

ABBREVIATIONS

A/E ARCHITECT / ENGINEER	FHX FLUE GAS/FEEDWATER HEAT	OAC OUTSIDE AIR
AAHX AIR TO AIR HEAT EXCHANGER	FM FLOW METER	OAG OUTSIDE AIR GRILLE
AB AIR BLENDER	FOP FUEL OIL PUMP	OAI OUTSIDE AIR INTAKE
AAV AUTOMATIC AIR VENT	FOT FUEL OIL TANK	OAI OUTSIDE AIR INTAKE
ACC AIR COOLED CONDENSER	FOH FUEL OIL HEAT EXCHANGER	OAI OUTSIDE AIR INTAKE
ACCH AIR COOLED CHILLER	FPM FEET PER MINUTE	OFM OIL FLOW METER
ACCU AIR-COOLED CONDENSING UNIT	FPS FEET PER SECOND	OR OPERATING ROOM
ACU AIR CONDITIONING UNIT	FRT FAN FLOW REGISTER	
ACD AUTOMATIC CONTROL DAMPER/MODULATING	FRP FIBER REINFORCED POLYESTER	
ACU AUTOMATIC CONTROL DAMPER/TWO POSITION	FS FLOOR SWITCH	
AD ACCESS DOOR	FT FEET	
AMP AMPERAGE	FT-LB FOOT-POUND	
AP ACCESS PANEL	FT-R FIN TUBE RADIATION	
APV AIR FLOW CONTROL VALVE	FTV FACE VELOCITY	
AFV ABOVE FINISHED FLOOR	GA GAUGE	
AFM AIR FLOW MEASURING DEVICE	GAL GALLONS	
AFW AIR FOIL WHEEL (FAN)	GH GRAVITY HOOD	
AHU AIR-HANDLING UNIT	GPD GALLONS PER DAY	
AMP AMPERAGE	GPH GALLONS PER HOUR	
AP ACCESS PANEL	GPM GALLONS PER MINUTE	
APD AIR PRESSURE DROP	GPR GAS PRESSURE REGULATOR	
ARI REFRIGERATION AND REFRIGERATION INSTITUTE	GSR GALVANIZED STEEL	
ASME AMERICAN SOCIETY OF MECHANICAL ENGINEERS	H HUMIDIFIER	
AW AIR WASHER	H&C HOT & COLD WATER	
AXF AXIAL FLOW	HAC HOUSEKEEPING AID CLOSET	
B BOILER	HAC HOSE BIBB	
B BUTTERFLY DAMPER	HC HEATING COIL	
BDD BACKDRAFT DAMPER	HD HEAD	
BDR BASE BOARD RADIATOR	HOA HAND/OFF/AUTOMATIC	
BFP BACKFLOW PREVENTER	HP HEAT PUMP	
BFT BOILER PLANT FIRE TUBE	HP HORSEPOWER	
BG BOTTOM GRILLE	HPDT HIGH PRESSURE DRIP TRAP	
BHP BRAKE HORSEPOWER	HPR HIGH PRESSURE RETURN	
BHW HOT WATER HEATING BOILER	HPS HIGH PRESSURE SUPPLY	
BHX BOILER BLOWDOWN HEAT EXCHANGER	HRC HEAT RECOVERY COIL	
BIW BACKWARD INCLINED WHEEL (FAN)	HRC HEAT RECOVERY COIL	
BMT BONE MARROW TRANSPLANT	HRT HYDRONIC RADIANT (CEILING) PANEL	
BR BOTTOM REGISTER	HRT HEAT RECOVERY WHEEL	
BSC BIOLOGICAL SAFETY CABINETS	HSTAT HUMIDISTAT	
BTD BLOWOFF TANK CONTROL VALVE	HTM HUMIDIFIER TERMINAL	
BTU BRITISH THERMAL UNIT PER HOUR	HUM HUMIDIFIER UNIT MOUNTED	
BWT BOILER PLANT WATER TUBE	HVU HEATING AND VENTILATING UNIT	
	HU HOT WATER	
	HWC HOT WATER COIL	
	WHWC HOT WATER HEATING COIL	
	HWP HEATING HOT WATER PUMP	
	HWR HEATING HOT WATER RETURN	
	HWS HEATING HOT WATER SUPPLY	
	HWHU HOT WATER UNIT HEATER	
	HVD HOISTWAY VENT DAMPER	
	HX HEAT EXCHANGER	
	HZ HERTZ	
	I/O INPUT/OUTPUT	
	IAQ INDOOR AIR QUALITY	
	IBT INVERTED BUCKET TRAP	
	ICU INTENSIVE CARE UNIT	
	ID INSIDE DIAMETER	
	IFB INTEGRATED FACE AND BYPASS	
	IN INCHES	
	IN HG INCHES OF MERCURY	
	IN WC INCH WATER COLUMN	
	IN WC INCH WATER GAUGE	
	IN-LB INCH-POUND	
	IPV INTEGRATED PART LOAD VALUE	
	IRH INFRARED HEATER	
	IS INSECT SCREEN	
	IU INDUCTION UNIT	
	IV INLET VANES	
	J INTENTIONALLY LEFT BLANK	
	Kg KILOGRAM	
	kg/hr KILOGRAM PER HOUR	
	kPa KILOPASCAL	
	kW KILOWATT	
	kWh KILOWATT HOUR	
	L LITER	
	L/h LITERS PER HOUR (OR LITERS/HOUR)	
	L/m LITERS PER MINUTE (OR LITERS/MINUTE)	
	L/s LITERS PER SECOND (OR LITERS/SECOND)	
	LAT LEAVING AIR TEMPERATURE	
	LBS/HR POUNDS PER HOUR	
	LF LINEAR FOOT (FEET)	
	LGT LEAVING GYCOL TEMPERATURE	
	LH LATENT HEAT	
	LPG LIQUID PROPANE GAS	
	LPR LOW PRESSURE RETURN (STEAM CONDENSATE)	
	LPRL LOW PRESSURE STEAM RETURN (CLEAN)	
	LLHX LIQUID TO LIQUID HEAT EXCHANGER	
	LPS LOW PRESSURE STEAM	
	LPSC LOW PRESSURE STEAM (CLEAN)	
	LSD LINEAR SLOT DIFFUSER	
	LTPC LOCAL TEMPERATURE CONTROL PANEL	
	LTV LEAVING	
	LVR LOUVER	
	LWT LEAVING WATER TEMPERATURE	
	M METER, SI UNIT	
	M METER, SI UNIT	
	M/s METERS PER SECOND	
	M/a (OR METERS/SECOND)	
	MA MIXED AIR	
	MAT MIXED AIR TEMPERATURE	
	MAU MAKE-UP AIR UNIT	
	MAV MANUAL AIR VENT	
	MAX MAXIMUM	
	MB MIXING BOX	
	MBH 1000 BTU/H	
	MCA MINIMUM BRANCH CIRCUIT AMPACITY	
	MD MOTORIZED DAMPER	
	ME MECHANICAL EQUIPMENT ROOM	
	MERV MINIMUM EFFICIENCY REPORTING VALUE	
	MANKHOLE FAN	
	MHP MOTOR HORSEPOWER	
	MIN MINIMUM	
	MM MILLIMETER	
	MOV MOTOR OPERATED VALVE	
	MPS MEDIUM PRESSURE RETURN (STEAM CONDENSATE)	
	MRI MEDIUM PRESSURE STEAM	
	MTD MAGNETIC RESONANCE IMAGING	
	MTD MEAN TEMPERATURE DIFFERENCE	
	MVD MANUAL VOLUME DAMPER	
	MZ MULTI-ZONE	
	NA NOT APPLICABLE	
	NC NOISE CRITERIA	
	N.C. NORMALLY CLOSED	
	NG NATURAL GAS	
	NGFM NATURAL GAS FLOWMETER	
	N.O. NORMALLY OPEN	
	NOAA NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION	
	NOM NOMINAL	
	NFLV NON-STANDARD PART LOAD VALUE	
	NPSH NET POSITIVE SUCTION HEAD	
	NTS NOT TO SCALE	
F FAHRENHEIT		
F&T FLOAT AND THERMOSTATIC		
F/SDPR COMBINATION FIRE SMOKE DAMPER		
FA FREE AREA		
FC FLEXIBLE CONNECTION		
FCU FAN COIL UNIT (4 PIPE)		
FCUC FAN COIL UNIT COOLING ONLY		
FCUH FAN COIL UNIT HEATING ONLY		
FCW FORWARD CURVED WHEEL (FAN)		
FD FLOOR DRAIN		
FD FIRE DAMPER		
FF FINAL FILTER		

DUCTWORK SYMBOLS

UP	DN	SUPPLY DUCT (UP & DOWN)
UP	DN	EXHAUST DUCT (UP & DOWN)
UP	DN	RETURN DUCT (UP & DOWN)
ROUND AND SQUARE 4-WAY CEILING DIFFUSERS		
SQUARE 3-WAY CEILING DIFFUSERS		
SQUARE 2-WAY CEILING DIFFUSERS		
SQUARE 1-WAY CEILING DIFFUSERS		
LINEAR SLOT DIFFUSER		
SUPPLY TOP REGISTER OR GRILLE (WALL TYPE)		
EXHAUST OR RETURN CEILING REGISTER OR GRILLE		
EXHAUST OR RETURN BOTTOM REGISTER OR GRILLE (WALL TYPE)		
EXHAUST OR RETURN REGISTER OR TOP GRILLE (WALL TYPE)		
VANED ELBOW & AIR SPLIT TYPE DUCT TAKE-OFF		
CONNECT NEW DUCT TO EXISTING DUCT		
INCLINED RISE, IN DIRECTION OF AIR FLOW		
INCLINED DROP, IN DIRECTION OF AIR FLOW		
LIMIT OF DEMOLITION		
FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC		
VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)		
VANED ELBOW (SHORT RADIUS)		
STANDARD RADIUS ELBOW (LONG RADIUS)		
STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP)		

GENERAL SYMBOLS

DIRECTION OF PIPE PITCH (DOWN)		
ANCHOR		
REDUCER OR INCREASER		
ECCENTRIC REDUCER		
TOP CONNECTION, 45° OR 90°		
BOTTOM CONNECTION, 45° OR 90°		
TRAP		
TOP REGISTER		
TRAP		
TOP STATIC PRESSURE		
THERMOSTAT		
RISE OR DROP IN PIPE		
UNION		
PIPE UP		
PIPE DOWN		
POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK		
LIMIT OF DEMOLITION		
INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES		
FLOAT & THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES		
THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES		
THERMOMETER		
PRESSURE GAGE		
FLOW ELEMENT		
REFRIGERANT SIGHT GLASS		
TEST PLUG (PRESSURE/TEMPERATURE)		
AUTOMATIC AIR VENT		
MANUAL AIR VENT		
POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK		
THERMOSTAT		
PRIMARY ELEMENT FOR FLOW METERING		
QUICK-COUPLE HOSE CONNECTOR		
INVERTED BUCKET STEAM TRAP ASSEMBLY (T)		
CLOSED-FLOAT-THERMOSTATIC STEAM TRAP ASSEMBLY (T)		
THERMOSTATIC STEAM TRAP (T)		
PRESSURE GAGE (WITH SIPHON ON STEAM SERVICE)		
REFRIGERANT DETECTOR		
THERMOSTAT		
FIRE DAMPER/SMOKE DAMPER		

VALVE SYMBOLS

GATE VALVE - THREADED/FLANGED	
GLOBE VALVE - THREADED/FLANGED	
GATE VALVE WITH 3/4" HOSE ADAPTER	
CHECK VALVE	
WYE STRAINER (WITH BALL VALVE & HOSE CONNECTION)	
FLEXIBLE CONNECTION	
ANGLE GLOBE VALVE	
BUTTERFLY VALVE	
BALL VALVE	
MODULATING CONTROL VALVE	
MODULATING CONTROL BUTTERFLY VALVE	
TWO POSITION CONTROL VALVE	
THREE-WAY MODULATING CONTROL VALVE	
THREE-WAY TWO POSITION CONTROL VALVE	
PRESSURE REGULATING VALVE	
PRESSURE SAFETY VALVE	
AUTOMATIC BALANCING CONTROL VALVE	
WATER BALANCE DEVICE	
CIRCUIT SETTER VALVE	
GATE VALVE WITH GLOBE-VALVED BYPASS	
PLUG VALVE	
CONTROL VALVE (CV) - FLOAT-OPERATED	
PRESSURE REDUCING VALVE (PRV)	
STRAINER WITH VALVED DRAIN AND QUICK-COUPLE HOSE CONNECTOR	
WATER LEVEL CONTROLLER	
FLOW METER	
TEMPERATURE SENSOR	
CARBON DIOXIDE DETECTOR	

PIPING SYMBOLS

HPS HPS HPS	HIGH PRESSURE STEAM (60 PSIG AND ABOVE)	CTPS CTPS CTPS	CONDENSATE TRANSFER PUMP DISCHARGE
HPH HPH HPH	HIGH PRESSURE STEAM CONDENSATE RETURN	CTPS CTPS CTPS	CONDENSATE TRANSFER PUMP SUCTION
MPS MPS MPS	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)	CW CW CW	COLD WATER (CITY WATER)
MPR MPR MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN	HW HW HW	HOT WATER
LPS LPS LPS	LOW PRESSURE STEAM (15 PSIG AND BELOW)	TH	TEMPORARY PIPING
LPR LPR LPR	LOW PRESSURE STEAM CONDENSATE RETURN	SH	ROLLER-TYPE HANGER
PC PC PC	CONDENSATE PUMP DISCHARGE	SCH	VARIABLE SPRING-TYPE HANGER (TYPE 51)*
HWS HWS HWS	HOT WATER HEATING SUPPLY	TH	SPRING SUSPENSION-TYPE HANGER (TYPE 48 OR 49)*
HWR HWR HWR	HOT WATER HEATING RETURN	TH	CLEVIS-TYPE HANGER
CWS CWS CWS	CONDENSER WATER SUPPLY (FROM WELL)	PS	TRAPEZE HANGER (PROVIDE U-BOLT PIPE ATTACHMENT TO TRAPEZE EXCEPT WHERE RH ARE INDICATED)
CWR CWR CWR	CONDENSER WATER RETURN (TO WELL)	RC	FLOOR-SUPPORTED PIPE STAND
CHS CHS CHS	CHILLED WATER SUPPLY	WB	RISER CLAMP (TYPE 42)*
CHR CHR CHR	CHILLED WATER RETURN	CSH	WALL BRACKET (TYPE 31, 32, 33)*
MW MW MW	MAKE-UP WATER	S	CONSTANT SUPPORT HANGER (TYPE 54, 55, 56)*
D D D	DRAIN LINE	S	SLIDING SUPPORTS (TYPE 35)*
V V V	VENT LINE		
GRS GRS GRS	GLYCOL-WATER RUN AROUND SUPPLY		
GRS GRS GRS	GLYCOL-WATER RUN AROUND RETURN		
GRS GRS GRS	EXISTING PIPE TO BE REMOVED		
GRS GRS GRS	HIGH PRESSURE GRAVITY CONDENSATE RETURN		
GRS GRS GRS	MEDIUM PRESSURE GRAVITY CONDENSATE RETURN		
GRS GRS GRS	LOW PRESSURE GRAVITY CONDENSATE RETURN		

TERMINAL UNIT SYMBOLS

	CEILING MOUNTED HEATER
	TERMINAL UNIT WITH REHEAT COIL

GENERAL NOTES

- ALL MECHANICAL WORKS SHALL COMPLY WITH THE VA HOSPITAL STANDARDS
- ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A FURRED CHASE OR ABOVE THE HARD SUSPENDED CEILING.
- THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.
- ACCESS PANELS IN HARD SUSPENDED CEILINGS (BY CONTRACTOR) ARE REQUIRED FOR ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, CONTROLS, ETC. ACCESS PANELS SHALL BE FURNISHED AND INSTALLED UNDER THE ARCHITECTURAL SPECIFICATIONS.
- TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, COILS, ETC.
- FOR TYPICAL STEAM AND WATER PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD EQUIPMENT DETAILS.
- WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE TO PROVIDE COUNTER FLOW BETWEEN WATER AND AIR.
- WALL TYPE EXHAUST REGISTERS NOTED DRAWINGS ARE TO BE INSTALLED WITH BOTTOM ELEVATION OF REGISTER AT 7" [175mm] ABOVE FINISHED FLOOR.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
- ALL PRESSURES LISTED ARE GAUGE PRESSURES UNLESS OTHERWISE NOTED.
- CEILING DIFFUSER SIZES SHOWN ON PLANS ARE NECK SIZES.
- ALL TRANSFER DUCTWORK SHALL BE NO MORE THAN 5'-0" LINEAR FEET
- ALL FLEXIBLE DUCT CONNECTIONS SHALL BE 5'-0" MAXIMUM.
- EXTERIOR WALL LOUVERS ARE PROVIDED BY DIV. 10. SEE ARCH DRAWINGS FOR ACTUAL SIZES AND ELEVATIONS.
- CONSTRUCTION OF ALL DUCTS MUST BE IN ACCORDANCE WITH THE LATEST SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE DUCT COVERINGS AND LININGS SHALL NOT FLAME, GLOW, SMOLDER, OR SMOKE WHEN TESTED IN ACCORDANCE WITH ASTM C411 AND SECTION 604.3 OF THE 2006 INTERNATIONAL MECHANICAL CODE. FLEXIBLE DUCTS AND CONNECTORS SHALL BE TESTED IN ACCORDANCE WITH UL 181 AND BE LABELED WITH FLEXIBLE CONNECTORS BEING LIMITED TO A MAXIMUM OF 5 FEET.
- SUPPORTS FOR MECHANICAL SYSTEM PIPING MUST MEET THE HORIZONTAL AND VERTICAL SPACING PROVISIONS IN THE RESPECTIVE MECHANICAL CODE.
- ALL OUTSIDE AIR INTAKE OPENINGS ARE LOCATED A MINIMUM OF 15 FEET FROM PLUMBING VENTS, FUEL-FIRED APPLIANCE VENTS OR 15'-0" FROM EXHAUST FAN DISCHARGE.
- BEFORE ADDING CLEANING CHEMICAL TO THE CLOSED SYSTEM, ALL AIR HANDLING COILS SHOULD BE ISOLATED BY CLOSING THE INLET AND OUTLET VALVES AND OPENING THE BYPASS VALVES. THIS IS DONE TO PREVENT DIRT AND SOLIDS FROM LODGING THE COILS.
- PROVIDE IDENTIFICATION NAMEPLATE FOR ALL EQUIPMENT.
- IN EVENT OF PROPOSED DUCTWORK INTERFERING WITH EXISTING CONCRETE JOISTS AND BEAMS, INFORMATION REGARDING THE INTERFERENCE MUST BE TRANSMITTED TO THE REVIEW AND 'POTENTIAL RETROFIT' ACTION, PRIOR TO INSTALLATION OF DUCTWORK PROCEEDING FURTHER.
- THERMOSTATS AND TEMPERATURE SENSORS SHALL BE GANGED NEXT TO EACH OTHER WHERE APPROPRIATE. THERMOSTATS AND TEMPERATURE SENSORS TO BE LOCATED 48" AFF. COORDINATE FINAL LOCATION W/COTR PRIOR TO INSTALLATION.
- DUCTWORK ON THE INTAKE SIDE OF THE VAV BOX SHALL BE RIGID.
- EXISTING MAIN DUCTWORK TO BE REUSED IN BUILDING 1E SHALL BE PRESSURE TESTED AND REPAIRED AS NECESSARY TO MAINTAIN ACCEPTABLE LEAKAGE.
- EXISTING DUCTWORK AND PIPE INSULATIONS SHALL BE REPAIRED OR REPLACED AS NECESSARY.

FULLY SPRINKLERED
Scale: AS NOTED

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