), RTAC (ROOF TOP AIR CONDITIONER), RTU (REMOTE TERMINAL UNIT), RV (RELIEF VALVE), S (SULFONATOR / SINK).

LOCATION ABBREVIATIONS

Table of location abbreviations including AFF (ABOVE FINISHED FLOOR), AMB (AMBIENT), APPROX (APPROXIMATE), BOD (BOTTOM OF DUCT), BOG (BOTTOM OF GRILLE), BOT (BOTTOM), BOU (BOTTOM OF UNIT), C TO C (CENTER TO CENTER), DIM (DIMENSION), DN (DOWN), EDP (ELEVATION), F TO F (FACE TO FACE), FOB (FLAT ON BOTTOM), FOT (FLAT ON TOP), F/F (FACE OF FLANGE), HGT (HEIGHT), HORIZ (HORIZONTAL), ID (INSIDE DIAMETER), I&VT (INVERT), IR (INSIDE RADIUS), N (NORTH), OC (ON CENTER), OD (OUTSIDE DIAMETER), PT (POINT), RAD (RADIUS), RF (RAISED FACE), SECT (SECTION), T & B (TOP AND BOTTOM), TOB (TOP OF BEAM), TOC (TOP OF CONCRETE), TOS (TOP OF SLAB OR TOP OF STEEL).

PIPING MATERIALS AND COMPONENTS

Table of piping materials and components including VERT (VERTICAL), WL (WATER LEVEL), WS (WATER SURFACE), ABS (ACRYLONITRILE BUTADIENE STYRENE PIPE), ACP (ASBESTOS CEMENT PIPE), AV (AIR VALVE), AVTR (ACID VENT THRU ROOF), BCCMP (BITUMINOUS-COATED CORRUGATED PIPE), BF (BLIND FLANGE), BFD (BUTTERFLY DAMPER), BFV (BUTTERFLY VALVE), BSP (BLACK STEEL PIPE), BU (BELL UP), BV (BALL VALVE), CCP (CONCRETE CYLINDER PIPE), CI (CAST IRON), CIMJ (CAST IRON MECHANICAL JOINT), CIP (CAST IRON PIPE), CISP (CAST IRON SOIL PIPE), CMP (CORRUGATED METAL PIPE), CO (CLEANOUT), CON (CONNECTION), CONC (CONCRETE), CPLG (COUPLING), CS (CARBON STEEL), CU (COPPER), CV (CHECK VALVE), D OR DR (DRAIN), DIP (DUCTILE IRON PIPE), DMJ (DOUBLE MECHANICAL JOINT), ECC (ELECTRICAL CONDUIT), ED (ECCENTRIC), ED (EQUIPMENT DRAIN), ELB (ELBOW), FA (FOUL AIR), FAD (FOUL AIR DIFFUSER), FC (FLUSHING CONNECTION), FCA (FLANGED COUPLING ADAPTER), FCV (FLOW CONTROL VALVE), FD (FLOOR DRAIN), FDC (FLEXIBLE DUCT CONNECTION), FLG (FLANGE), FCA (FLANGED COUPLING ADAPTOR), FE (FLOW ELEMENT), FM (FLOW METER), FOD (FOUNDATION DRAIN), FRP (FIBERGLASS REINFORCED PLASTIC), FS (FLOOR SINK), GALV (GALVANIZED IRON), GALVI (GALVANIZED STEEL), GIP (GREY IRON PIPE), GSP (GALVANIZED STEEL PIPE), GV (GATE VALVE), HB (HOSE BIB), HDPE (HIGH DENSITY POLYETHYLENE), HMC (HARNESSED MECHANICAL COUPLING), HV (HOSE VALVE), KGV (KNIFE GATE VALVE), LCV (LEVEL CONTROL VALVE), LE (LEVEL SENSOR), MC (MECHANICAL COUPLING), MDMJ (MODIFIED DOUBLE MECHANICAL COUPLING), MOV (MOTOR OPERATED VALVE), NPT (NATIONAL PIPE THREAD), NRS (NON-RISING STEM), PB (POLYBUTYLENE PIPE), PE (PLAIN END PIPE), PP (POLYPROPYLENE PIPE), PRS (PRESSURE REDUCING STATION), PRV (PRESSURE RELIEF VALVE), PS (PIPE SUPPORT), PSL (PIPE SLEEVE), PV (PLUG VALVE), RASV (RETURN ACTIVATED SLUDGE VALVE), PVC (POLYVINYL CHLORIDE), RCCP (REINFORCED CONCRETE CULVERT PIPE), RCP (REINFORCED CONCRETE PIPE), RD (ROOF DRAIN), RED (REDUCER), RTRP (REINFORCED THERMOSETTING RESIN PIPE), SS OR SST (STAINLESS STEEL), STL (STEEL), SV (SOLENOID VALVE), TS (TUBULAR STEEL), UHMW (ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE), V (VENT), VC (VICTAULIC COUPLING), VCP (VITRIFIED CLAY PIPE), VTR (VENT THRU ROOF), WSP (WELDED STEEL PIPE).

PIPING & DUCT FLUIDS

Table of piping and duct fluids including A (AIR), AB (ABANDONED), ABE (AERATION BASIN EFFLUENT), AS (AUXILIARY STEAM), AW (ACID WASTE), AWB (ADVANCED WASTE TREATMENT BYPASS), BD (BASIN DRAIN), CA (COMPRESSED AIR), CCE (CONTACT CLARIFIER EFFLUENT), CCI (CONTACT CLARIFIER INFLUENT), CD (CHLORINE OR CONDENSATE DRAIN), CDG (COMPRESSED DIGESTER GAS), CDR (CONDENSER WATER RETURN), CDS (CONDENSER WATER SUPPLY), CEN (CENTRATE), CHEM FD (CHEMICAL FEED), CS (CHLORINE SOLUTION), CW (COLD WATER), CWS (CHILLED WATER SUPPLY), CWR (CHILLED WATER RETURN), D (DRAIN (DRAINAGE)), DEW (DEWATERING DISCHARGE), DF (DIESEL FUEL), DI (DISTILLED WATER), DO (DIESEL OIL), DS (DIGESTED SLUDGE), DSL (DIESEL), DSW (DOMESTIC COLD WATER, SOFTENED), DW (DILUTION WATER OR DEMINERALIZED WATER), E (ELECTRICAL CONDUIT), EFF (EFFLUENT), EA (EXHAUST AIR), EPD (EMERGENCY PUMPED DISCHARGE), EXH (EXHAUST), FECL (FERRIC CHLORIDE), FEF (FILTER EFFLUENT), FI (FILTER INFLUENT), FO (FUEL OIL), FOR (FUEL OIL RETURN), FOS (FUEL OIL SUPPLY), FW (FIRE WATER), G (GAS), GT (GRIT), GW (GREY WATER), HPA (HIGH PRESSURE AIR), HPW (HIGH PURITY WATER), HRR (HEAT RESERVOIR RETURN), HRS (HEAT RESERVOIR SUPPLY), HW (HOT WATER), HYDFLD (HYDRAULIC FLUID), IA (INSTRUMENT AIR), IGNTO (IGNITION OIL), INF (PLANT INFLUENT WASTEWATER), IQ (INCINERATOR QUENCH), IW (IN-PLANT WASTE RECYCLE), LO (LUBRICATING OIL), LPA (LOW PRESSURE AIR), LS (LIME SLURRY), MA (MIXED AIR), NG (NATURAL GAS), NPW (NONPOTABLE WATER), OA (OUTSIDE AIR), OF (OVERFLOW), PLM (POLYMER), PR SC (PRIMARY SCUM), PS (PRIMARY SLUDGE), PSS (SUMP PUMP), PW (POTABLE WATER), RA (RETURN AIR), RAS (RETURN ACTIVATED SLUDGE), REC (RECIRCULATE OR RECLAMATION), RL (REFRIGERANT LIQUID), RS (REFRIGERANT SUCTION (GAS)), RW (RAW WATER), SA (SODA ASH), SA (SUPPLY AIR (HVAC)), SAM (SAMPLE OR SAMPLING LINE), SCUM (SCUM), SD (STORM DRAIN).

Table of secondary fluids including SEC SC (SECONDARY SCUM), SEC SL (SECONDARY SLUDGE), SEP (SEPTAGE), SEW (SEAL WATER & SEAL WATER DRAIN), SFTW (SOFT WATER), SG (SEWAGE GAS), SL (SLUDGE), SNL (SNAIL LINE), SS (SANITARY SEWER), SS FM (SANITARY SEWER FORCE MAIN), STM (STORM WATER), SUPER (SUPERNATANT), SW (SERVICE WATER), SWS (SURFACE WATER SUPPLY), TS (THICKENED SLUDGE), TWAS (THICKENED WAS), VAC (VACUUM), WAS (WASTE ACTIVATED SLUDGE), WO (WASTE OIL), WS (WATER SOFTENER), WST (WASTE), WW (WELL WATER).

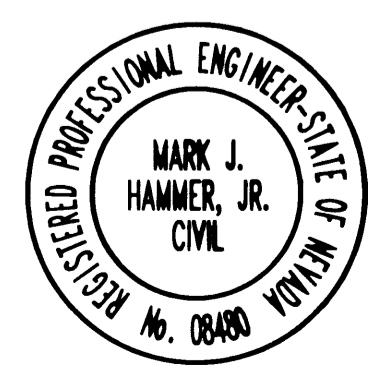
MEASURE/MEASUREMENT ABBREVIATIONS

Table of measure/measurement abbreviations including ATM (ATMOSPHERE), BTU (BRITISH THERMAL UNITS), BTUH (BRITISH THERMAL UNITS PER HOUR), C (CELSIUS), CF (CUBIC FEET), CFM (CUBIC FEET PER MINUTE), CFS (CUBIC FEET PER SECOND), CU YD (CUBIC YARD), CY (CUBIC YARD), D (DAY), D (DEPTH), DIA (DIAMETER), DISCH (DISCHARGE), DO (DISSOLVED OXYGEN/EQUIPMENT EACH), E (EACH), FPM (FEET PER MINUTE), FPS (FEET PER SECOND), FT (FEET/FOOT), G (GAUGE), GAL (GALLON), GAL/SF (GALLONS PER SQUARE FOOT), GPD (GALLONS PER DAY), GPH (GALLONS PER HOUR), GPM (GALLONS PER MINUTE), GPS (GALLONS PER SECOND), H OR HGT (HEIGHT), HP (HORSEPOWER), IPS (INCHES PER SECOND), KW (KILOWATT), KWH (KILOWATT-HOUR), MAX (MAXIMUM), MIN (MINIMUM), MW (MEGAWATT), NO (NUMBER), NTS (NOT TO SCALE), PRESS (PRESSURE), PSF (POUNDS PER SQUARE FOOT), PSI (POUNDS PER SQUARE INCH), PSIG (POUNDS PER SQUARE INCH GAGE), RPM (REVOLUTIONS PER MINUTE), SQ (SQUARE), TDH (TOTAL DYNAMIC HEAD), TEMP (TEMPERATURE), W (WIDTH).



HDR Engineering, Inc.

Revision table with columns for Issue No., Description, Date, and initials (JJD, JMC, DAP, DJG, DBC, RGS, MJH, DAP).



Project information table including Project Manager (DAVE A. PIVETTI), Architect (R. STRATTON), Electrical (K. GARDNER), and Mechanical (M. HAMMER).

City of Los Angeles logo and project details: Water Pollution Control Facility, Contract 17A, NITRIFICATION FACILITY EXPANSION.

MECHANICAL & PROCESS ABBREVIATIONS title block with Date (OCTOBER 2000), Project No. (00120-123-141), Drawing No. (M-100), and Issue (33 of 33).

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GENERAL ABBREVIATIONS

EQUIPMENT ABBREVIATIONS

PIPING MATERIALS AND COMPONENTS

PIPING & DUCT FLUIDS

ABBREVIATIONS FOR GENERAL USE
 A - ABOVE
 B - BELOW
 C - CENTER
 D - DIRECTION
 E - EAST
 F - FLOOR
 G - GROUND
 H - HORIZONTAL
 I - INSIDE
 J - JOINT
 K - KEY
 L - LEG
 M - MAIN
 N - NORTH
 O - OFF
 P - PRESSURE
 Q - QUANTITY
 R - RADIUS
 S - SOUTH
 T - TOP
 U - UNDER
 V - VERTICAL
 W - WEST
 X - EXTENSION
 Y - YARD
 Z - ZONE

EQUIPMENT ABBREVIATIONS
 A - AIR
 B - BURNER
 C - COMPRESSOR
 D - DUCT
 E - EXHAUST
 F - FAN
 G - GENERATOR
 H - HEATER
 I - INSULATOR
 J - JOINT
 K - KEY
 L - LEG
 M - MAIN
 N - NORTH
 O - OFF
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PIPING MATERIALS AND COMPONENTS
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MEASUREMENT ABBREVIATIONS
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MECHANICAL & PROCESS ABBREVIATIONS
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HR



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