DESIGNER'S NOTES FOR DETAILS AND SCHEDULES

1. REFER TO DESIGNER'S NOTES ON THE DETAILS. REMOVE DESIGNER'S NOTES PRIOR TO ISSUING.

2. GROUP COMMON DETAILS, SUCH AS PIPING, AS MUCH AS POSSIBLE.

3. MANUAL AIR VENTS ARE REQUIRED ON CHILLED AND HEATING HOT WATER SYSTEMS AND AT LOCAL HIGH POINTS. LOCAL HIGH POINT IS A SECTION OF PIPE AT A HIGHER ELEVATION THAN THE SECTION OF PIPE IMMEDIATELY DOWNSTREAM AND IMMEDIATELY UPSTREAM.

4. FOR EQUIPMENT SCHEDULES:

   A. PROVIDE SCHEDULES FOR EXISTING FANS OR OTHER EQUIPMENT THAT MUST BE MODIFIED OR REBALANCED. SHOW EXISTING AND FUTURE CAPACITIES AND MOTOR SIZES.

   B. DO NOT USE DITTO MARKS FOR REPETITIVE ENTRIES.

   C. USE IN SCHEDULES WHERE THE COLUMN HEADING IS NOT APPLICABLE TO INDICATE THAT THE LACK OF AN ENTRY WAS NOT AN OMISSION.

   D. GROUP SCHEDULES AS MUCH AS POSSIBLE. SEE HVAC DESIGN MANUAL FOR SEQUENCE OF SCHEDULES.

5. ALL DUCTWORK, WITHOUT EXCEPTION, AND ALL PIPING 150mm [6"] AND LARGER SHALL BE SHOWN IN DOUBLE LINE.

ABBREVIATION AND SYMBOL NOTES

1. THE COMPOSITE LIST OF ABBREVIATIONS IS COORDINATED WITH THE UNITED STATES NATIONAL CAD STANDARD VERSION 4.0, LEGACY VA LIST OF ABBREVIATIONS, AND ASHRAE. THIS LIST SHALL BE USED FOR ALL VA PROJECTS AND EDITED, AS REQUIRED, TO BE PROJECT SPECIFIC. THE DESIGNER MAY SELECT AND USE ADDITIONAL ABBREVIATIONS, IF REQUIRED, FROM ANY KNOWN SOURCES.

2. THE LIST OF SYMBOLS IS MOSTLY BASED ON THE VA MASTER LIST OF STANDARD SYMBOLS AND HAS BEEN UPDATED IN CONSULTATION WITH OTHER SOURCES, SUCH AS, NATIONAL CAD STANDARD VERSION 4, AND ISA (THE INSTRUMENTATION, SYSTEMS, AND AUTOMATION SOCIETY). THIS LIST SHALL BE USED FOR ALL VA PROJECTS AND EDITED, AS REQUIRED, TO BE PROJECT SPECIFIC. THE DESIGNER CAN SELECT AND USE ADDITIONAL SYMBOLS, IF REQUIRED, FROM ANY KNOWN SOURCE

GENERAL NOTES

1. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A FURRED CHASE OR ABOVE HARD SUSPENDED CEILING, OR ACOUSTICAL CEILING.

2. THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.

3. ACCESS PANELS IN HARD SUSPENDED CEILINGS ARE REQUIRED FOR ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, CONTROLS, ETC. ACCESS PANELS SHALL BE FURNISHED AND INSTALLED UNDER THE ARCHITECTURAL SPECIFICATIONS. COORDINATE LOCATION WITH MECHANICAL INSTALLATION AND DEMONSTRATE ACCESS TO EQUIPMENT SERVED.

4. TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, COILS, ETC. LOSS FOR FILTERS SHALL BE FOR FILTERS AT 50% LOADING.

5. FOR TYPICAL STEAM AND WATER PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD EQUIPMENT DETAILS.

6. DIFFUSER, REGISTER AND GRILLE SIZES SHOWN ON FLOOR PLANS ARE NECK SIZES.

7. WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE TO PROVIDE COUNTER FLOW BETWEEN WATER AND AIR.

8. WALL TYPE EXHAUST REGISTERS NOTED AS "BR" ON DRAWINGS ARE TO BE INSTALLED WITH BOTTOM ELEVATION OF REGISTER AT 175mm [7"] ABOVE FINISHED FLOOR.

9. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.

10. STEAM HEADER SET PRESSURE: ___ kPa [PSIG] NORMAL
    ___ kPa [PSIG] LOW DEMAND PERIODS

11. ALTITUDE–BOILER ROOM FLOOR: ___ M [FT.] ABOVE SEA LEVEL

12. SEISMIC PROVISIONS // REQUIRED – SEE SPECS // NOT REQUIRED //
    ALL PRESSURES LISTED ARE GAGE PRESSURE UNLESS OTHERWISE NOTED

Department of Veterans Affairs

DETAIL TITLE: GENERAL NOTES

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511–02.DWG

ABBREVIATIONS

A/E	ARCHITECT / ENGINEER
AAHX	AIR TO AIR HEAT EXCHANGER
AAV	AUTOMATIC AIR VENT
AB	AIR BLENDER
ACC	AIR COOLED CONDENSER
ACCH	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
ACD	AUTOMATIC CONTROL DAMPER, MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER, TWO POSITION
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AF	AFTER FILTER
AFCV	AIR FLOW CONTROL VALVE
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MEASURING STATION
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR-HANDLING UNIT
AMP	AMPERE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
AQST	AQUASTAT
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
AS	AIR SEPARATOR
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATION AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AW	AIR WASHER
AXF	AXIAL FLOW
B	BOILER
BD	BUTTERFLY DAMPER
BDD	BACKDRAFT DAMPER
BDR	BASE BOARD RADIATOR
BFP	BACKFLOW PREVENTER
BFT	BOILER PLANT FIRE TUBE
BG	BOTTOM GRILLE
BHP	BRAKE HORSEPOWER
BHW	HOT WATER HEATING BOILER
BHX	BOILER BLOWDOWN HEAT EXCHANGER
BIW	BACKWARD INCLINED WHEEL (FAN)
BMT	BONE MARROW TRANSPLANT
BR	BOTTOM REGISTER
BSC	BIOLOGICAL SAFETY CABINETS
BT	BLOWOFF TANK
BTC	BLOWOFF TANK CONTROL VALVE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BWT	BOILER PLANT WATER TUBE
C	CENTIGRADE (CELSIUS)
CAV	CONSTANT AIR VOLUME
CC	COOLING COIL
CCD	COOLING COIL CONDENSATE DRAIN
CD	CEILING DIFFUSER
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION1)
CD-2	CONSTRUCTION DOCUMENTS (SUBMISSION2)
CENT	CENTRIFICAL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CFT	CUBIC FEET
CFP	CHEMICAL FEED PUMP
CG	CEILING GRILLE
CH	CHILLER
CHP	CHILLED WATER PUMP
CHW	CHILLER WATER
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CI	CAST IRON
CM	CARBON MONOXIDE
CM	CUBIC METER
CM/S	CUBIC METER PER SECOND
CO	CLEAN OUT
CO2	CARBON DIOXODE
COMP	COMPRESSOR UNIT
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CR	CEILING REGISTER
CS	CONDENSATE STORAGE TANK
CSG	CLEAN STEAM GENERATOR
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME
CW	COLD WATER (POTABLE)
CWCC	CHILLED WATER COOLING COIL
CWP	CONDENSER WATER PUMP
CWR	CONDENSER WATER RETURN (TO COOLING TOWER)
CWS	CONDENSER WATER SUPPLY (FROM COOLING TOWER)
D	DAMPER - AUTOMATIC
Db	DRY-BULB TEMPERATURE
DB	DECIBELS
DCW	DOMESTIC COLD WATER
DD-1	DESIGN DEVELOPMENT (SUBMISSION 1)
DD-2	DESIGN DEVELOPMENT (SUBMISSION 2)
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DF	DIFFUSER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
DIA	DIAMETER
DIW	DEIONIZED WATER
DP	DEW POINT TEMPERATURE
DP	DIFFUSER PLATE
DPA	DIFFERENTIAL PRESSURE ASSEMBLY
DPS	DIFFERENTIAL PRESSURE SENSOR
DX	DIRECT EXPANSION
DXCC	DIRECT EXPANSION COOLING COIL

Department of Veterans Affairs

DETAIL TITLE: ABBREVIATIONS

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-03.DWG

ABBREVIATIONS

EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EVAPORATIVE COOLER
ECC	ENGINEERING CONTROL CENTER
ECU	EVAPORATIVE CONDENSER UNIT
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EGS	EMERGENCY GAS SHUTOFF
EGT	ENTERING GLYCOL TEMPERATURE
EH	EXHAUST HOOD
EJ	EXPANSION JOINT
EMD	END OF MAIN DRIP (STEAM)
ENT	ENTERING
ER	EXHAUST REGISTER
ERC	ELECTRIC REHEAT COIL
ERP	ELECTRIC RADIANT PANEL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETO	ETHYLENE OXIDE
EUH	ELECTRIC UNIT HEATER
EWC	EVAPORATIVE WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
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
FHX	FLUE GAS/FEEDWATER HEAT EXCHANGER
FM	FLOW METER
FOP	FUEL OIL PUMP
FOT	FUEL OIL TANK
FOHX	FUEL OIL HEAT EXCHANGER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTU	FAN POWERED TERMINAL UNIT
FR	FLOOR REGISTER
FRP	FIBER REINFORCED POLYESTER
FS	FLOW SWITCH
FSTAT	FREEZESTAT
FT	FEET
FT WC	FEET OF WATER COLUMN
FT-LB	FOOT-POUND
FTR	FIN TUBE RADIATION
FV	FACE VELOCITY
GA	GAUGE
GAL	GALLONS
GH	GRAVITY HOOD
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPR	GAS PRESSURE REGULATOR
GS	GALVANIZED STEEL
H	HUMIDIFER
HAC	HOUSEKEEPING AID CLOSET
HB	HOSE BIBB
HC	HEATING COIL
HD	HOOD
HOA	HAND/OFF/AUTOMATIC
HP	HEAT PUMP
HP	HORSEPOWER
HPDT	HIGH PRESSURE DRIP TRAP
HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)
HPS	HIGH PRESSURE SUPPLY (STEAM)
HRC	HEAT RECOVERY COIL
HRD	HEAT RECOVERY DEVICE
HRP	HYDRONIC RADIANT (CEILING) PANEL
HRW	HEAT RECOVERY WHEEL
HSTAT	HUMIDISTAT
HTM	HUMIDIFIER TERMINAL
HUM	HUMIDIFIER UNIT MOUNTED
HVU	HEATING AND VENTILATING UNIT
HW	HOT WATER
HWC	HOT WATER COIL
HWHC	HOT WATER HEATING COIL
HWP	HEATING HOT WATER PUMP
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
HWUH	HOT WATER UNIT HEATER
HVD	HOISTWAY VENT DAMPER
HX	HEAT EXCHANGER
HZ	HERTZ

ABBREVIATIONS

I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
IBT	INVERTED BUCKET TRAP
ICF	IN-LINE CENTRIFUGAL FAN
ICU	INTENSIVE CARE UNIT
ID	INSIDE DIAMETER
IFB	INTEGRAL FACE AND BYPASS
IN	INCHES
IN HG	INCHES OF MERCURY
IN WC	INCH WATER COLUMN
IN WG	INCH WATER GAUGE
IN-LB	INCH-POUND
IPLV	INTERGRATED PART LOAD VALUE
IRH	INTRARED HEATER
IS	INSECT SCREEN
IU	INDUCTION UNIT
IV	INLET VANES
J	INTENTIALLY 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 GLYCOL TEMPERATURE
LH	LATENT HEAT
LPG	LIQUEFIED PETROLEUM GAS
LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)
LPRC	LOW PRESSURE STEAM RETURN (CLEAN)
LLHX	LIQUID TO LIQUID HEAT EXCHANGER
LPS	LOW PRESSURE STEAM
LPSC	LOW PRESSURE STEAM (CLEAN)
LSD	LINEAR SLOT DIFFUSER
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVG	LEAVING
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M	METER, SI UNIT
M/S	METERS PER SECOND (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	1,000 BTUH
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MER	MECHANICAL EQUIPMENT ROOM
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MH	MANHOLE
MHP	MOTOR HORSEPOWER
MIN	MINIMUM
MM	MILLIMETER
MOV	MOTOR OPERATED VALVE
MPR	MEDIUM PRESSURE RETURN (STEAM CONDENSATE)
MPS	MEDIUM PRESSURE STEAM
MRI	MAGNETIC RESONANCE IMAGING
MTD	MEAN TEMPERATURE DIFFERENCE
MVD	MANUAL VOLUME DAMPER
MZ	MULTI-ZONE
NA	NOT APPLICABLE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NG	NATURAL GAS
NGFM	NATURAL GAS FLOWMETER
Nm	NEWTON METER
NO	NORMALLY OPEN
NOAA	NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION
NOM	NOMINAL
NPLV	NON-STANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NPSHA	NET POSITIVE SUCTION HEAD AVAILABLE
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAD	OUTDOOR AIR DAMPER
OAG	OUTSIDE AIR GRILLE
OAI	OUTSIDE AIR INTAKE
OD	OUTSIDE DIAMETER
OFM	OIL FLOWMETER
OR	OPERATING ROOM

ABBREVIATIONS

P	PUMP
Pa	PASCAL
PC	PUMPED CONDENSATE
PCF	POUNDS PER CUBIC FOOT (FEET)
PD	PRESSURE DROP
PEF	PROPELLER (TYPE) EXHAUST FAN
PF	PRE-FILTER
PG	PRESSURE GAGE
PGW	PROPYLENE GLYCOL-WATER (SOLUTION)
PHC	PREHEAT COIL
PPM	PARTS PER MILLION
PRS	PRESSURE REGULATING (VALVE) STATION
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAGE
PSS	PRIMARY SECONDARY SYSTEM
PSV	PRESSURE SAFETY VALVE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
R/E	RETURN OR EXHAUST
RA	RETURN AIR
RAD	RETURN AIR DAMPER
RAF	RADIO FREQUENCY
RAHX	ROTARY AIR HEAT EXCHANGER
RAT	RETURN AIR TEMPERATURE
RCCH	REMOTE CONDENSER CHILLER
RCU	RECIPROCATING CHILLER UNIT
RD	REFRIGERANT DISCHARGE
RDS	ROOM DATA SHEETS
REA	RELIEF AIR
RELAD	RELIEF AIR DAMPER
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID LINE
RLA	RUN LOAD AMPERE
RO	REVERSE OSMOSIS
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
RV	RELIEF VALVE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAT	SUPPLY AIR TEMPERATURE
SC	SHADING COEFFICIENT
SCFM	STANDARD CUBIC FEET PER MINUTE
SCI	SPINAL CODE INJURY
SCR	SILICON CONTROLLED RECTIFIER
SD	SMOKE DETECTOR
SD	SUPPLY AIR DIFFUSER
SD-1	SCHEMATIC DESIGN (SUBMISSION1)
SD-2	SCHEMATIC DESIGN (SUBMISSION2)
SDPR	SMOKE DAMPER
SDR	SMOKE DAMPER (RETURN)
SDS	SMOKE DAMPER (SUPPLY)
SEN	SENSIBLE HEAT
SF	SUPPLY FAN
SG	SUPPLY AIR GRILLE
SH	STEAM HUMIDIFIER
SHC	STEAM HEATING COIL
SI	SQUARE INCHES
SP	STATIC PRESSURE
SP GR	SPECIFIC GRAVITY
SPD	SUPPLY PROCESS AND DISTRIBUTION
SPRV	STEAM PRESSURE REDUCING VALVE
SPS	STATIC PRESSURE SENSOR
SQ FT	SQUARE FOOT (FEET)
SR	SUPPLY AIR REGISTER
SS	STAINLESS STEEL
SSHX	STEAM TO STEAM HEAT EXCHANGER
SSR	SOLID SEPARATOR
ST	STEAM TRAP
SUH	STEAM UNIT HEATER
SV	STEAM PRESSURE REDUCING VALVE
SVS	STEAM VENT SILENCER
SW	SOFTWATER
SWHX	STEAM TO WATER HEAT EXCHANGER
T&PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
TAB	TESTING, ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TDH	TOTAL DYNAMIC HEAD
TDS	TOTAL DISSOLVED SOLIDS
TG	TRANSFER GRILLE
TP	TRAP
TR	TOP REGISTER
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TU	TERMINAL UNIT
TWU	THRU-WALL UNIT

Department of Veterans Affairs

DETAIL TITLE: ABBREVIATIONS

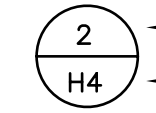
SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-06.DWG

ABBREVIATIONS

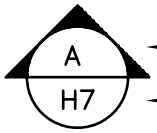
UC	UNDER CUT
UC	UNIT COOLER
UH	UNIT HEATER
U	UNDERWRITERS LABORATORY
URV	UPBLAST UNIT VENTILATOR
V	VALVE
VAF	VANE-AXIAL FAN
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VFD	VARIABLE FREQUENCY DRIVE
VHA	VETERANS HEALTH ADMINISTRATION
VI	VIBRATION ISOLATOR
VP	VACUUM PUMP
VPS	VARIABLE PRIMARY SYSTEM
VR	VACUUM (STEAM CONDENSATE) RETURN
VSD	VARIABLE SPEED DRIVE
VUH	VERTICAL UNIT HEATER
W	WATTS
WAG	WASTE ANETHESIA GAS
Wb	WET-BULB (TEMPERATURE)
WC	WATER COOLED
WCCH	WATER COOLED CHILLER
WCCU	WATER COOLED CONDENSING UNIT
WCHP	WATER COOLED HEAT PUMPS
WCPU	WATER COOLED PACKAGED UNIT
WEF	WALL EXHAUST FAN
WF	WATER FILTER
WFCV	WATER FLOW CONTROL VALVE
WFM	WATER FLOWMETER
WFMD	WATER FLOW MEASURING DEVICE
WG	WATER GAGE
WPD	WATER SIDE PRESSURE DROP
YR	YEAR

DRAWING SYMBOLS



DETAIL NUMBER

DRAWING NUMBER WHERE DRAWN



SECTION LETTER

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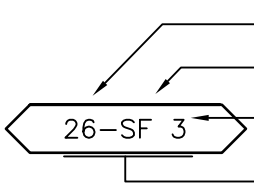
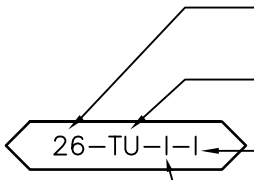


BUILDING NO. WHERE EQUIPMENT IS LOCATED.

EQUIPMENT ABBREVIATION (SUPPLY FAN)

SUPPLY FAN NO. 3 IN BUILDING NO. 26

TYPICAL UNIT NO.



BUILDING NO. WHERE EQUIPMENT IS LOCATED

ITEM (TERMINAL UNIT SHOWN)

ITEM NUMBER (TERMINAL UNIT NO. 1)

SERVED BY AIR HANDLER UNIT NO. 1

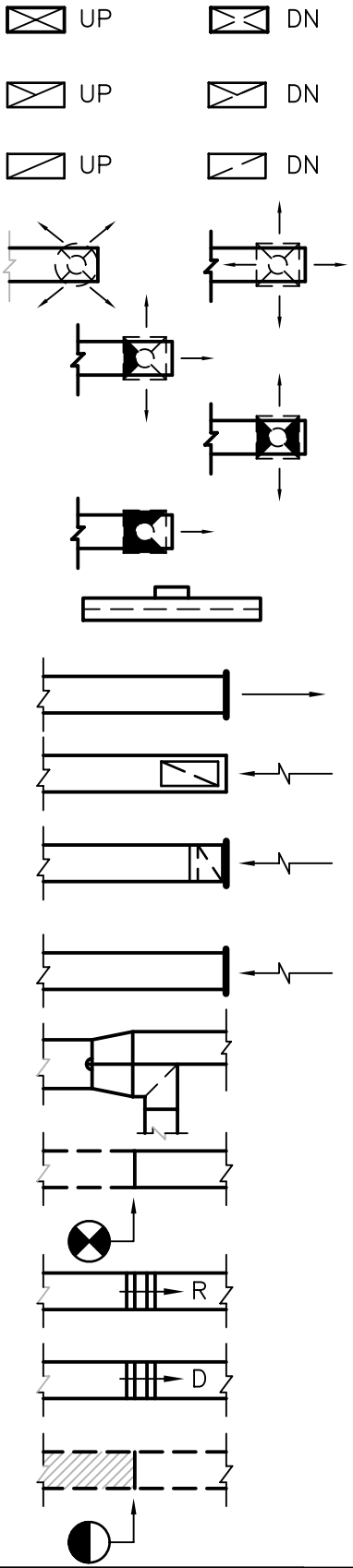
Department of Veterans Affairs

DETAIL TITLE / DRAWING SYMBOLS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511–08.DWG

DUCTWORK SYMBOLS



SUPPLY DUCT (UP & DOWN)

EXHAUST DUCT (UP & DOWN)

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

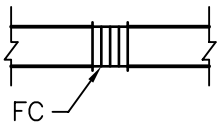
Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SYMBOLS

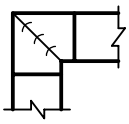
SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511–09.DWG

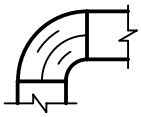
DUCTWORK SYMBOLS



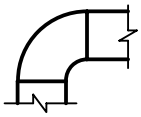
FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC



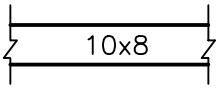
VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)



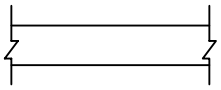
VANED ELBOW (SHORT RADIUS)



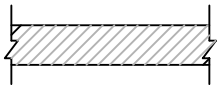
STANDARD RADIUS ELBOW (LONG RADIUS)



NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH)

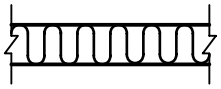


EXISTING DUCT TO REMAIN

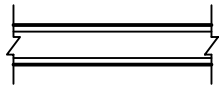


EXISTING DUCT TO BE REMOVED

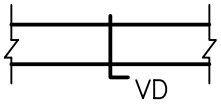
LOUVER (LOUVER SPECIFIED IN ARCHITECTURAL SECTION.)



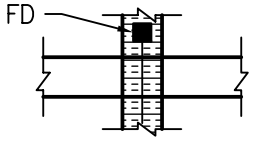
FLEXIBLE DUCTWORK (INSULATED)



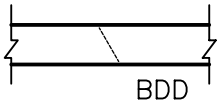
DUCT WITH SOUND LINING



MANUAL VOLUME DAMPER



FIRE DAMPER



BACK DRAFT DAMPER

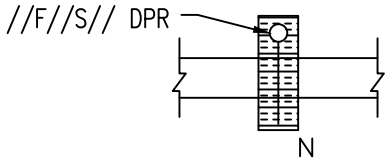
Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SYMBOLS

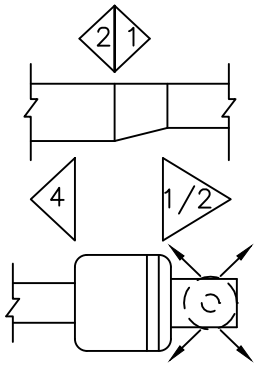
SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-10.DWG

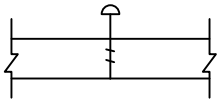
DUCTWORK SYMBOLS



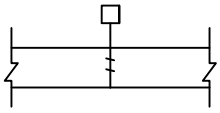
//FIRE//SMOKE// DAMPER
(VA DOES NOT ALLOW COMBINATION FIRE/SMOKE DAMPERS.)



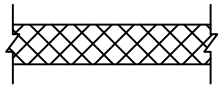
POINT OF CHANGE IN DUCT CONSTRUCTION BY STATIC PRESSURE CLASS. THE NUMBER ASSIGNS PRESSURE CLASS (IN. OF WATER) WHICH WILL ACCOMMODATE MAXIMUM OPERATING PRESSURE IN THE DUCT SUBSECTION. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS. A "N" SUPERSCRIPT INDICATES NEGATIVE PRESSURE.



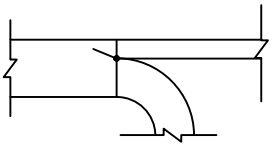
AUTOMATIC CONTROL DAMPER MODULATING



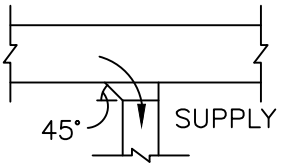
AUTOMATIC CONTROL DAMPER TWO POSITION



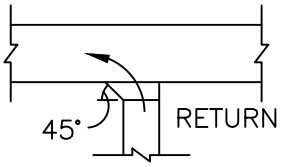
STAINLESS STEEL DUCT

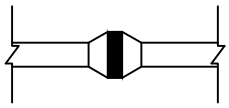


MANUAL SPLITTER DAMPER

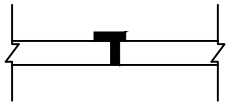


STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP)





DUCT MOUNTED COIL (HOT WATER OR STEAM COIL)



DUCT MOUNTED COIL (ELECTRIC)

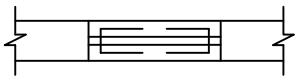
Department of Veterans Affairs

DETAIL TITLE: DUCTWORK SYMBOLS

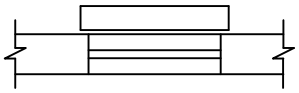
SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-11.DWG

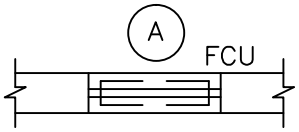
TERMINAL UNIT SYMBOLS



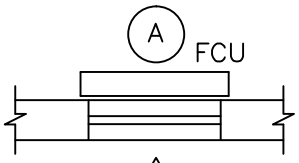
CONVECTOR OR RADIATOR (RECESSED)



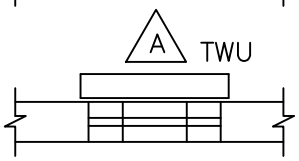
CONVECTOR OR RADIATOR (WALL HUNG)



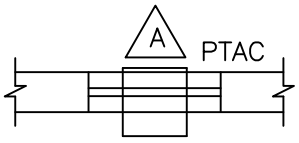
FLOOR MOUNTED VERTICAL RECESSED FAN COIL UNIT. LETTER INDICATES UNIT SIZE.



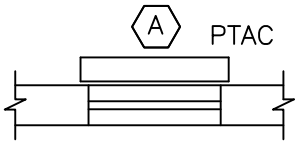
FLOOR MOUNTED VERTICAL CABINET FAN COIL UNIT. LETTER INDICATES UNIT SIZE.



THRU WALL AIR CONDITIONING UNIT. LETTER INDICATES UNIT SIZE.

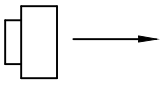


WINDOW TYPE AIR CONDITIONING UNIT. LETTER INDICATES UNIT SIZE.

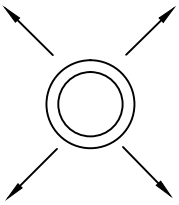


FLOOR MOUNTED HEAT PUMP. LETTER INDICATES UNIT SIZE.

AIR CURTAIN

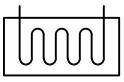


UNIT HEATER (HORIZONTAL)



UNIT HEATER (VERTICAL)

2'x2' RADIANT CEILING PANEL



2'x4' RADIANT CEILING PANEL

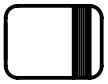
Department of Veterans Affairs

DETAIL TITLE: TERMINAL UNIT SYMBOLS

SCALE :NONE

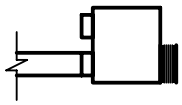
DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-12.DWG

AIR TERMINAL SYMBOLS



TERMINAL UNIT WITH REHEAT COIL

DOUBLE DUCT MIXING BOX.



FAN POWERED VARIABLE VOLUME
TERMINAL UNIT WITH HEATING COIL.

Department of Veterans Affairs

DETAIL TITLE / AIR TERMINAL SYMBOLS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-13.DWG

PIPING SYMBOLS

——S-60——	HIGH PRESSURE STEAM (60 PSIG AND ABOVE)
— — — —CR-60— — — —	HIGH PRESSURE STEAM CONDENSATE RETURN
——S-30——	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)
— — — —CR-30— — — —	MEDIUM PRESSURE STEAM CONDENSATE RETURN
——S-15——	LOW PRESSURE STEAM (15 PSIG AND BELOW)
— — — —CR-15— — — —	LOW PRESSURE STEAM CONDENSATE RETURN
——PC——	CONDENSATE PUMP DISCHARGE
——HWS——	HOT WATER HEATING SUPPLY
— — — —HWR— — — —	HOT WATER HEATING RETURN
——GHS——	GLYCOL–WATER HEATING SUPPLY
— — — —GHR— — — —	GLYCOL–WATER HEATING RETURN
——SWS——	SOLAR WATER SUPPLY
— — — —SWR— — — —	SOLAR WATER RETURN
——RL——	REFRIGERANT LIQUID
——RS——	REFRIGERANT SUCTION
——RHG——	REFRIGERANT HOT GAS
——CWS——	CONDENSER WATER SUPPLY (FROM TOWER)
— — — —CWR— — — —	CONDENSER WATER RETURN (TO TOWER)
——CHS——	CHILLED WATER SUPPLY
— — — —CHR— — — —	CHILLED WATER RETURN
——GCS——	CHILLED GLYCOL–WATER SUPPLY
— — — —GCR— — — —	CHILLED GLYCOL–WATER RETURN
——MW——	MAKE–UP WATER
——D——	DRAIN LINE
——V——	VENT LINE
——GRS——	GLYCOL–WATER RUN AROUND SUPPLY
— — — —GRR— — — —	GLYCOL–WATER RUN AROUND RETURN
——X——	EXISTING PIPE TO BE REMOVED

Department of Veterans Affairs

DETAIL TITLE: PIPING SYMBOLS

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-14.DWG

PIPING SYMBOLS

—— FWPD ——	FEEDWATER PUMP DISCHARGE
—— FWPS ——	FEEDWATER PUMP SUCTION
—— CTPD ——	CONDENSATE TRANSFER PUMP DISCHARGE
—— CTPS ——	CONDENSATE TRANSFER PUMP SUCTION
—— VR ——	VACUUM CONDENSATE RETURN
—— TC ——	TUBE CLEANER WATER SUPPLY
—— BO ——	BOILER BLOWOFF
—— CBD ——	CONTINUOUS BLOWDOWN
—— BWS ——	BOILER WATER SAMPLE
—— FWS ——	FEEDWATER SAMPLE (FROM DEAERATOR)
—— CF ——	CHEMICAL FEED
—— OFL ——	OVERFLOW
—— A ——	COMPRESSED AIR
—— G ——	NATURAL GAS MAIN FUEL
—— G(I) ——	NATURAL GAS IGNITER FUEL
—— LPG(I) ——	LIQUEFIED PETROLEUM GAS IGNITER FUEL
—— FOS ——	FUEL OIL SUPPLY
—— FOR ——	FUEL OIL RETURN
—— CW ——	COLD WATER (CITY WATER)
—— SW ——	SOFTENED WATER
—— HW ——	HOT WATER
RH ■	ROLLER–TYPE HANGER
SH ■	VARIABLE SPRING–TYPE HANGER (TYPE 51)*
SCH ■	SPRING CUSHION–TYPE HANGER (TYPE 48 OR 49)*
■	CLEVIS–TYPE HANGER
TH ■	TRAPEZE HANGER (PROVIDE U–BOLT PIPE ATTACHMENT TO TRAPEZE EXCEPT WHERE RH ARE INDICATED)
PS ■	FLOOR–SUPPORTED PIPE STAND
RC ○	RISER CLAMP (TYPE 42)*
WB ■	WALL BRACKET (TYPE 31, 32, 33)*
CSH ■	CONSTANT SUPPORT HANGER (TYPE 54, 55, 56)*
SS ■	SLIDING SUPPORTS (TYPE 35)*

* TYPE NUMBERS REFER TO MANUFACTURER'S STANDARDIZATION SOCIETY STANDARD PRACTICE SP–58

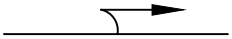
Department of Veterans Affairs

DETAIL TITLE: PIPING SYMBOLS

SCALE :NONE

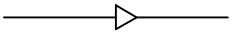
DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511–15.DWG

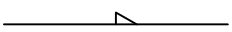
GENERAL PIPING SYMBOLS


DIRECTION OF PIPE PITCH (DOWN)

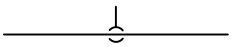

DIRECTION OF FLOW

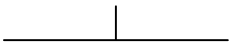

ANCHOR

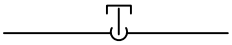

REDUCER OR INCREASER

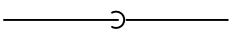

ECCENTRIC REDUCER

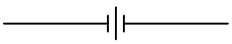

TOP CONNECTION, 45° OR 90°


BOTTOM CONNECTION, 45° OR 90°

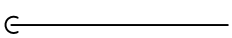

SIDE CONNECTION


CAPPED OUTLET

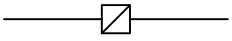

RISE OR DROP IN PIPE


UNION

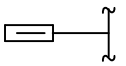
PIPE UP

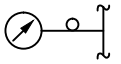

PIPE DOWN


INVERTED BUCKET TRAP SET INCLUDING
PIPING ACCESSORIES SEE DETAIL

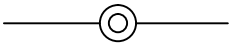

FLOAT & THERMOSTATIC TRAP SET INCLUDING
PIPING ACCESSORIES SEE DETAIL


THERMOSTATIC TRAP SET INCLUDING
PIPING ACCESSORIES SEE DETAIL


THERMOMETER


PRESSURE GAGE


VENTURI FLOW METER


REFRIGERANT SIGHT GLASS


TEST PLUG (PRESSURE/TEMPERATURE)

AUTOMATIC AIR VENT

MANUAL AIR VENT

QUICK–COUPLE HOSE CONNECTOR

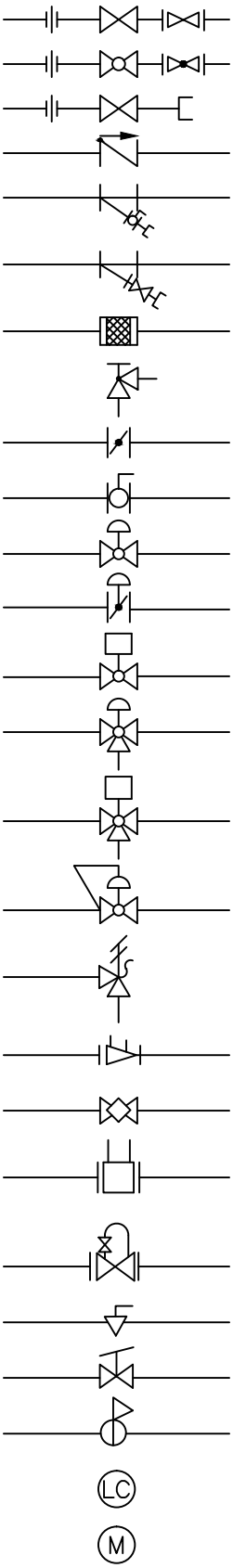
Department of Veterans Affairs

DETAIL TITLE: GENERAL SYMBOLS

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-16.DWG

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)

WYE STRAINER WITH VALVED DRAIN AND QUICK–COUPLE HOSE CONNECTOR

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)

LC WATER LEVEL CONTROLLER

M FLOW METER

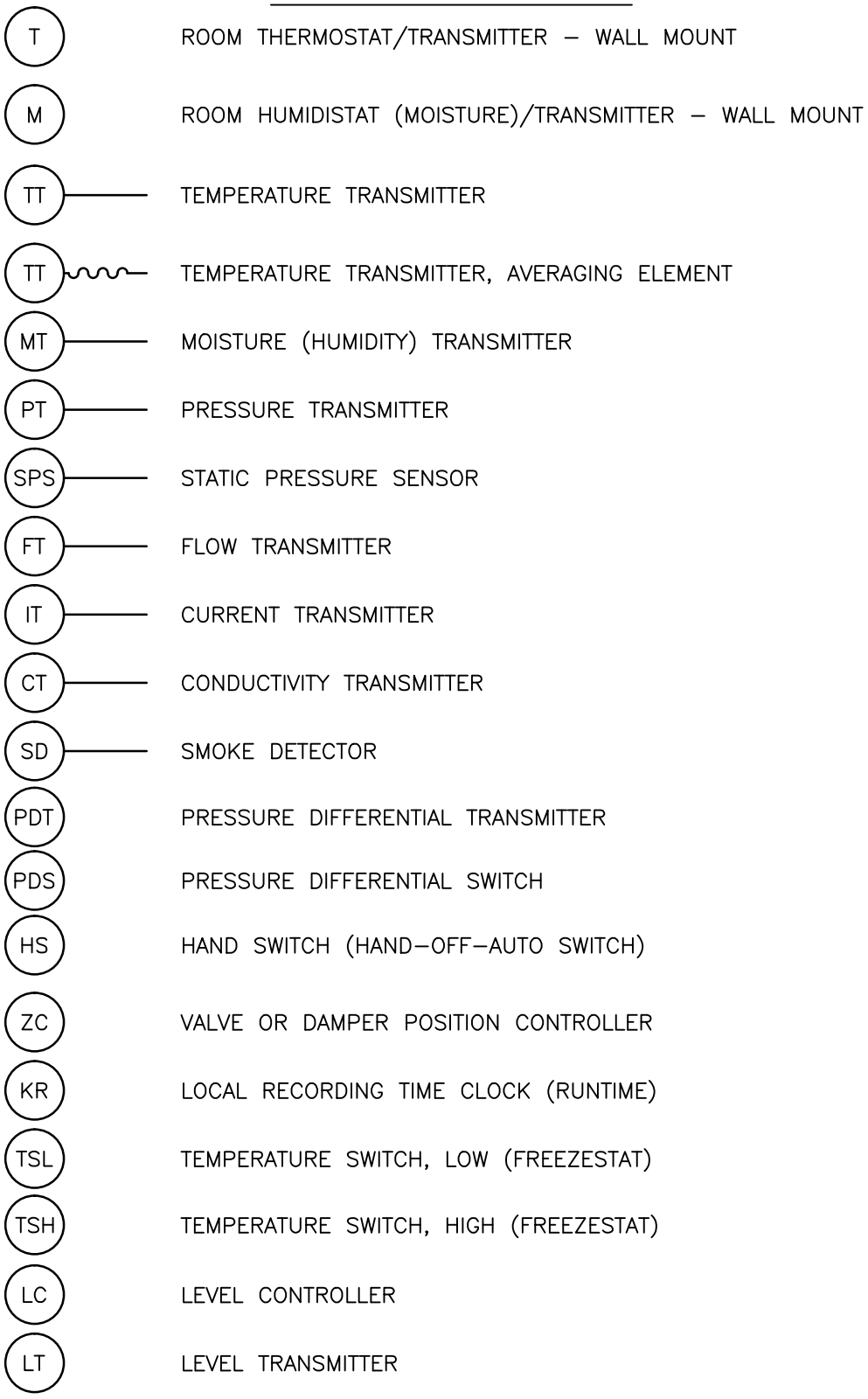
Department of Veterans Affairs

DETAIL TITLE: VALVE SYMBOLS

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511–17.DWG

CONTROLS SYMBOLS



Department of Veterans Affairs

DETAIL TITLE / CONTROLS SYMBOLS

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010 CAD DETAIL NO.: SD230511–18.DWG

CONTROLS SYMBOLS

PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
EPT	ELECTRONIC TO PNEUMATIC TRANSDUCER
AT $_{CO2}$	CARBON DIOXIDE TRANSMITTER
AT $_{CO}$	CARBON MONOXIDE TRANSMITTER
AT $_{OC}$	OCCUPANCY SENSOR
LTCP	LOCAL TEMPERATURE CONTROL PANEL
HVAC	HVAC CONTROL PANEL
VSMC	VARIABLE SPEED MOTOR CONTROLLER
ECC	INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER
TC	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
PC	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
SC	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION
FC	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
KC	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE

Department of Veterans Affairs

DETAIL TITLE / CONTROLS SYMBOLS

SCALE :NONE

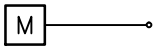
DATE ISSUED: SEPTEMBER 2010 CAD DETAIL NO.: SD230511-19.DWG

CONTROLS SYMBOLS

TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES [200mm] MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)

SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS

MOTOR STARTER



ELECTRIC OPERATED CONTROL DAMPER/OR VALVE

Department of Veterans Affairs

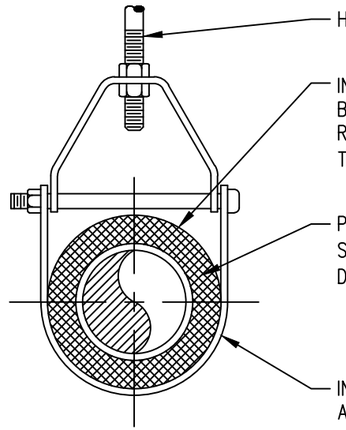
DETAIL TITLE / CONTROLS SYMBOLS

SCALE :NONE

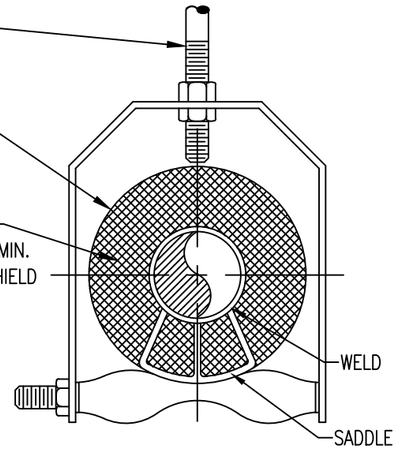
DATE ISSUED: SEPTEMBER 2010 CAD DETAIL NO.: SD230511-20.DWG

DESIGNER'S NOTE:
SHOW ON THE DRAWINGS OTHER SPECIFIED AND SPECIAL PIPE SUPPORTS WHERE REQUIRED.

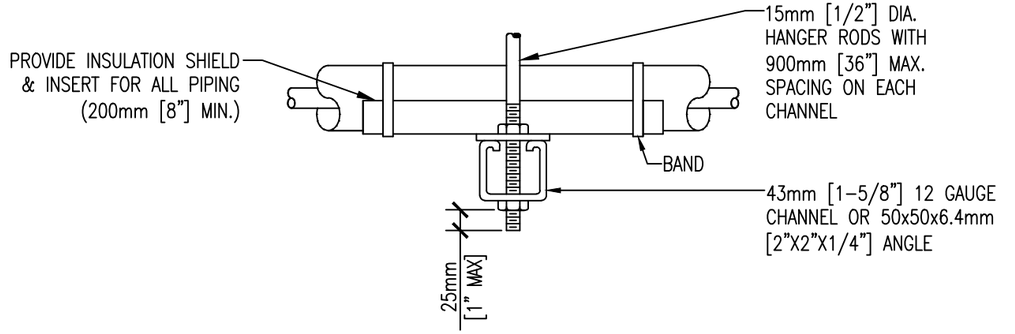
NOTES:
SEE SPECIFER FOR DETAILED HANGER REQUIREMENTS



ADJUSTABLE CLEVIS HANGER TYPE 1 – SEE SPECIFICATIONS



ADJUSTABLE CLEVIS HANGER TYPE 43 – SEE SPECIFICATIONS



SIDE VIEW TRAPEZE HANGER FOR UP TO 453KG [1000 LB.] UNIFORM LOAD

MAXIMUM PIPE/TUBING SUPPORT SPACING																			
NOM. SIZE	mm [IN]	THRU 20 [THRU ¾]	25 [1]	32 [1¼]	40 [1½]	50 [2]	65 [2½]	75 [3]	100 [4]	125 [5]	150 [6]	200 [8]	250 [10]	300 [12]	350 [14]	400 [16]	450 [18]	500 [20]	600 [24]
PIPE	mm [FT]	2100 [7]	2100 [7]	2100 [7]	2700 [9]	3000 [10]	3400 [11]	3700 [12]	4100 [14]	4900 [16]	5200 [17]	5800 [19]	6700 [22]	7000 [23]	7600 [25]	8200 [27]	8500 [28]	9100 [30]	9600 [32]
TUBING	mm [FT]	1500 [5]	1800 [6]	2100 [7]	2400 [8]	2400 [8]	2700 [9]	3000 [10]	3700 [12]	4000 [13]	4100 [14]	4900 [16]	– –	– –	– –	– –	– –	– –	– –
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

PIPE HANGERS

NTS

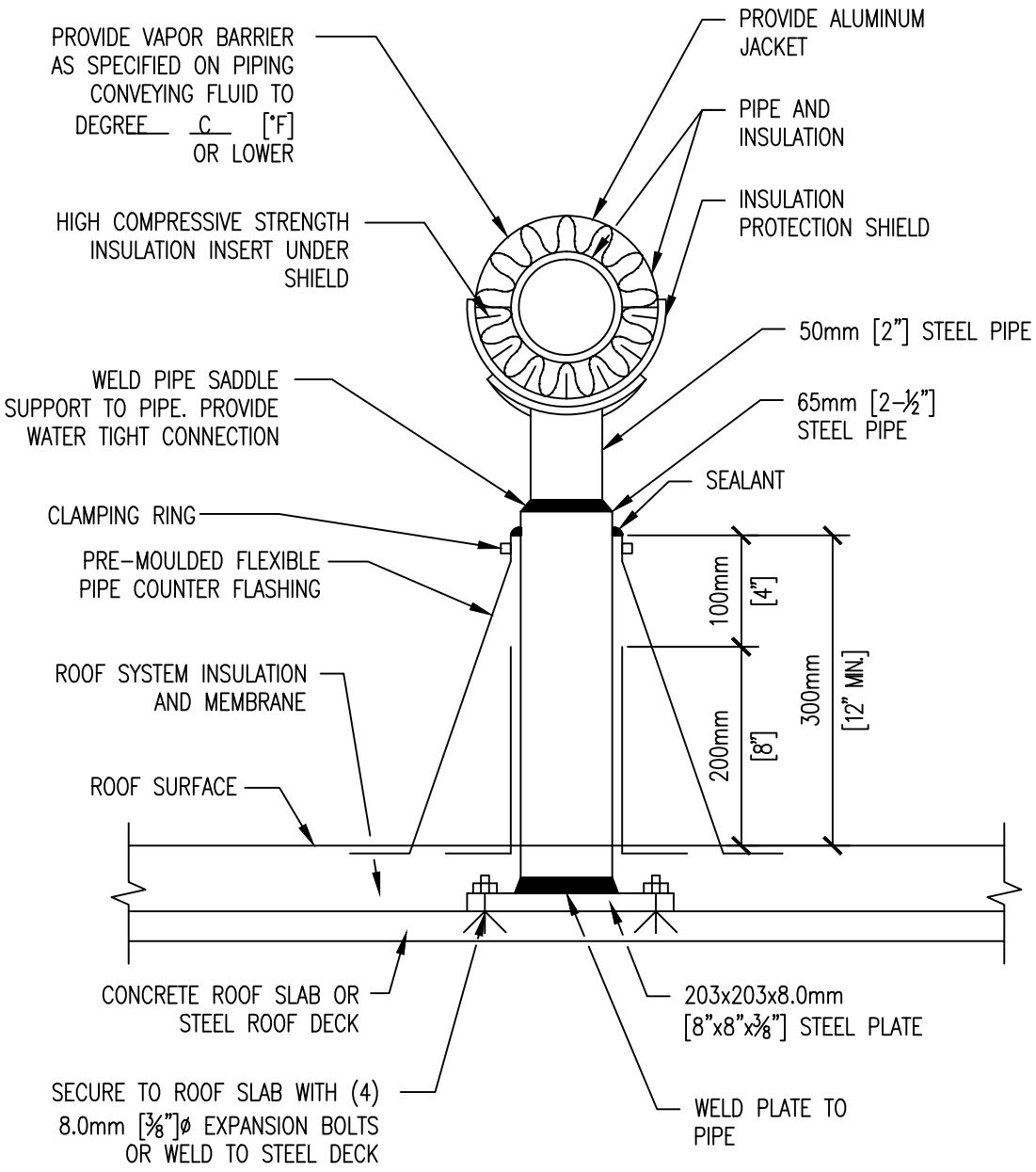
DETAIL TITLE: PIPE HANGERS

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. SD230511-21.DWG

Department of Veterans Affairs



NOTES:
PROVIDE RESTRAINING CLAMPS 2438mm [8'-0"] O.C.

DETAIL FOR SUPPORTING PIPE ON ROOF

NTS

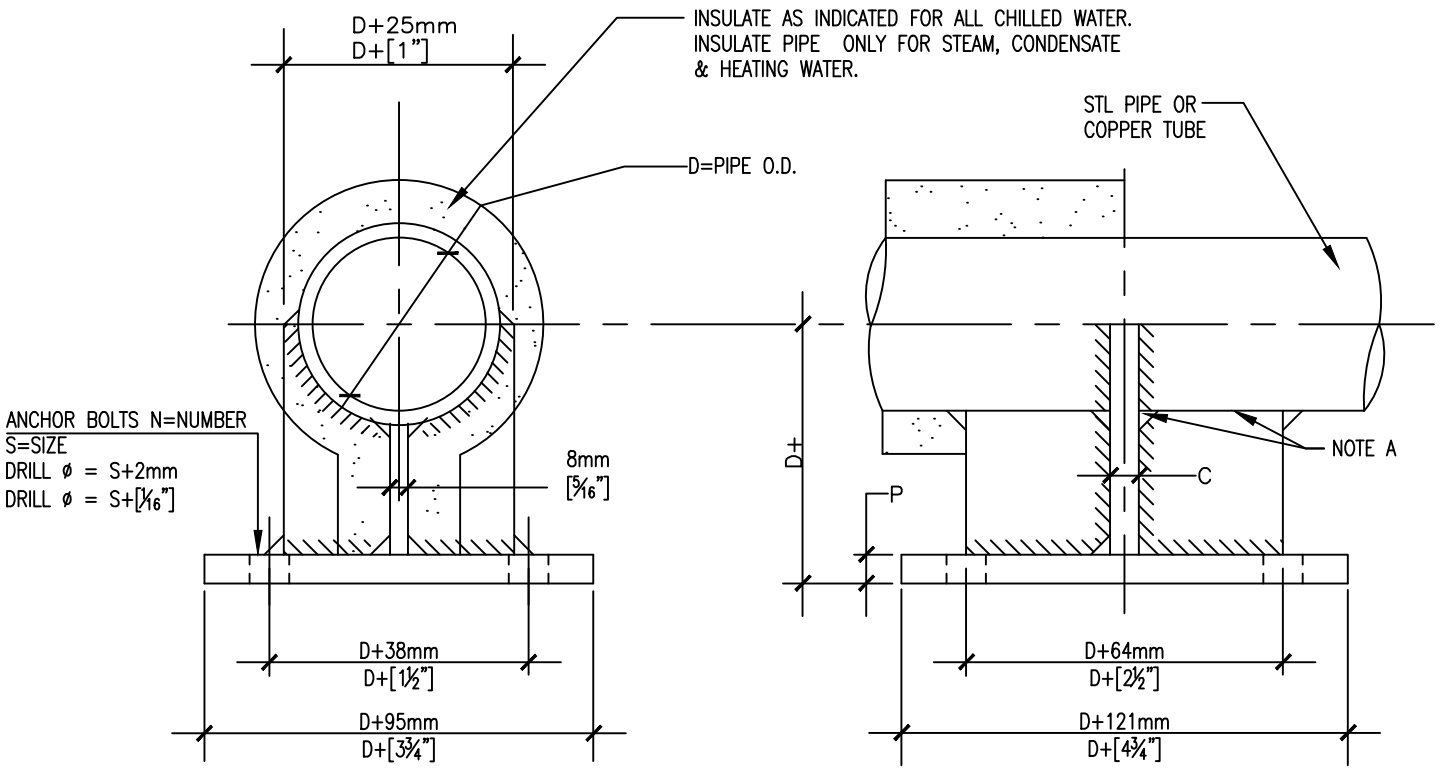
Department of Veterans Affairs

DETAIL TITLE: DETAIL FOR SUPPORTING PIPE ON ROOF

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-22.DWG

PIPE ANCHOR SCHEDULE										
D		P		C		N		S		BOLT PATTERN
mm	in	mm	in	mm	in	mm	in	mm	in	
102	4	16	5/8	19	3/4	102	4	19	3/4	
76	3	13	1/2	13	1/2	102	4	16	5/8	
64	2 1/2	10	3/8	10	3/8	102	4	16	5/8	
51	2	10	3/8	10	3/8	102	4	16	5/8	
38	1 1/2	10	3/8	6	1/4	102	4	13	1/2"	



NOTE:
WHERE USED FOR COPPER TUBE OR PIPE, BRAZE TO FABRICATED STEEL ANCHOR

SMALL PIPE ANCHOR 38-102mm [1 1/2"-4"]

NTS

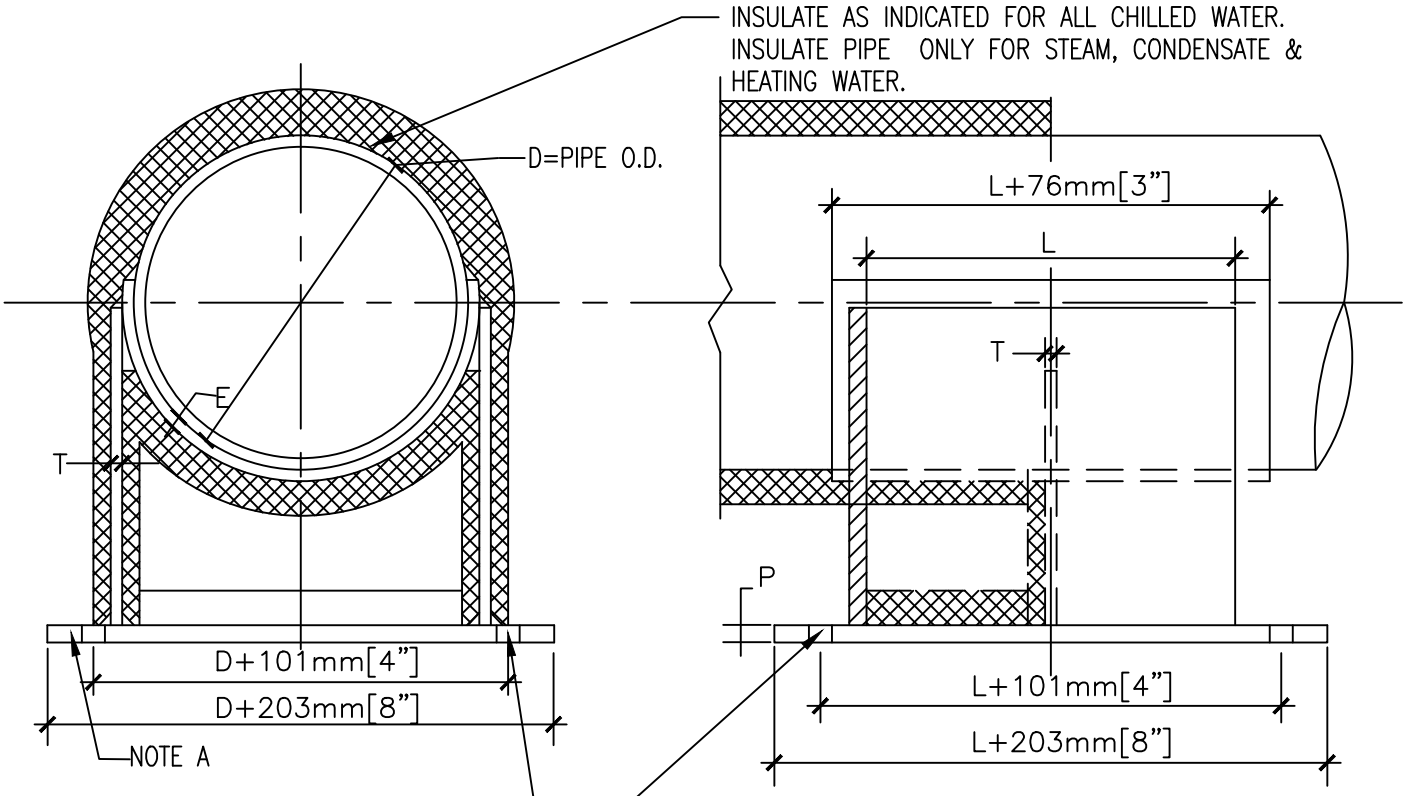
Department of Veterans Affairs

DETAIL TITLE: SMALL PIPE ANCHOR 38-104mm [1-1/2"-4"]

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-23.DWG

PIPE ANCHOR SCHEDULE														
D		L		P		T		E		N		S		BOLT PATTERN
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
152	6	216	8½	19	¾	10	⅜	6	¼	102	4	22	⅞	
203	8	254	10	19	¾	13	½	6	¼	102	4	22	⅞	
254	10	305	12	19	¾	13	½	6	¼	102	4	22	⅞	
305	12	356	14	19	¾	13	½	6	¼	102	4	22	⅞	
356	14	406	16	19	¾	13	½	13	½	102	4	22	⅞	
406	16	457	18	19	¾	13	½	13	½	102	4	22	⅞	
457	18	508	20	25	1	13	⅝	13	½	152	6	25	1	



NOTES:

A. INSTALL WALL PLATE FIRST THEN WELD ON REMAINING ASSEMBLY. ONE WALL PLATE FOR BOTH CHILLED WATER S.&R. IS OPTIONAL.

ANCHOR BOLTS
N=NUMBER S=SIZE
DRILL ø = S+3.175mm
DRILL ø = S+[⅛"]

LARGE PIPE ANCHOR 152-457mm [6" -18"]

NTS

Department of Veterans Affairs

DETAIL TITLE: LARGE PIPE ANCHOR 152-457mm [6"-18"]

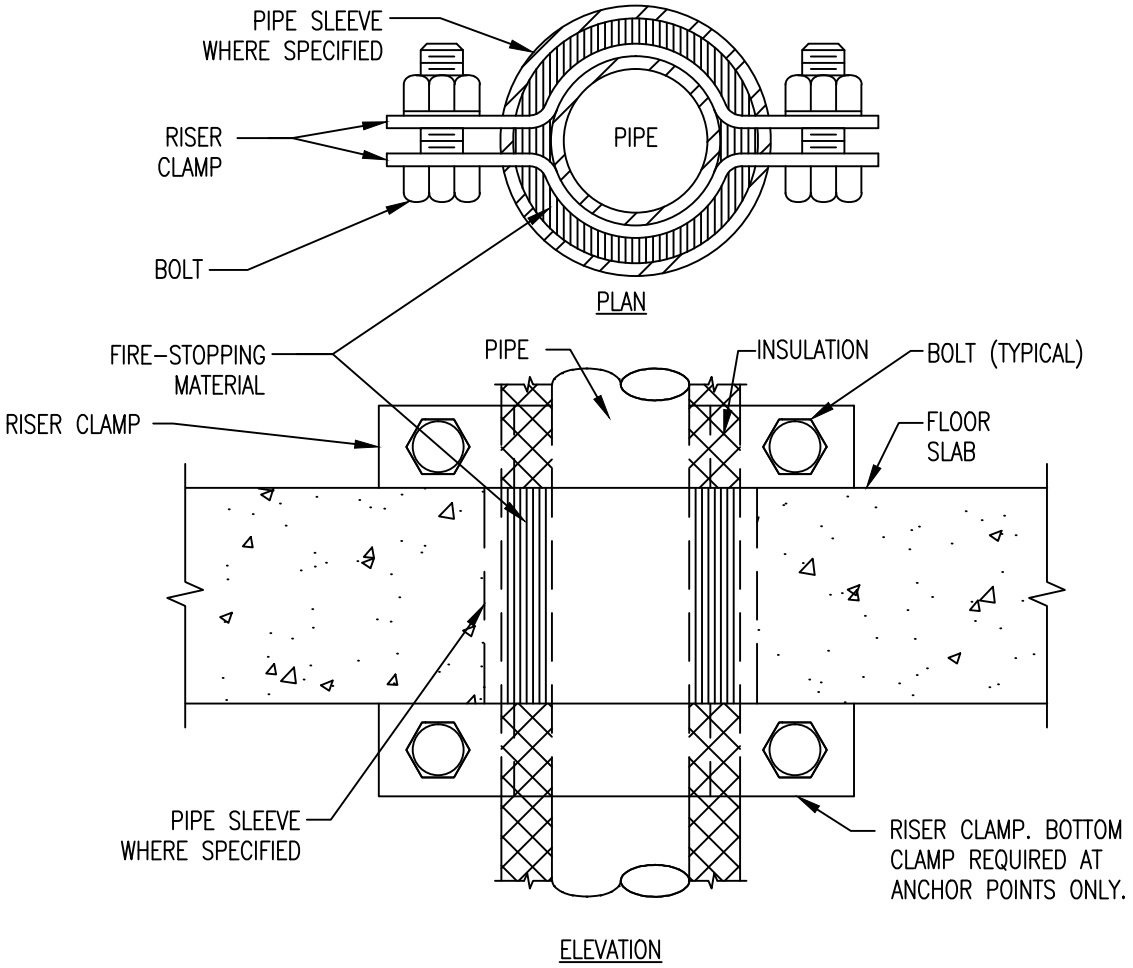
SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-24.DWG

NOTES:

1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.
2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

DESIGNER'S NOTE:
SHOW REQUIRED ANCHORS ON PLAN, SECTIONS OR DIAGRAMS.



SUPPORT/ANCHOR FOR PIPE RISERS

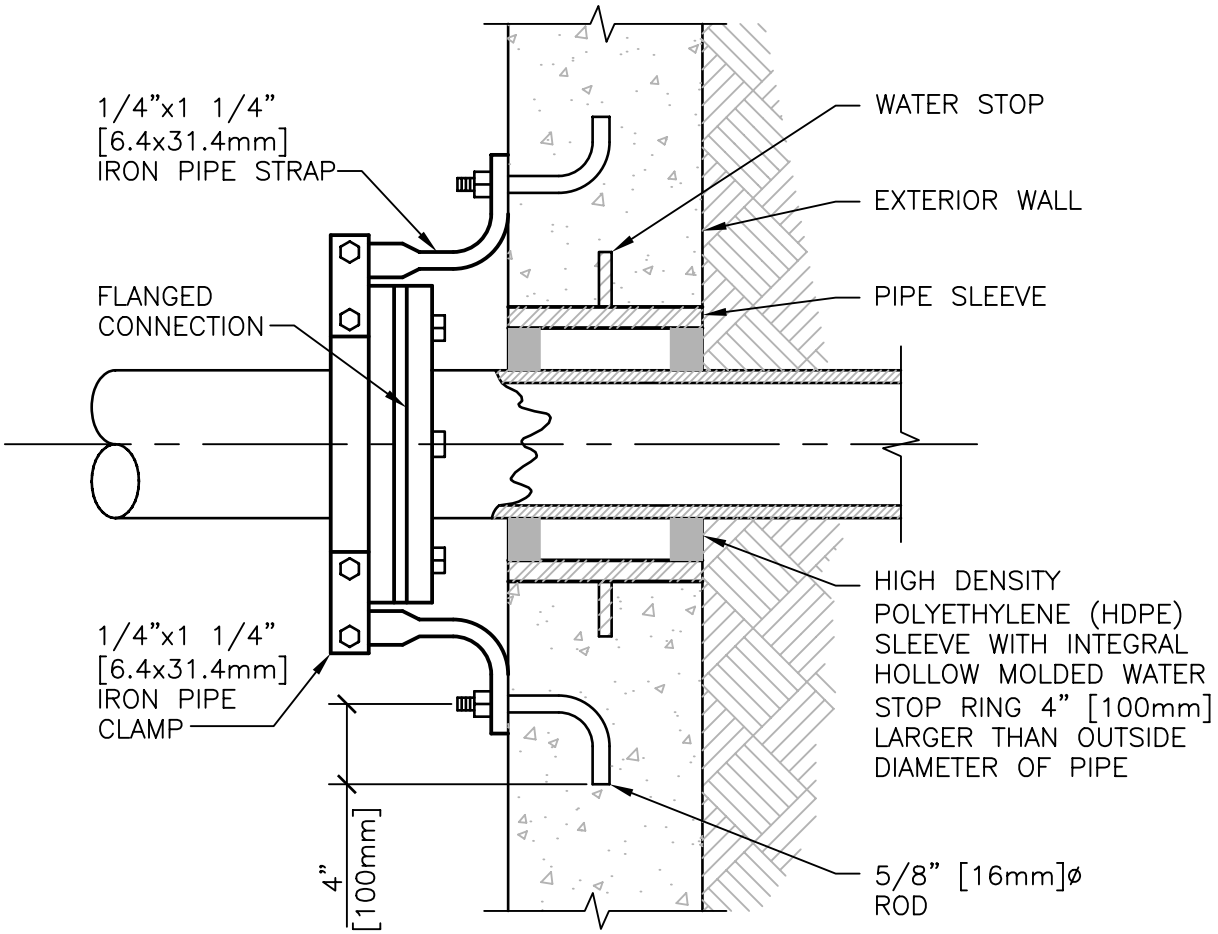
NTS

Department of Veterans Affairs

DETAIL TITLE: SUPPORT/ANCHOR FOR PIPE RISERS

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230511-25.DWG



SUPPORT ANCHOR (CONDENSER WATER OR CHILLED WATER)

#

NTS

Department of Veterans Affairs

DETAIL TITLE / SUPPORT ANCHOR (CONDENSER WATER OR CHILLED WATER)

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-26.DWG

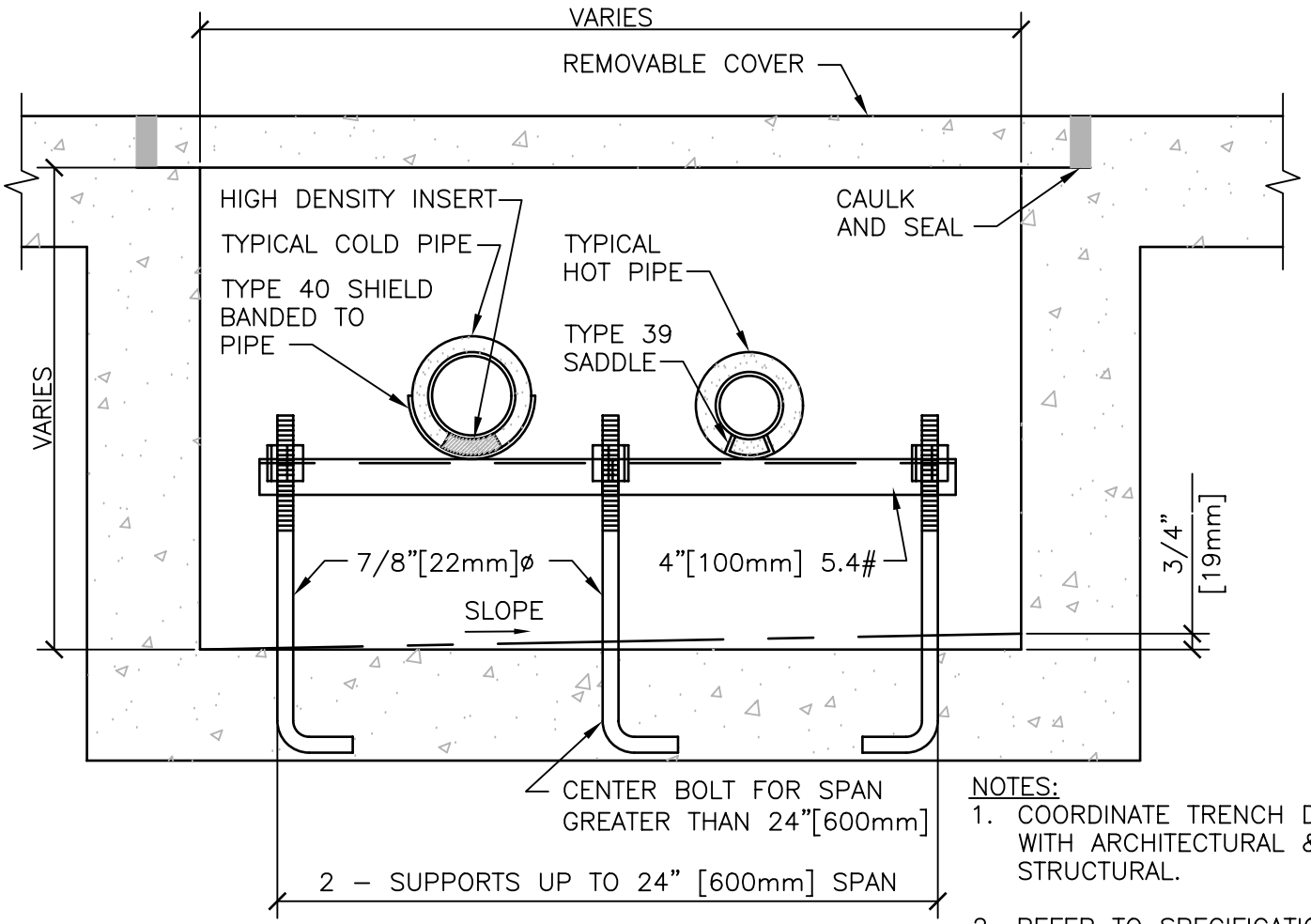
Department of Veterans Affairs

DETAIL TITLE / PIPE TRENCH IN BUILDING

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD230511-27.DWG



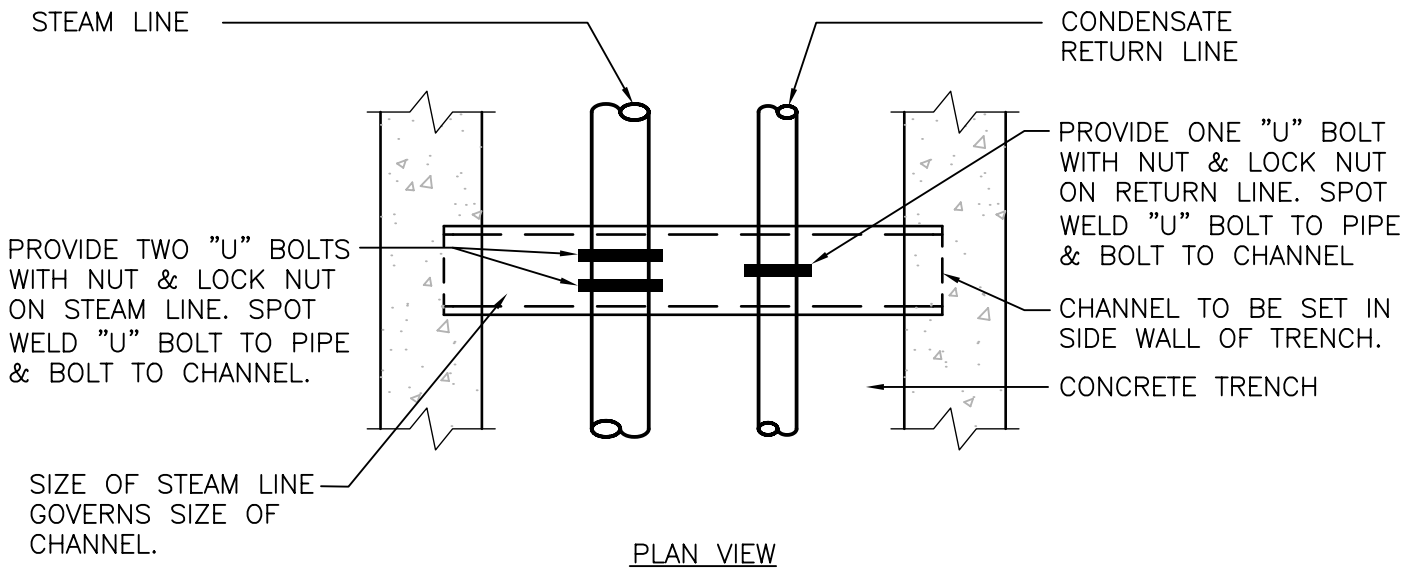
NOTES:

1. COORDINATE TRENCH DETAIL WITH ARCHITECTURAL & STRUCTURAL.
2. REFER TO SPECIFICATION, SEALING & CAULKING.

PIPE TRENCH IN BUILDING

NTS

DESIGNER'S NOTE:
COORDINATE TRENCH DETAIL WITH ARCHITECTURAL & STRUCTURAL.



PLAN VIEW

SCHEDULE		
SIZE OF PIPE INCH [mm]	SIZE OF "U" BOLT INCH [mm]	SIZE OF CHANNEL INCH [mm]
1 – 2 [25 – 50]	3/8 [10] DIA.	6 x 10.5 [150x265]
2-1/2 – 5 [65 – 125]	1/2 [15] DIA.	8 x 13.75 [200x345]
6 – 8 [150 – 200]	3/4 [20] DIA.	10 x 20 [250x500]

SCHEDULE FOR 8 FT. [2.4m] SPAN OR LESS.

ANCHOR INSTALLATION STEAM/CONDENSATE PIPING IN TRENCH

#

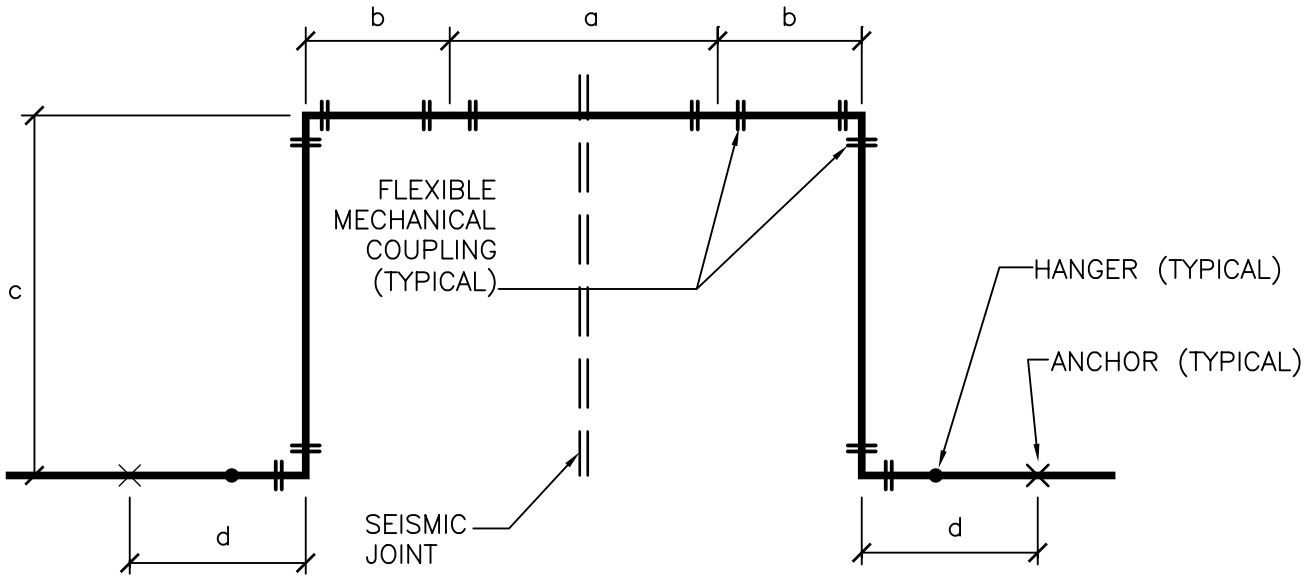
NTS

Department of Veterans Affairs

DETAIL TITLE / ANCHOR INSTALLATION – STEAM/CONDENSATE PIPING IN TRENCH

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511-28.DWG



DETAIL "A"
(STEEL PIPE FOR WATER/GLYCOL)

NOTE:

1. SEISMIC SEPARATION ASSEMBLY DETAIL SHOWN IN NFPA 13 (SPRINKLER PIPING), UTILIZING FLEXIBLE MECHANICAL COUPLINGS, MAY BE USED IN LIEU OF PIPING DETAIL SHOW ABOVE.

SCHEDULE FOR PIPING CROSSING A SEISMIC JOINT

LOCATION	PIPE	DETAIL	DIMENSIONS INCHES [mm]					
			a	b	c	d	e	f
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–

PIPING CROSSING A SEISMIC JOINT DETAIL "A"

NTS

DESIGNER'S NOTE:

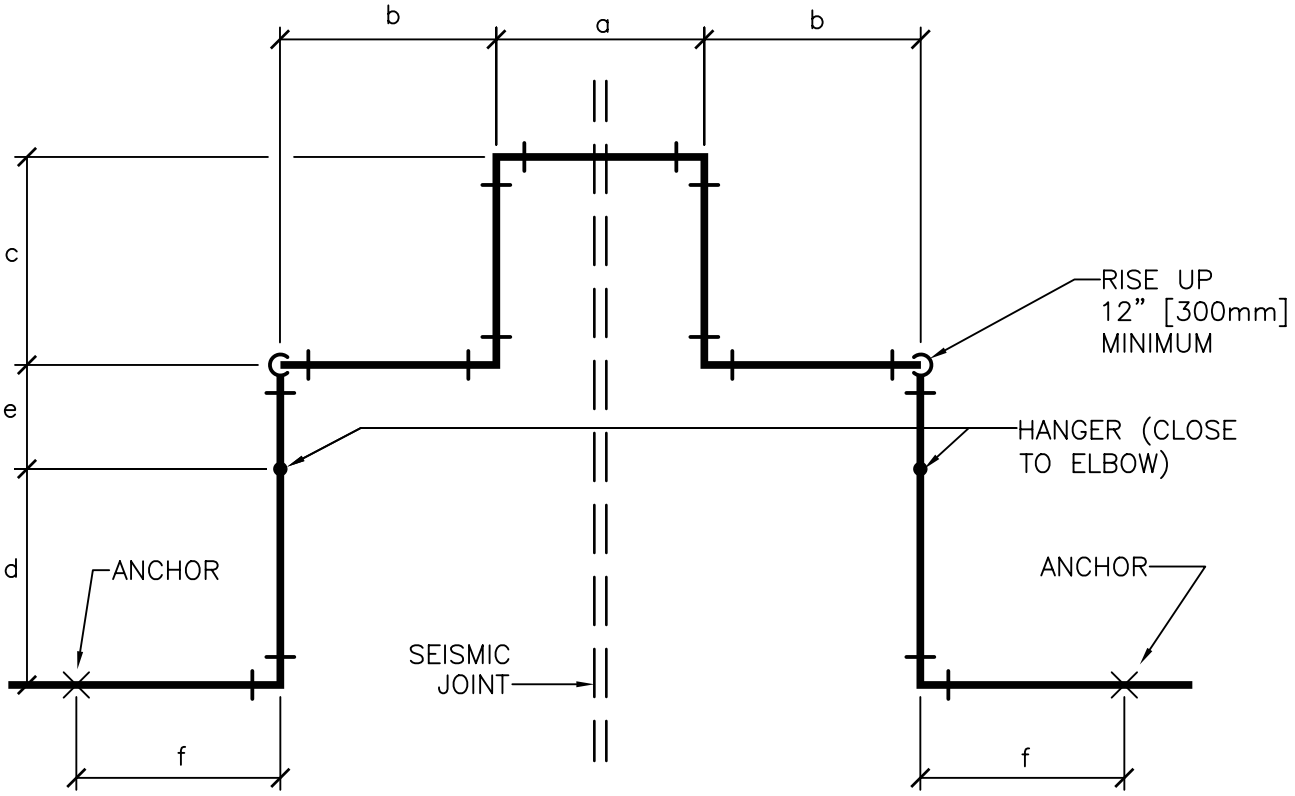
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. THE MECHANICAL DESIGNER SHALL COMPLETE THE BLANK SCHEDULES BY INSERTING THE DISTANCES, TO BE CALCULATED AND FURNISHED BY PROVIDED BY THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.

Department of Veterans Affairs

DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT DETAIL "A"

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511–29.DWG



DETAIL "B"

(PLASTIC PIPE FOR PRESSURIZED SYSTEMS)

SCHEDULE FOR PIPING CROSSING A SEISMIC JOINT

LOCATION	PIPE	DETAIL	DIMENSIONS INCHES [mm]			
			a	b	c	d
–	–	–	–	–	–	–
–	–	–	–	–	–	–

PIPING CROSSING A SEISMIC JOINT DETAIL "B"

#

NTS

DESIGNER'S NOTE:

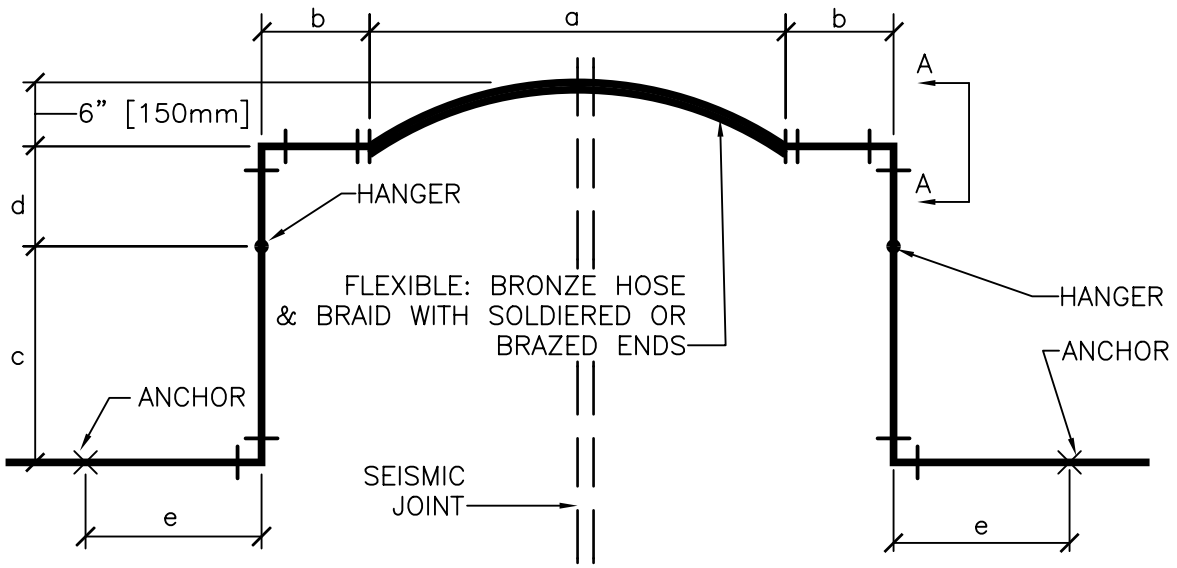
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. THE MECHANICAL DESIGNER SHALL COMPLETE THE BLANK SCHEDULES BY INSERTING THE DISTANCES, TO BE CALCULATED AND FURNISHED BY PROVIDED BY THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.

Department of Veterans Affairs

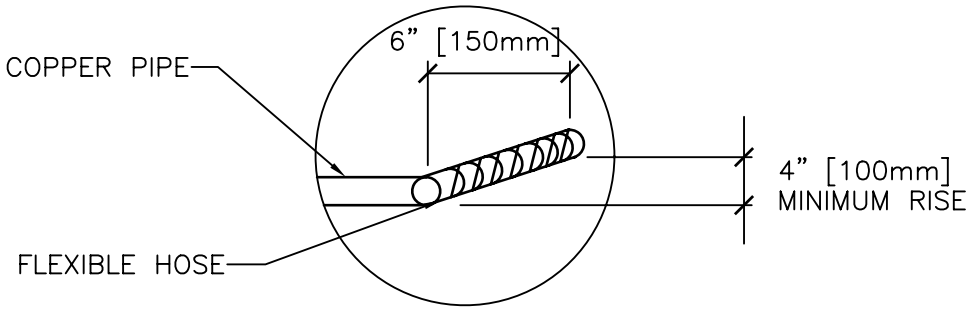
DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT
DETAIL "B"

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511–30.DWG



DETAIL "C"
(COPPER PIPE)



SECTION "A–A"

SCHEDULE FOR PIPING CROSSING A SEISMIC JOINT

LOCATION	PIPE	DETAIL	DIMENSIONS INCHES [mm]				
			a	b	c	d	e
–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–

PIPING CROSSING A SEISMIC JOINT DETAIL "C"

NTS

DESIGNER'S NOTE:

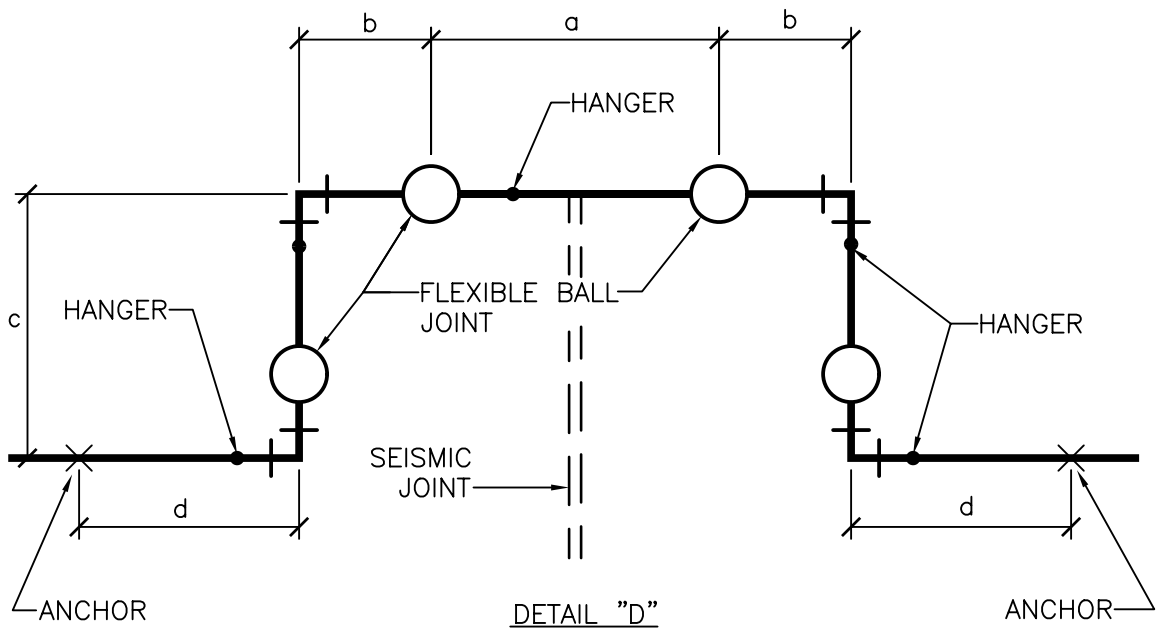
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. THE MECHANICAL DESIGNER SHALL COMPLETE THE BLANK SCHEDULES BY INSERTING THE DISTANCES, TO BE CALCULATED AND FURNISHED BY PROVIDED BY THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.

Department of Veterans Affairs

DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT
DETAIL "C"

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511–31.DWG



DETAIL "D"

(STEEL PIPE FOR STEAM OR WATER)

SCHEDULE FOR PIPING CROSSING A SEISMIC JOINT

LOCATION	PIPE	DETAIL	DIMENSIONS INCHES [mm]			
			a	b	c	d
–	–	–	–	–	–	–
–	–	–	–	–	–	–

PIPING CROSSING A SEISMIC JOINT DETAIL "D"

#

NTS

DESIGNER'S NOTE:

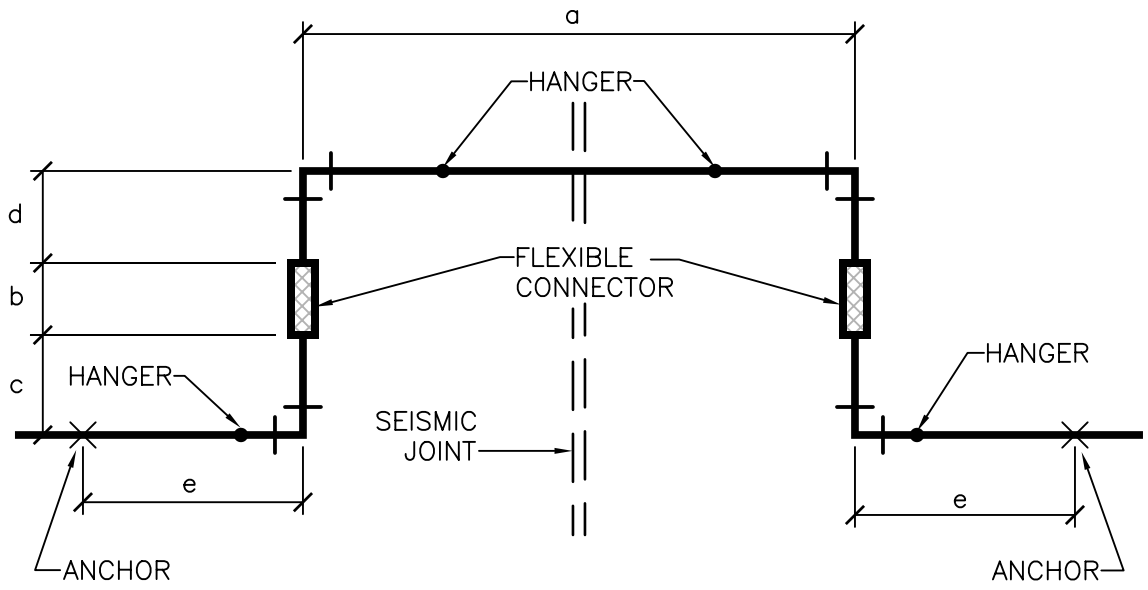
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. THE MECHANICAL DESIGNER SHALL COMPLETE THE BLANK SCHEDULES BY INSERTING THE DISTANCES, TO BE CALCULATED AND FURNISHED BY PROVIDED BY THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.

Department of Veterans Affairs

DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT DETAIL "D"

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511–32.DWG



DETAIL "E"

(STEEL PIPE FOR WATER)

SCHEDULE FOR PIPING CROSSING A SEISMIC JOINT

LOCATION	PIPE	DETAIL	DIMENSIONS INCHES [mm]					
			a	b	c	d	e	f
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–

PIPING CROSSING A SEISMIC JOINT DETAIL "E"

#

NTS

DESIGNER'S NOTE:

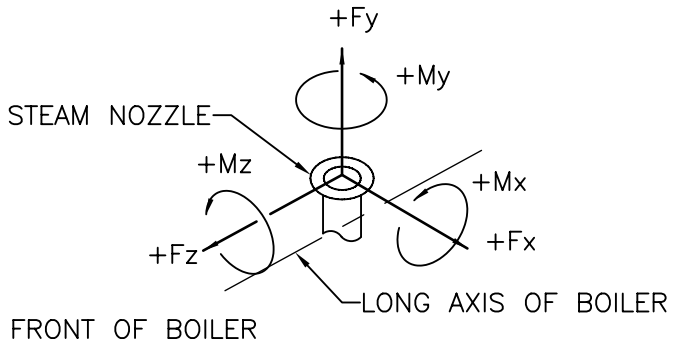
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. THE MECHANICAL DESIGNER SHALL COMPLETE THE BLANK SCHEDULES BY INSERTING THE DISTANCES, TO BE CALCULATED AND FURNISHED BY PROVIDED BY THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.

Department of Veterans Affairs

DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT
DETAIL "E"

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD230511–33.DWG



ISOMETRIC VIEW

TABLE OF FORCES AND MOMENTS DUE TO THERMAL EXPANSION AND WEIGHT OF STEAM LEAD AND VALVES

BOILER NO.	Fx LB [Kg]	Fy LB [Kg]	Fz LB [Kg]	Mx FT LB [J]	My FT LB [J]	Mz FT LB [J]
------	--[--]	--[--]	--[--]	--[--]	--[--]	--[--]

TABLE OF FORCES AND MOMENTS DUE TO SEISMIC ACTION OF THE STEAM LEAD AND VALVES

BOILER NO.	Fx LB [Kg]	Fy LB [Kg]	Fz LB [Kg]	Mx FT LB [J]	My FT LB [J]	Mz FT LB [J]
------	--[--]	--[--]	--[--]	--[--]	--[--]	--[--]

NOTES:

1. BOILERS SHALL BE DESIGNED TO WITHSTAND THE FORCES AND MOMENTS SHOWN ABOVE.

2. ADD ANY Fy FORCE (500 LB [230 Kg] MINIMUM) AS AN ESTIMATION OF THE WEIGHT EFFECT OF THE STEAM LEAD AND VALVE ON THE BOILER. BOILER AND PIPE HANGER SUPPLIERS SHALL COORDINATE TO DETERMINE THE EXACT Fy FORCE WHICH WILL BE IMPOSED ON THE STEAM NOZZLES.

3. DELETE THE SEISMIC TABLE ON NON-SEISMIC AREAS.

FORCES AND MOMENTS ON BOILER STEAM NOZZLES

#

NTS

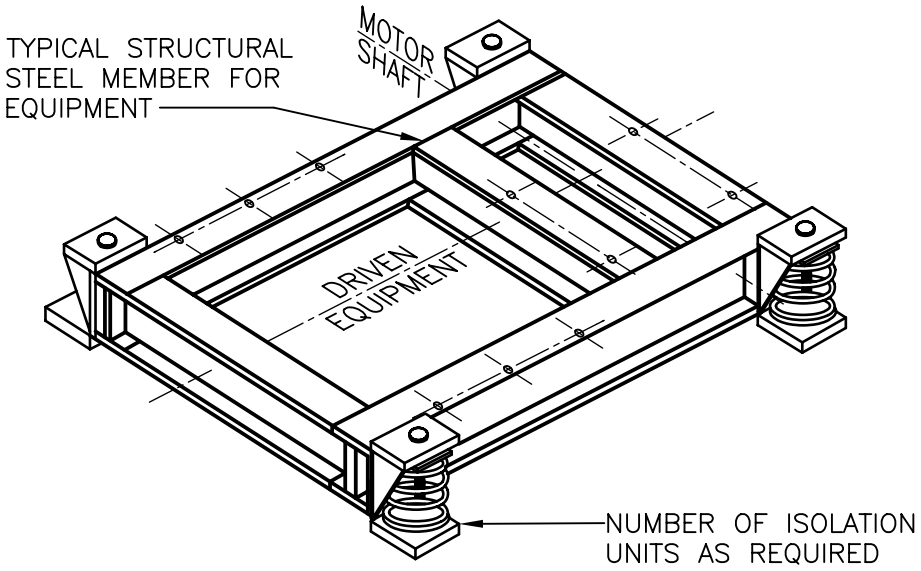
Department of Veterans Affairs

DETAIL TITLE / FORCES AND MOMENTS ON BOILER STEAM NOZZLES

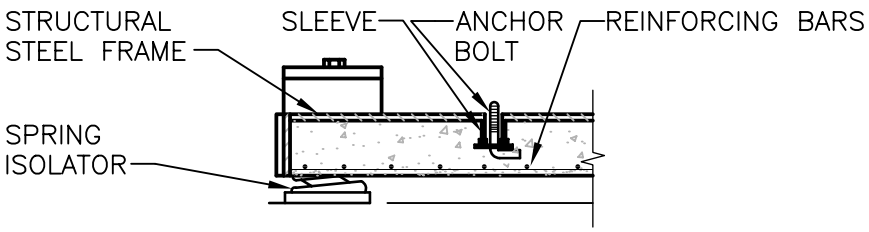
SCALE :NONE

DATE ISSUED :FEBRUARY 2008

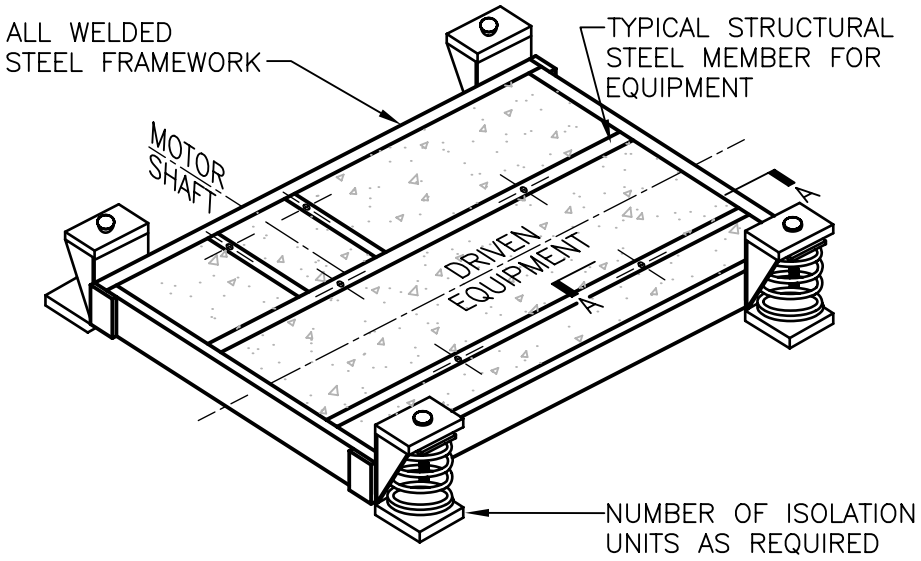
CADD DETAIL NO. : SD230511-34.DWG



TYPE"B"
WELDED STEEL BASE



SECTION A–A



TYPE "1"
CONCRETE INERTIA BASE

VIBRATION ISOLATION BASES

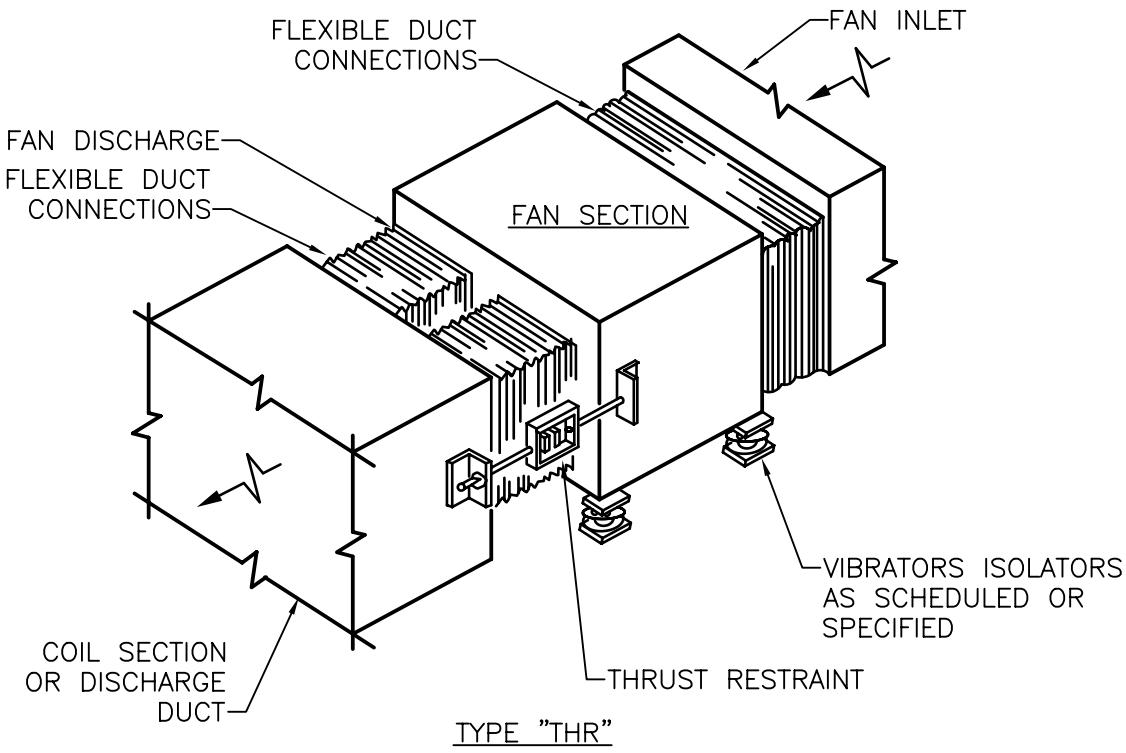
NTS

Department of Veterans Affairs

DETAIL TITLE / VIBRATION ISOLATION BASES

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541–01.DWG



TYPE "THR"

NOTES:

1. ATTACH THRUST RESTRAINTS SYMMETRICALLY ON BOTH SIDES OF THE FAN DISCHARGE.
2. ADJUST RESTRAINT TO ALLOW 1/4" [6 mm] MOVEMENT OF FAN AT START AND STOP.

THRUST RESTRAINT FOR FANS

NTS

DESIGNER'S NOTE:

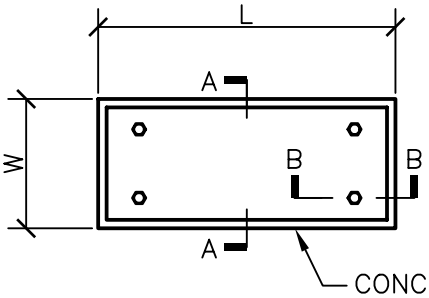
ON THE VIBRATION ISOLATION SCHEDULE OR UNDER THE TITLE OF THIS DETAIL DESIGNATE FANS REQUIRING RESTRAINT. THIS IS USUALLY SEPARATELY MOUNTED FAN SECTIONS FOR STATIC PRESSURE OVER 4" [100 mm] AND POSSIBLY FOR AXIAL FLOW FANS FOR STATIC PRESSURE OVER 4" [100 mm].

Department of Veterans Affairs

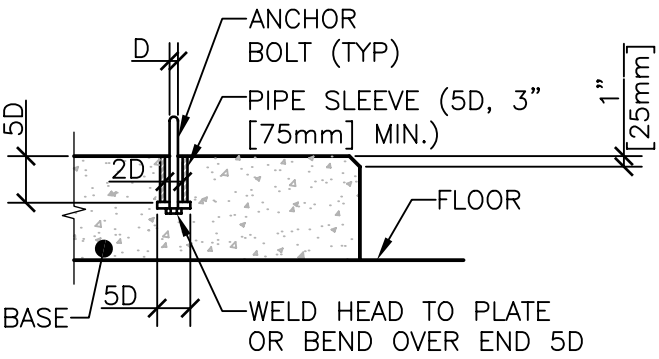
DETAIL TITLE / THRUST RESTRAINT FOR FANS

SCALE :NONE

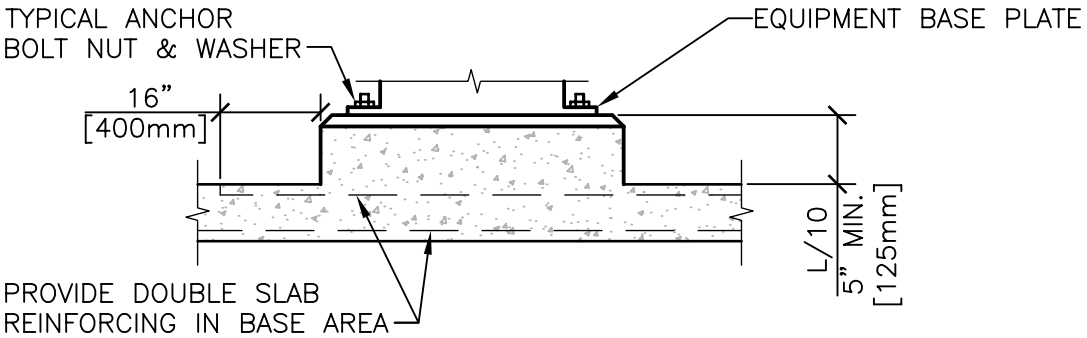
DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541-02.DWG



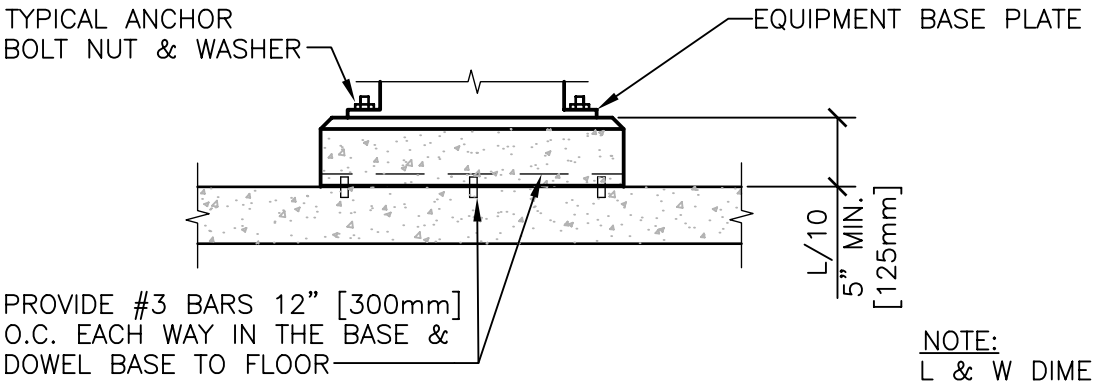
PLAN



SECTION B–B



SECTION A–A (BASE POURED WITH FLOOR SLAB)



SECTION A–A (BASE NOT POURED WITH SLAB)

NOTE:
L & W DIMENSIONS SHALL BE 6" [150mm] GREATER THAN THE EQUIPMENT BASE PLATE.

CONCRETE EQUIPMENT BASES

NTS

DESIGNER'S NOTE:
THIS DETAIL IS PRIMARILY FOR PUMPS WITHOUT ISOLATORS. COORDINATE DETAIL WITH ARCHITECTURAL AND STRUCTURAL.

Department of Veterans Affairs

DETAIL TITLE / CONCRETE EQUIPMENT BASES

SCALE :NONE

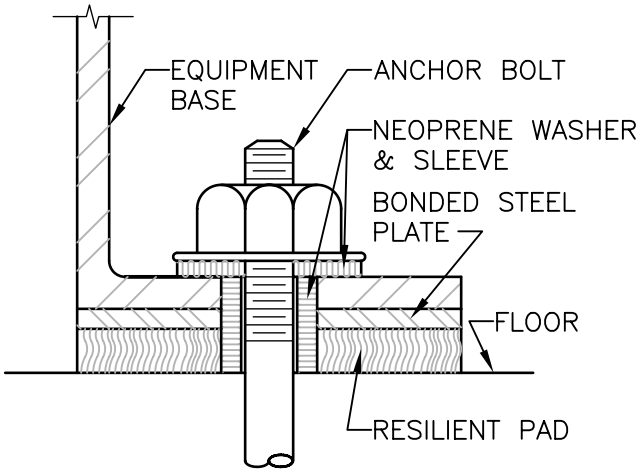
DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541–03.DWG

Department of Veterans Affairs

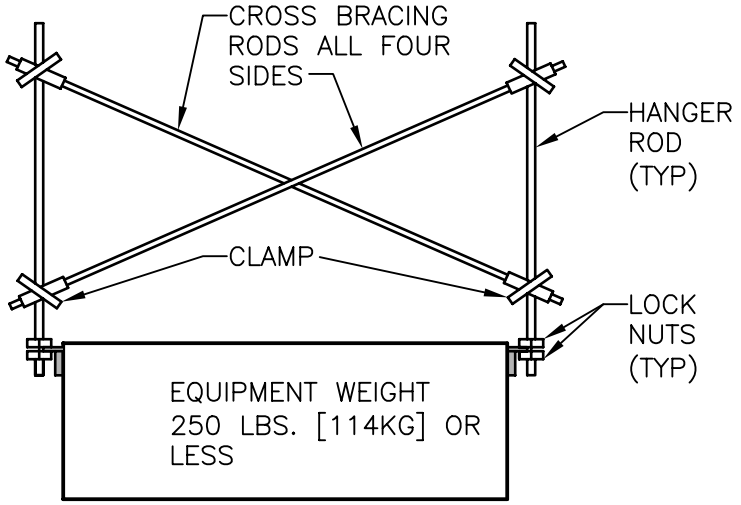
DETAIL TITLE / SEISMIC BRACING FOR LIGHT SUSPENDED EQUIPMENT/ EQUIPMENT RESTRAINED BY RESILIENT PADS (TYPE DS)

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541-04.DWG



FLOOR MOUNT EQUIPMENT RESTRAINED BY RESILIENT PADS (TYPE DS)

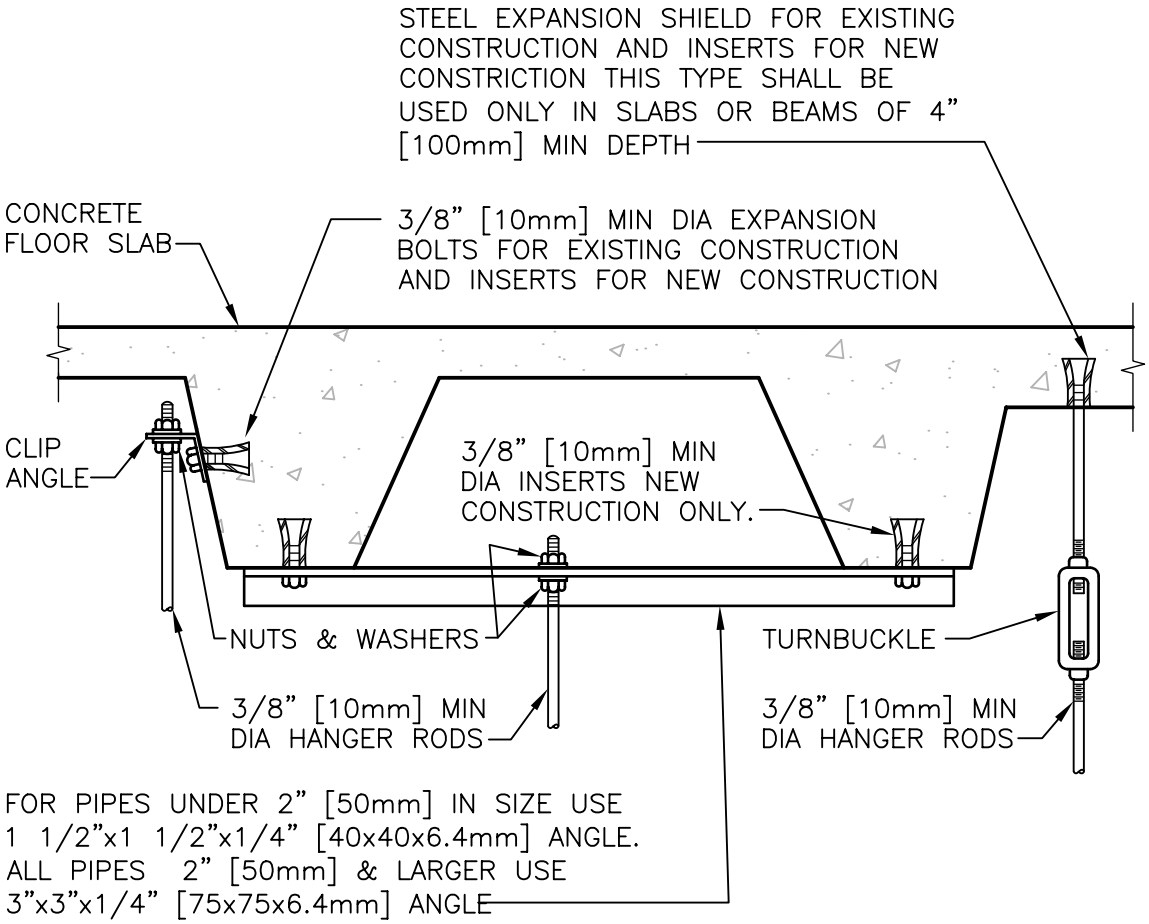


SEISMIC BRACING FOR LIGHT SUSPENDED EQUIPMENT

NOTE:
NOT REQUIRED FOR AIR TERMINAL UNITS.

SEISMIC BRACING FOR EQUIPMENT

NTS



SECURING HANGER RODS IN CONCRETE

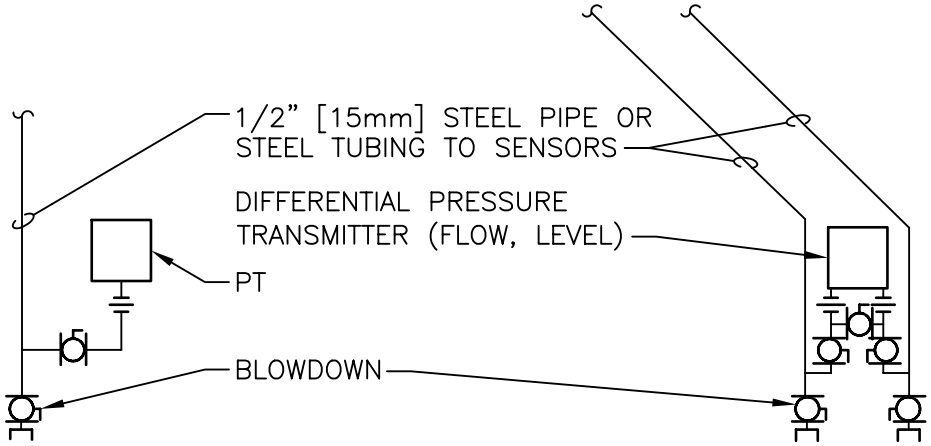
NTS

Department of Veterans Affairs

DETAIL TITLE / SECURING HANGER RODS IN CONCRETE

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541-05.DWG



ELEVATION

NOTES:

1. INSTALLATION OF SENSORS AND TRANSMITTERS SHALL CONFORM TO RECOMMENDATIONS OF MANUFACTURERS OF TRANSMITTERS.

PRESSURE TRANSMITTER INSTALLATION

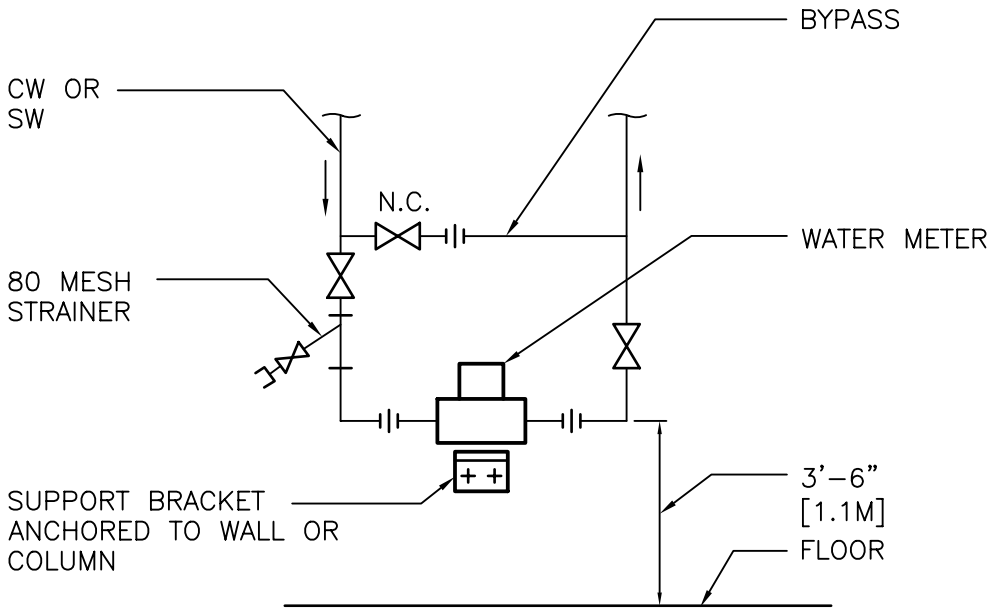
NTS

Department of Veterans Affairs

DETAIL TITLE / PRESSURE TRANSMITTER INSTALLATION

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230911-01.DWG



ELEVATION

WATER METER INSTALLATION

NTS

Department of Veterans Affairs

DETAIL TITLE / WATER METER INSTALLATION

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD230911-02.DWG

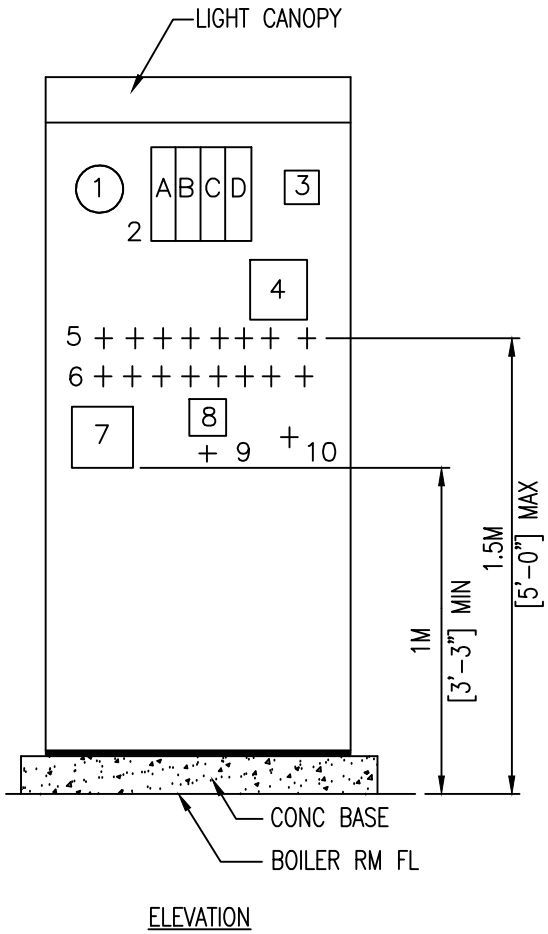
Department of Veterans Affairs

DETAIL TITLE: BURNER CONTROL PANEL FOR WATER TUBE BOILERS

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. : SD230911-03.DWG



ELEVATION

LEGEND

ITEM NO.	DESCRIPTION
1.	ALARM BELL (WATER LEVEL)
2.	2 DRAFT GAUGES
	A. WINDBOX (0 TO _____mm(___IN) WC) (SEE NOTE 4)
	B. FURNACE (0 TO _____mm(___IN) WC) (SEE NOTE 4)
	C. BOILER OUTLET (-_____mm(___IN) TO + _____mm(___IN) WC) (SEE NOTE 5)
	D. ECONOMIZER OUTLET (-25mm(-1") TO +25mm(+1") WC) (SEE NOTE 5)
3.	ALARM HORN (FLAME FAILURE, LOW WATER CUTOUT)
4.	BURNER CONTROL SYSTEM ANNUNCIATOR
5.	ROW OF BURNER CYCLE PILOT-LIGHTS
6.	ROW OF BURNER CONTROL SWITCHES
7.	BOILER WATER LEVEL CONTROL STATION
8.	ECONOMIZER TEMPERATURE INDICATOR
9.	SELECTOR SWITCH FOR ECONOMIZER TEMPERATURE INDICATOR
10.	BURNER STOP SWITCH

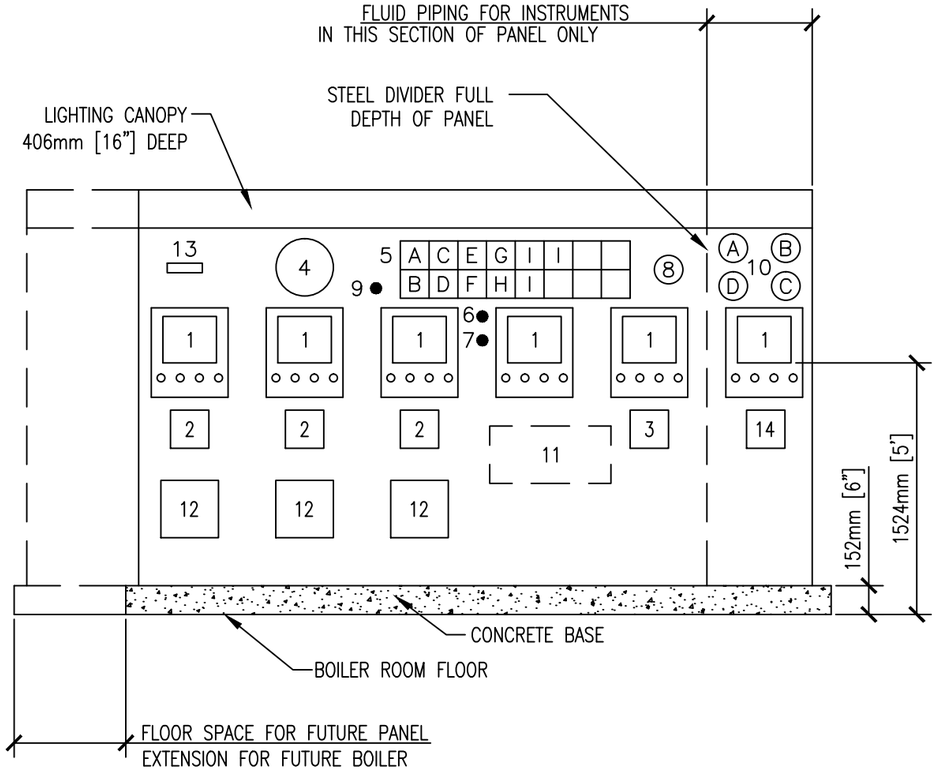
NOTES:

1. INTERIOR OF PANEL SHALL BE UTILIZED FOR MOUNTING RELAYS, BURNER CONTROL PROGRAMMER, AND OTHER DEVICES.
2. PROVIDE FRONT OR REAR ACCESS DOORS FULL HEIGHT AND WIDTH OF PANEL.
3. PANEL DIMENSIONS APPROX, 1M(3'-0")Wx0.5M(1'-6")Dx2.3M(7'-6")H.
4. WINDBOX AND FURNACE DRAFT GAGE SCALE RANGES RECOMMENDED BY BOILER AND BURNER MANUFACTURER.
5. SCALE RANGE OF BOILER OUTLET DRAFT GAGE MUST BE COORDINATED WITH ECONOMIZER DRAFT LOSS. IF THERE IS NO ECONOMIZER, RANGE SHOULD BE -25mm(-1") TO +25mm(+1") WC.
6. BOILER COMBUSTION CONTROL SUBMASTER, DRAFT CONTROL AND OXYGEN TRIM CONTROL STATIONS MAY BE LOCATED ON THIS PANEL.

BURNER CONTROL PANEL FOR WATER TUBE BOILERS

#

NTS



ELEVATION

DESIGNER NOTES:

1. PANEL APPROX. 3810mm[12'–6"]Wx610mm[2'–0"]Dx2438mm[8"–0"]H. SHOW ACTUAL SIZE ON DWGS.
2. SOME RECORDING & MONITORING FUNCTIONS MAY BE HANDLED BY A COMPUTER WORK STATION & THEREFORE MAY BE DELETED FROM THIS PANEL.
3. ON SOME PROJECTS, IT MAY BE DESIRABLE TO LOCATE EMERGENCY GENERATOR ANNUNCIATORS & METERS ON THIS PANEL.
4. PROVIDE SMOKE DENSITY MONITORS ONLY ON PLANTS BURNING HEATED OIL OR WHERE REQUIRED BY LOCAL CODES.
5. ON PLANTS WHERE DRAFT CONTROL SYSTEMS ARE PROVIDED, CONSIDER LOCATING THE DRAFT GAGES ON THIS PANEL ABOVE THE BOILER OPERATION RECORDERS. THE GAGES ARE NORMALLY LOCATED ON THE BURNER CONTROL PANELS.
6. DELETE THE "ENGINEERING NOTES" FROM THE PROJECT DRAWINGS.

BOILER PLANT INSTRUMENTATION PANEL

NTS

ITEM NO.	DESCRIPTION
1.	BOILER / BOILER PLANT DIGITAL DATA RECORDER A. STEAM FLOW: INDICATE, RECORD, INTEGRATE, [0–_____ KG/S [LB/HR]) B. BOILER OUTLET FLUE GAS TEMPERATURE: RECORD (0–500°C [0–1000°F]) C. FLUE GAS OXYGEN CONTENT: RECORD (0–10% OXYGEN) D. HIGH PRESS STEAM DIST: RECORD, INTEGRATE, (0–___ KG/S [LB/HR]) E. MED PRESS STEAM DIST: RECORD, INTEGRATE, (0–___ KG/S [LB/HR]) F. LAUNDRY STEAM DIST: RECORD, INTEGRATE, (0–___ KG/S [LB/HR]) G. BOILER PLANT STEAM: RECORD, INTEGRATE, (0–___ KG/S [LB/HR]) H. STEAM HEADER PRESS: RECORD (0–2000 kPa [0–300 PSIG]) I. BOILER FEEDWATER TEMP: RECORD (0–150°C [0–300°F]) J. OUTSIDE AIR TEMP: RECORD (–35°C[–30°F] TO +50°C[+120°F])
2.	BOILER CONTROL STATIONS (MANUAL/AUTOMATIC, BIAS) (THESE CONTROL STATIONS MAY BE LOCATED ON THE BURNER CONTROL PANELS INSTEAD OF ON THE INSTRUMENTATION PANEL.) A. COMBUSTION CONTROL SUBMASTER B. DRAFT CONTROL (WHEN SPECIFIED) C. OXYGEN TRIM (WHEN SPECIFIED)
3.	MASTER STEAM PRESSURE CONTROLLER
4.	CLOCK
5.	ALARM ANNUNCIATOR A. CONDENSATE STORAGE TANK HIGH LEVEL B. CONDENSATE STORAGE TANK LOW LEVEL C. FEEDWATER HEATER HIGH LEVEL D. FEEDWATER HEATER LOW LEVEL E. HIGH STEAM HEADER PRESS F. EMERGENCY GAS VALVE CLOSED G. HIGH NATURAL GAS HEADER PRESS (SET AT 35 kPa [5 PSIG] ABOVE MAIN REGULATOR SET PRESS) H. LP IGNITER GAS IN USE–FOR EMERGENCY ONLY (PROVIDE HIGH PRESS SWITCH SET AT 14 kPa [2 PSIG]) I. LOW EXCESS AIR BOILER NO. (PROVIDE ONE POINT FOR EACH BOILER, SET AT ___ % OXYGEN)
6.	ANNUNCIATOR ACKNOWLEDGE BUTTON
7.	ANNUNCIATOR TEST BUTTON
8.	ANNUNCIATOR BELL / HORN
9.	EMERGENCY GAS SAFETY SHUT OFF VALVE CONTROL
10.	PRESSURE GAGES A. STEAM HEADER (0–1500 kPa [0–200 PSIG]) B. NATURAL GAS HEADER (0–100 kPa [0–15 PSIG]) C. FUEL OIL HEADER (0–1500 kPa [0–200 PSIG]) D. BOILER FEEDWATER HEADER (0–2000 kPa [0–300 PSIG]) (WHEN HEADER SERVING ALL BOILERS IS PROVIDED)
11.	START–STOP BUTTONS AND PILOT LIGHTS FOR PUMPS
12.	SMOKE DENSITY MONITOR (WHEN SPECIFIED)
13.	REMOTE REGISTER FOR GAS METER (WHEN SPECIFIED)
14.	FEEDWATER DEAERATOR TANK AND CONDENSATE STORAGE TANK WATER LEVEL CONTROL STATION

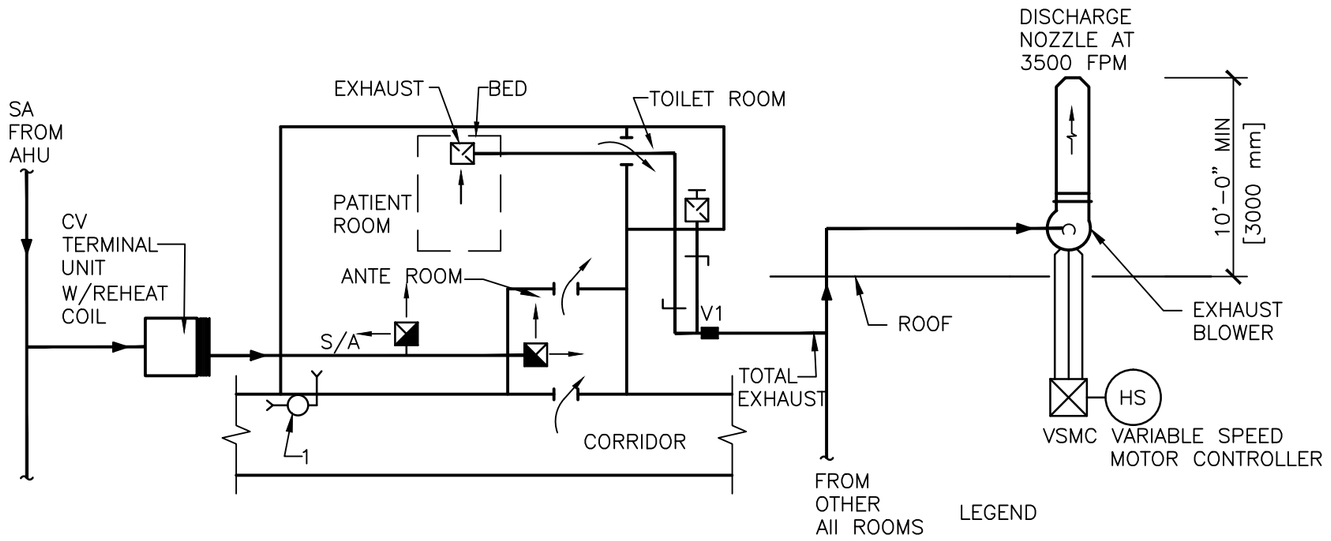
DETAIL TITLE: BOILER PLANT INSTRUMENTATION PANEL

SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD230911-04.DWG

Department of Veterans Affairs



GENERAL NOTES:

1. MAINTAIN NEGATIVE AIR PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL]) BETWEEN THE AII ROOM AND THE ANTEROOM AND THE ANTEROOM AND THE CORRIDOR BY MODULATING VALVE V1. AII ROOMS SHALL HAVE A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND THE CORRIDOR. A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER NEGATIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED. (STROBE LIGHT)
2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE AII ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.
3. LOCATE EXHAUST AIR REGISTER OVER THE PATIENT BED ON THE CEILING. AS AN ALTERNATE, THE EXHAUST AIR REGISTER CAN BE LOCATED ON THE WALL NEAR THE PATIENT HEAD, IF FEASIBLE.
4. LOCATE THE SUPPLY AIR OUTLET TO BLOW AIR TOWARDS THE OCCUPIED AREA.
5. PROVIDE A DEDICATED EXHAUST SYSTEM FOR THE AII ROOMS WITHOUT MIXING IT WITH ANY OTHER EXHAUST.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER NEGATIVE PRESSURE BY ENSURING AIR MOVEMENT INTO THE BEDROOM SPACE FROM THE ANTE ROOM AND ADJOINING CORRIDOR.
2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE AS FOLLOWS:

A – PATIENT BEDROOM	MINIMUM 12 ACPH SUPPLY AIR (ASHRAE STANDARD 170 2008). INCREASE SUPPLY AIR VOLUME, IF REQUIRED, TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODES. EXAMPLE: 400 CFM [190 L/S]
B – ANTE ROOM	MINIMUM 10 ACPH (ASHRAE STANDARD 170 2008) OR MINIMUM 40 CFM [19 L/S] SUPPLY + 100 CFM [47 L/S] INFILTRATED INTO ANTE ROOM FROM CORRIDOR FOR A TOTAL OF 140 CFM [66 L/S].
C – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE-UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28 L/S]. EXAMPLE: 60 CFM [28 L/S]

3. THE DEDICATED EXHAUST AIR SYSTEM SHALL BE BALANCED AS FOLLOWS:

A – PATIENT BEDROOM	400 CFM [190 L/S](SUPPLY) – 60 CFM [28 L/S](TOILET) + 40 CFM [19 L/S] SUPPLY AIR TO ANTE ROOM + 100 CFM [47 L/S] INFILTRATED FROM CORRIDOR INTO ANTE ROOM THEN 140 CFM [66 L/S] INTO AII ROOM = 480 CFM [227 L/S] (EXHAUST), TOTAL EXHAUST 540 CFM [255 L/S]

4. COORDINATE DOOR UNDER CUTS FOR DOORS BETWEEN ANTE ROOM AND PATIENT (1")[2.54 CM], DOOR TO CORRIDOR.

AIR SYSTEM FOR AIRBORNE INFECTION ISOLATION ROOM (AII)(WITH ANTE ROOM)

#

NTS NEGATIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.

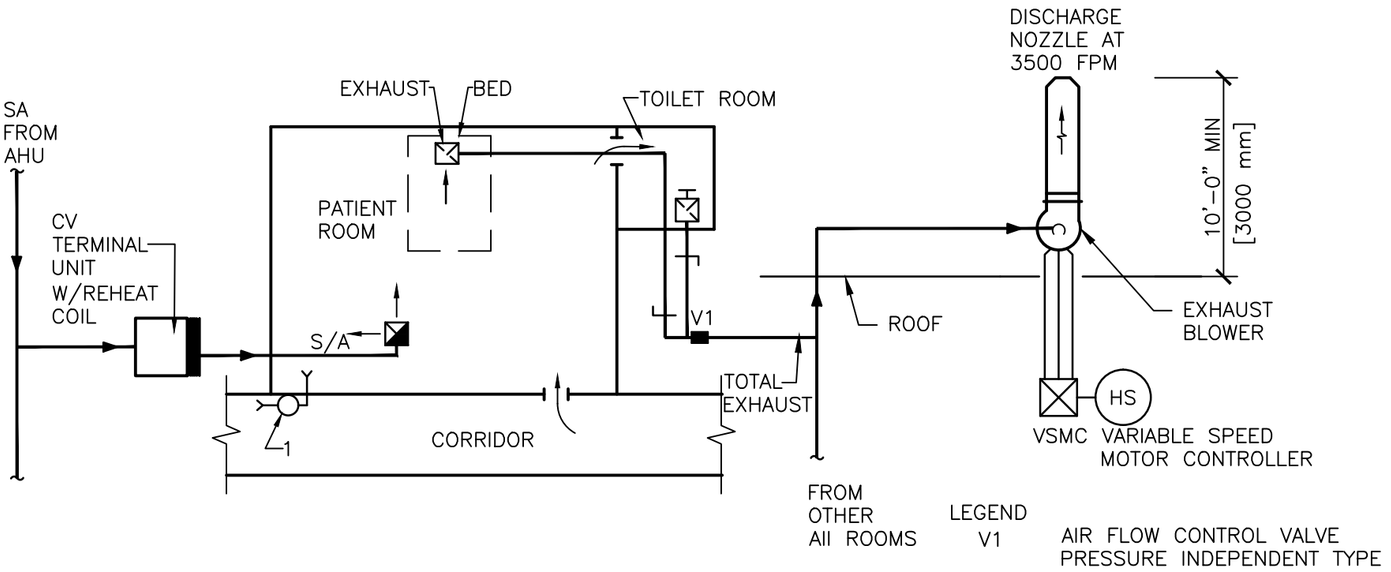
Department of Veterans Affairs

DETAIL TITLE / AIR SYSTEM FOR AIRBORNE INFECTION ISOLATION ROOM W/ANTE ROOM

SCALE :NONE

DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923-01.DWG



GENERAL NOTES:

1. MAINTAIN NEGATIVE AIR PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL]) BETWEEN THE AII ROOM AND THE CORRIDOR BY MODULATING VALVE V1. AII ROOMS SHALL HAVE A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND THE CORRIDOR.
   A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER NEGATIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED. (STROBE LITE)
2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE AII ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.
3. LOCATE EXHAUST AIR REGISTER OVER THE PATIENT BED ON THE CEILING. AS AN ALTERNATE, THE EXHAUST AIR REGISTER CAN BE LOCATED ON THE WALL NEAR THE PATIENT HEAD, IF FEASIBLE.
4. LOCATE THE SUPPLY AIR OUTLET TO BLOW AIR TOWARDS THE OCCUPIED AREA.
5. PROVIDE A DEDICATED EXHAUST SYSTEM FOR THE AII ROOMS WITHOUT MIXING IT WITH ANY OTHER EXHAUST.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER NEGATIVE PRESSURE BY ENSURING AIR MOVEMENT INTO THE BEDROOM SPACE FROM THE ADJOINING CORRIDOR.
2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE AS FOLLOWS:

A – PATIENT BEDROOM	MINIMUM 12 ACPH SUPPLY AIR (ASHRAE STANDARD 170 2008). INCREASE SUPPLY AIR VOLUME, IF REQUIRED, TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODES. EXAMPLE: 400 CFM [190 L/S]
B – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE–UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28 L/S]. EXAMPLE: 60 CFM [28 L/S]

3. THE DEDICATED EXHAUST AIR SYSTEM SHALL BE BALANCED AS FOLLOWS:

A – PATIENT BEDROOM	400 CFM [190 L/S] (SUPPLY) – 60 CFM [28 L/S] (TOILET) + 100 CFM [47 L/S] INFILTRATED FROM CORRIDOR = 440 CFM [180 L/S] (EXHAUST), TOTAL EXHAUST 500 CFM [240 L/S].

AIR SYSTEM FOR AIRBORNE INFECTIOUS ISOLATION ROOM (AII) (WITHOUT ANTEROOM)

#

NTS NEGATIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.

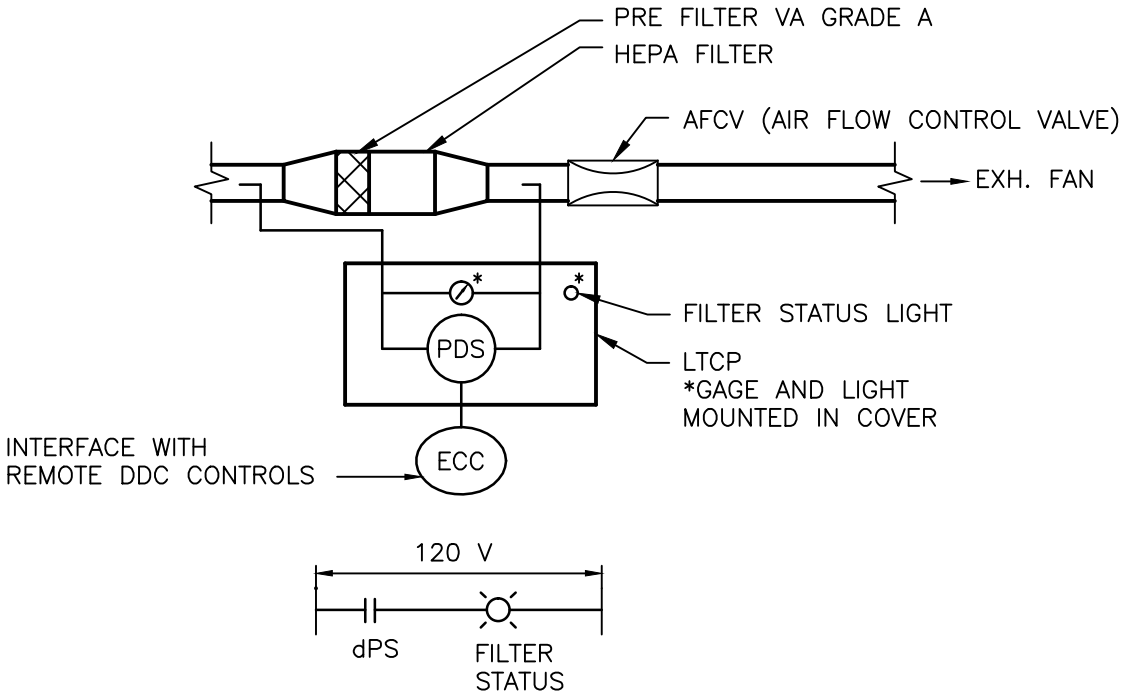
Department of Veterans Affairs

DETAIL TITLE / AIR SYSTEM FOR AIRBORNE INFECTIOUS ISOLATION ROOM WO/ANTEROOM

SCALE :NONE

DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923-02.DWG



SEQUENCE OF OPERATION:

WHEN FILTER PRESSURE DROP RISES TO 2" [7 KPA] OF WATER COLUMN, FILTER STATUS LIGHT (RED) SHALL BE ENERGIZED.

HEPA FILTER CONTROLS FOR AUTOPSY EXHAUST SYSTEMS

#

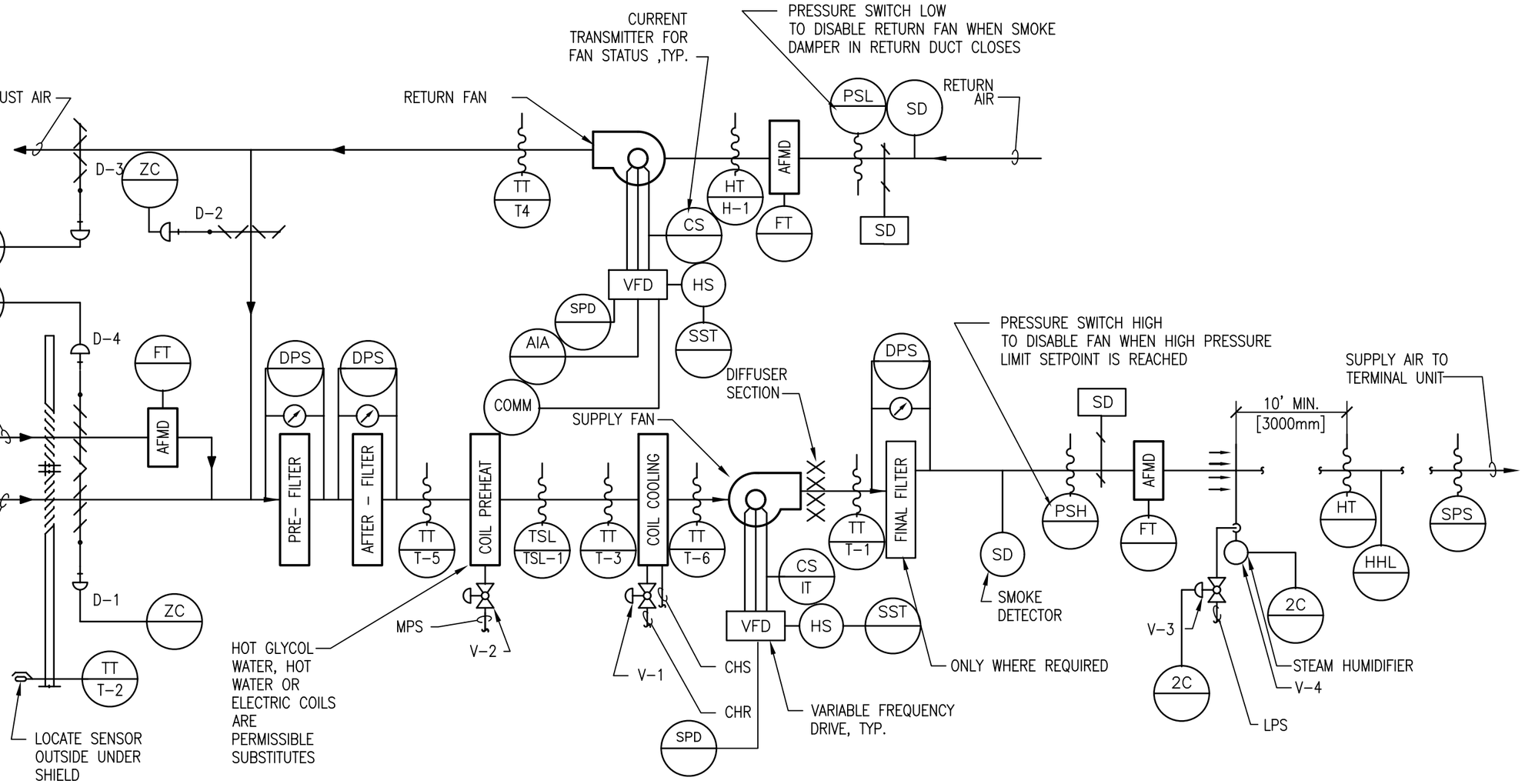
NTS

Department of Veterans Affairs

DETAIL TITLE / HEPA FILTER CONTROLS FOR AUTOPSY EXHAUST SYSTEMS

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010 CAD DETAIL NO.: SD230923-03.DWG



VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM

NTS

DETAIL TITLE / VARIABLE AIR VOLUME AIR HANDLING UNIT
WITH MINIMUM OUTSIDE AIR CONTROL DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD230923-04.DWG

Department of Veterans Affairs

SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

1. GENERAL

_1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H–O–A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D–1, D–3, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D–1, SD–1 AND SD–2 SHALL BE FULLY OPEN. D–2 AND D–3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

_2.1 SUPPLY AIR TEMPERATURE, SENSED BY TT–1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING V–1 OR D–2 AND D–3 OR V–2 IN SEQUENCE.

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT–2, IS ABOVE 75°F (ADJ) [23.8°C], THE DIGITAL CONTROL PANEL SHALL PREVENT THE MODULATION OF D–2 AND D–3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D–2 FULLY OPENED AND D–3 FULLY CLOSED). THE DIGITAL CONTROL PANEL SHALL MODULATE V–1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT–1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT–2, IS BETWEEN 65°F [18.3°C] AND THE SUPPLY AIR TEMPERATURE SENSED BY TT–1, DAMPER D–2 SHALL FULLY CLOSE AND D1 AND D3 SHALL BE FULLY OPEN (MAXIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL MODULATE V–1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT–1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT–2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY TT–1, DAMPERS D1, D–2 AND D–3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D–2 IS OPEN AND D–3 IS CLOSED TO MINIMUM OUTSIDE AIR, V–2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT–1.

3. AIR FLOW CONTROL

_3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" [25mm] OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), SENSED BY SPS–1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATU

3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN VSMC TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

3.3 USING HIGH PRESSURE SENSOR SPS–2 LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" [75mm] OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS–2 DOES EXCEED 3" [75mm] THE SUPPLY AIR FAN SHALL STOP. SPS–2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND,AUTO OR BYPASS MODE. SPS–2 WILL REQUIRE MANUAL RESET AT THE DEVICE.

4. HUMIDITY CONTROL

_4.1 WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY H–1, 2–WAY "ON–OFF" CONTROL VALVE V–3 SHALL REMAIN CLOSED. WHEN THE DIGITAL CONTROL PANEL IS CALLING FOR HUMIDITY, V–3 SHALL REMAIN OPEN.

4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 35% RH (ADJ) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V–4 TO MAINTAIN THE DESIRED HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN HUMIDITY OF 80% AS SENSED BY H–2. DCP SHALL CLOSE VALVE V–3 WHENEVER THE SUPPLY FAN IS OFF. VALVE V–4 SHALL BE INTERLOCKED WITH A TEMPERATURE SWITCH TO KEEP THE HUMIDIFIER OFF UNTIL CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

5. FREEZE PROTECTION

_5.1 IF THE AIR TEMPERATURE AS SENSED BY TT–3 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN UFD AND UNIT SHALL BE SHUTDOWN IN HAND,AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. AUTOMATIC SHUTDOWN/RESTART

6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.

6.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION

_7.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY–PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

DETAIL TITLE / SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD230923–05.DWG

Department of Veterans Affairs

JOB: 0555.09
BUILDING: VA SAMPLE POINTS LIST

SYSTEM: VAV AIR HANDLER SYSTEM COMPONENT:	POINT ID	ABBREVIATION	POINT LEGEND: PRIORITY/ADD-ALTERNATE NO.	SYSTEM OUTPUTS: BINARY: ELECTRIC DEVICE	SYSTEM OUTPUTS: BINARY: START/STOP	SYSTEM OUTPUTS: BINARY: OPEN/CLOSE	SYSTEM OUTPUTS: ANALOG: SPEED COMMAND	SYSTEM OUTPUTS: ANALOG: VALVE POSITION	SYSTEM OUTPUTS: ANALOG: DAMPER POSITION	SYSTEM INPUTS: BINARY: STATUS	SYSTEM INPUTS: BINARY: ALARM	SYSTEM INPUTS: BINARY: PRESSURE	SYSTEM INPUTS: BINARY: HIGH HUMIDITY	SYSTEM INPUTS: BINARY: HIGH STATIC PRESSURE	SYSTEM INPUTS: BINARY: LOW TEMPERATURE	SYSTEM INPUTS: ANALOG: TEMPERATURE (TD)	SYSTEM INPUTS: ANALOG: PRESSURE	SYSTEM INPUTS: ANALOG: POSITION	SYSTEM INPUTS: ANALOG: FLOW	SYSTEM INPUTS: ANALOG: PERCENT	SYSTEM INPUTS: ANALOG: STATIC PRESSURE	SYSTEM INPUTS: ANALOG: CARBON MONOXIDE	SYSTEM INPUTS: ANALOG: HUMIDITY	SYSTEM INPUTS: ANALOG: VACUUM	SYSTEM INPUTS: ANALOG: Local Alarm Panel	SYSTEM INPUTS: ANALOG: Area Alarm Panel	SYSTEM INPUTS: ANALOG: Master Alarm Panel	SYSTEM INPUTS: ANALOG: HIGH LIMIT	SYSTEM INPUTS: ANALOG: LOW LIMIT	SYSTEM SOFTWARE/CONTROL: ALARM PROCESSING: SCHEDULE START/STOP	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: FUNCTION START/STOP	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: DUTY CYCLE	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: TEMPERATURE ECONOMIZER	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: ENTHALPY ECONOMIZER	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: TEMPERATURE RESET	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: DEMAND LIMITING	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: STATIC PRESSURE RESET	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: PRESSURE/VOLUME CONTROL	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: FAILURE MODE	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: SPACE TEMP CONTROL	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: FULL COMMUNICATION	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION: TRENDING	REMARKS
Return air Temperature	AI-1	RAT								●					●																									
Return Air Humidity	AI-2	RAH								●												●																	
Return Air Flow (cfm)	AI-3	RAF								●								●																				
Mixed Air Temperature	AI-4	MAT								●					●																							
Pre-Heat Temperature	AI-5	PHT								●					●																							
Cooiling Coil Temperature	AI-6	CCT								●					●																							
Discharge Air Temperature	AI-7	DAT								●					●																							
Discharge Static Pressure	AI-8	DASP								●										●																		
Discharge Air Humidity	AI-9	DAH								●												●																
Supply Air Flow (cfm)	AI-10	SAF								●								●																				
OUTSIDE AIR TEMPERATURE	AI-11	OAT													●																							
RETURN LOW PRESSURE	BI-1	RLP									●																											
RETURN FAN STATUS	BI-2	RF-STS								●																												
SUPPLY FAN STATUS	BI-3	SF-STS								●																												
MIXED AIR LOW LIMIT	BI-4	TSL-1											●																		●							
STATIC PRESSURE HIGH LIMIT	BI-5	SPS-2											●																									
HUMIDITY HIGH LIMIT	BI-6	HHL												●																							
SUPPLY FAN VSMC ALARM	BI-7	SF-ALA									●																											
RETURN FAN VSMC ALARM	BI-8	RF-ALA									●																											
RETURN FAN VSMC	AO-1	RF-SPD							●																											●	●	FULL COMMUNICATION
SUPPLY FAN VSMC	AO-2	SF-SPD							●																											●	●	FULL COMMUNICATION
OUTSIDE AIR DAMPER	AO-3	OAD								●																												
RETURN AIR DAMPER	AO-4	RAD								●																												
EXHAUST AIR DAMPER	AO-5	EAD								●																												
MINIMUM OUTSIDE AIR DAMPER	AO-7	MIN-OAD								●																												
PRE-HEAT VALVE V-2	AO-8	PHT-V1								●																												
COILING VALVE V-1	AO-9	CLG-V1								●																												
STEAM HUMIDIFIER VALVE V-4	AO-10	HUM-V4								●																												
RETURN FAN START/STOP	BO-1	RF-SST			●																											●					
SUPPLY FAN START/STOP	BO-2	SF-SST			●																											●					
STEAM ISOLATION VALVE V-3	BO-3	HUM-ISO-V3				●																															

PAGE:

POINTS LIST FOR VAV AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

NTS

DETAIL TITLE / POINTS LIST FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

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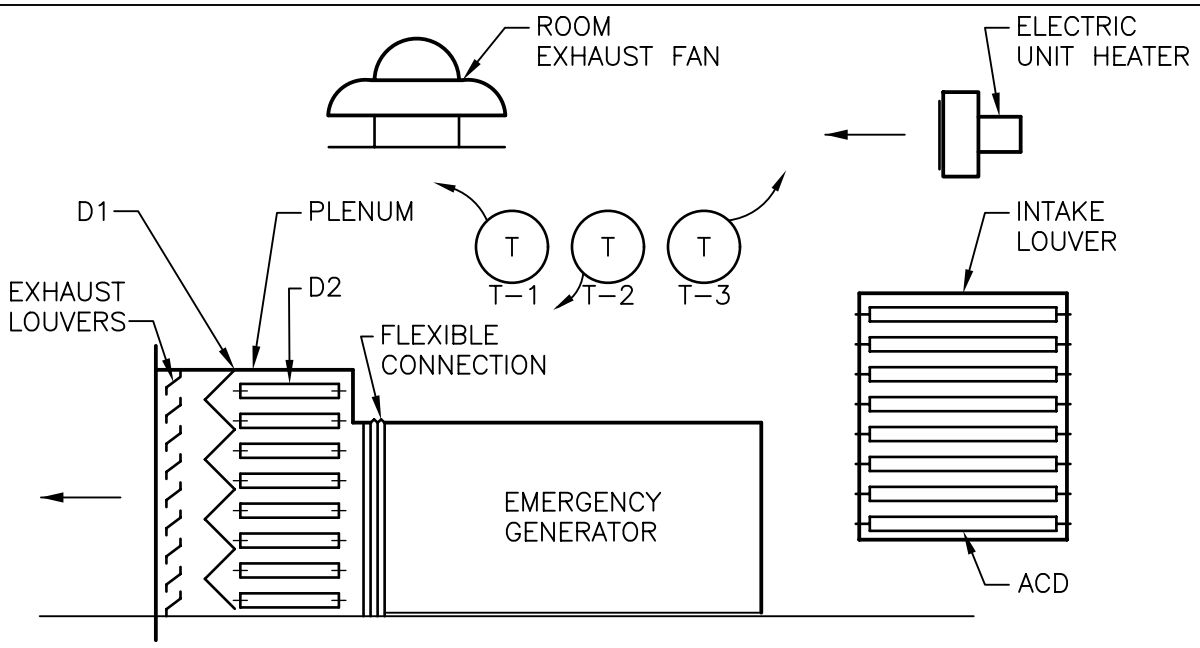
Department of Veterans Affairs



NOTES:

1. EMERGENCY GENERATOR SHALL BE INTERLOCKED WITH D3. WHEN EMERGENCY GENERATOR IS ENERGIZED D3 SHALL OPEN. WHEN EMERGENCY GENERATOR IS DE-ENERGIZED D3 SHALL CLOSE, PROVIDED ROOM EXHAUST FAN IS OFF.

2. ROOM EXHAUST FAN SHALL BE INTERLOCKED WITH D3 & ROOM THERMOSTAT T1. WHEN ROOM THERMOSTAT RISES ABOVE 85°F [29°C] ROOM EXHAUST FAN SHALL RUN & D3 SHALL OPEN. WHEN ROOM THERMOSTAT DROPS BELOW 80°F [27 C] ROOM EXHAUST FAN SHALL STOP & D3 SHALL CLOSE, PROVIDED EMERGENCY GENERATOR IS DE-ENERGIZED.

3. POWER OPERATED, OPPOSED BLADE, DAMPERS D1 & D2 SHALL BE INTERLOCKED WITH ROOM THERMOSTAT T2 SET AT 60°F [16°C]. ON A RISE IN ROOM TEMPERATURE ABOVE 60°F [16°C] D1 SHALL MODULATE OPEN & D2 SHALL MODULATE CLOSED. ON A DROP IN ROOM TEMPERATURE BELOW 60°F [16°C], D1 SHALL MODULATE CLOSED & D2 SHALL MODULATE OPEN.

4. ELECTRIC UNIT HEATER SHALL BE INTERLOCKED WITH ROOM THERMOSTAT T3 SET AT 45°F [7.2°C]. ON A DROP IN ROOM TEMPERATURE BELOW 43°F [6.1°C] ELECTRIC UNIT HEATER SHALL BE ENERGIZED & ON A RISE IN ROOM TEMPERATURE ABOVE 47°F [8.3°C].

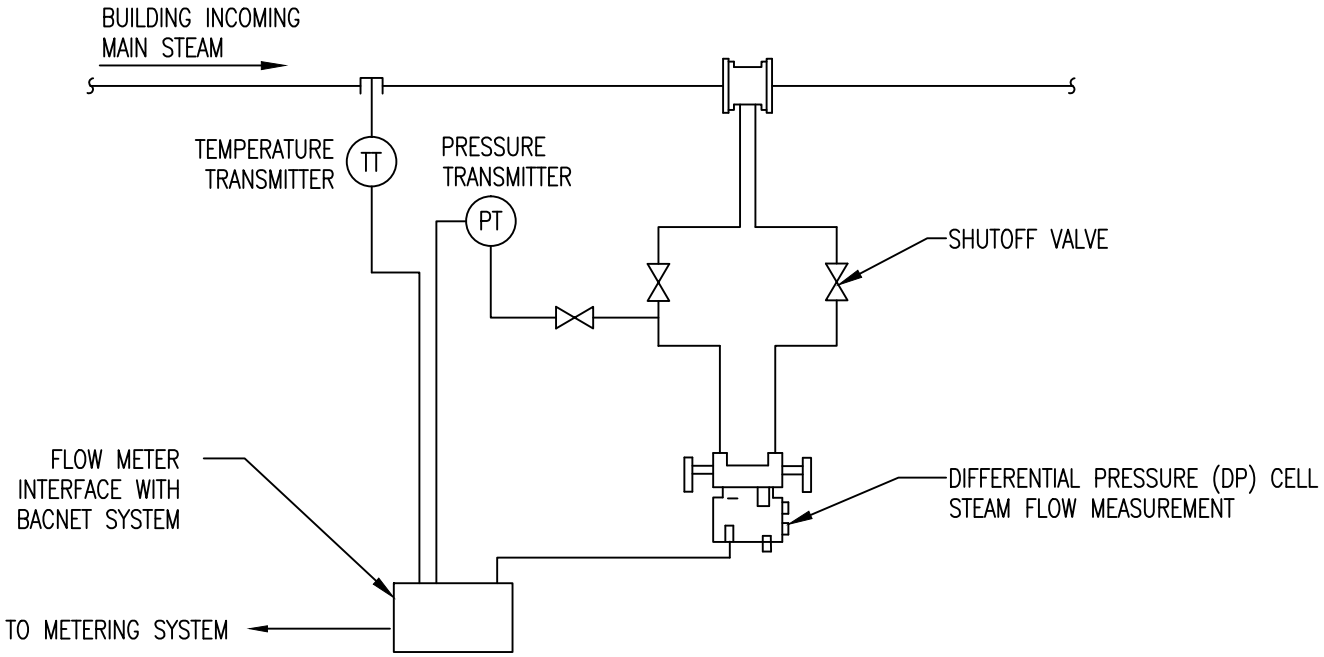
EMERGENCY GENERATOR ROOM CONTROLS

NTS

DESIGNER'S NOTES:

1. IF THE PROJECT INVOLVES MULTIPLE EMERGENCY GENERATORS, EACH GENERATOR SHALL HAVE A DEDICATED SECTION OF THE OUTSIDE AIR INTAKE LOUVER & DAMPER MOTOR(S) ASSIGNED TO IT. THE DESIGNER SHALL SHOW A SCHEDULE OF THE EMERGENCY GENERATORS & THE SPECIFIC INTERLOCKED LOUVER/DAMPER SECTIONS ON THE FLOOR PLANS.

2. WHEN THE ROOM EXHAUST FAN IS RUNNING ALONE, WITHOUT ANY EMERGENCY GENERATOR, ONLY A DESIGNATED PORTION OF THE OUTSIDE AIR INTAKE LOUVER SHALL OPEN. THE DESIGNER SHALL SHOW THIS SECTION ON THE FLOOR PLANS.



NOTE:
MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURERS

DESIGNER'S NOTE:
MODIFY DETAIL AS REQUIRED TO BE PROJECT SPECIFIC FOR THE TYPE OF METER BEING USED.

STEAM METER DETAIL

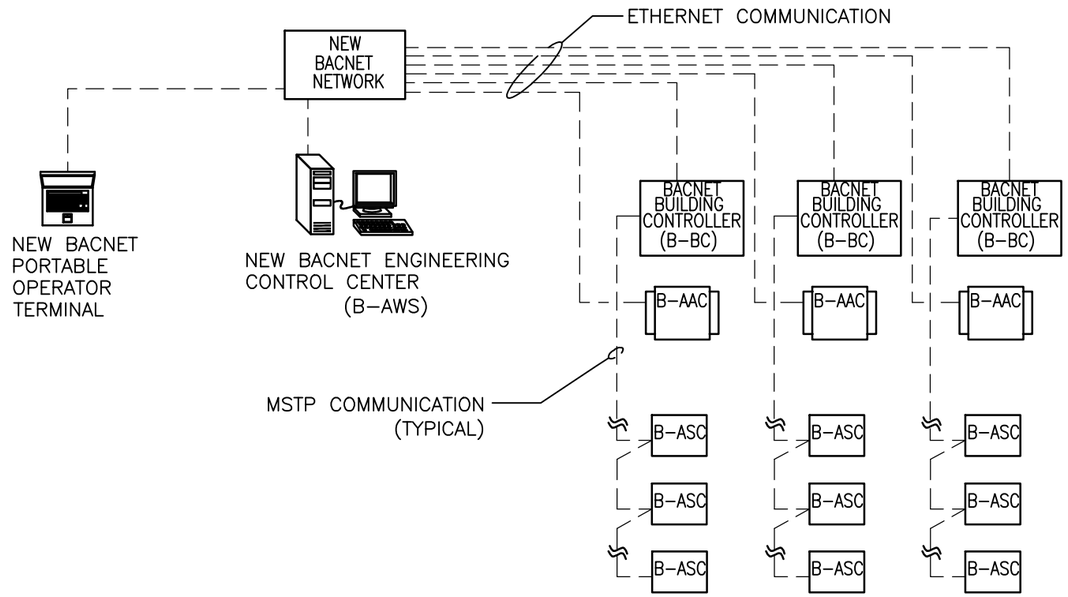
NTS

Department of Veterans Affairs

DETAIL TITLE: STEAM METER DETAIL

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD230923-10.DWG



CONTROL SYSTEM CONFIGURATION
OPTION 1 –
NEW BACNET ECC, UPGRADE EXISTING CONTROLS WITH NEW BACNET CONTROLS SYSTEM, INSTALL NEW BACNET COMMUNICATIONS NETWORK.

NOTES:
1. REPLACE EXISTING ECC WITH NEW BACNET (B–AWS) ENGINEERING CONTROL CENTER.
2. REPLACE ALL EXISTING CONTROLLERS WITH NEW BACNET CONTROLLERS.
3. INSTALL NEW BACNET COMMUNICATION NETWORK.
4. INSTALL MULTIPLE BUILDING CONTROLLERS (B–BC) AS REQUIRED.
5. INSTALL NEW CONTROLLERS (B–AAC, B–ASC) AS REQUIRED.
6. PROVIDE NEW PORTABLE OPERATORS TERMINAL.

BACNET SYSTEM ARCHITECTURE OPTION 1

NTS

DETAIL TITLE / BACNET SYSTEM ARCHITECTURE OPTION 1

SCALE :NONE

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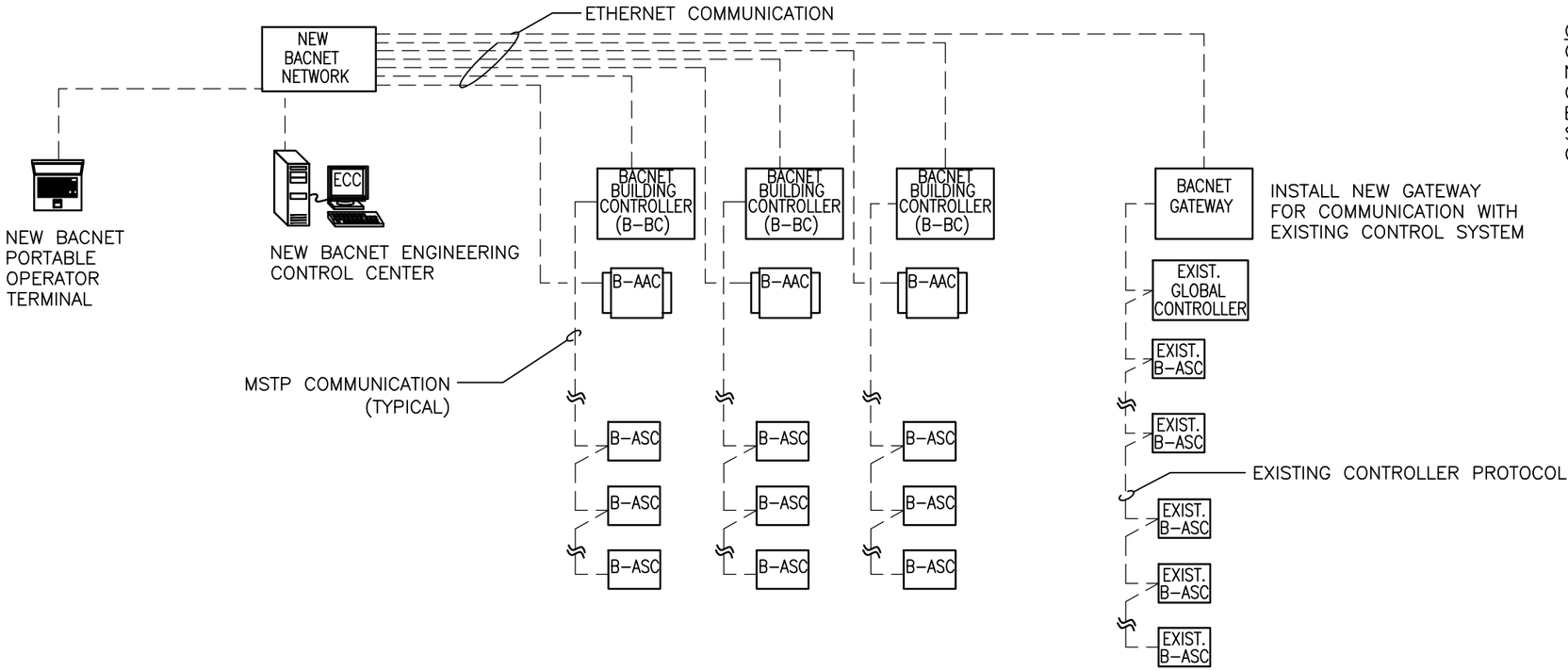
Department of Veterans Affairs



CONTROL SYSTEM CONFIGURATION
OPTION 2 –
NEW BACNET ECC, INSTALL NEW BACNET CONTROLS ON CURRENT PROJECT, PROVIDE BACNET GATEWAY FOR EXISTING CONTROL SYSTEM. INSTALL NEW BACNET COMMUNICATION NETWORK.

NOTES:
1. REPLACE EXISTING ECC WITH NEW BACNET (B–AWS) ENGINEERING CONTROL CENTER (ECC).
2. EXISTING CONTROLLERS TO REMAIN.
3. INSTALL NEW BACNET GATEWAY WITH FULL COMMUNICATION TO EXISTING CONTROLLERS.
4. INSTALL NEW BACNET COMMUNICATION NETWORK.
5. INSTALL MULTIPLE BUILDING CONTROLLERS AS REQUIRED.
6. INSTALL NEW CONTROLLERS (B–AAC/B–ASC) AS REQUIRED.
7. PROVIDE NEW PORTABLE OPERATORS TERMINAL.

BACNET SYSTEM ARCHITECTURE OPTION 2

NTS

DETAIL TITLE / BACNET SYSTEM ARCHITECTURE OPTION 2

SCALE :NONE

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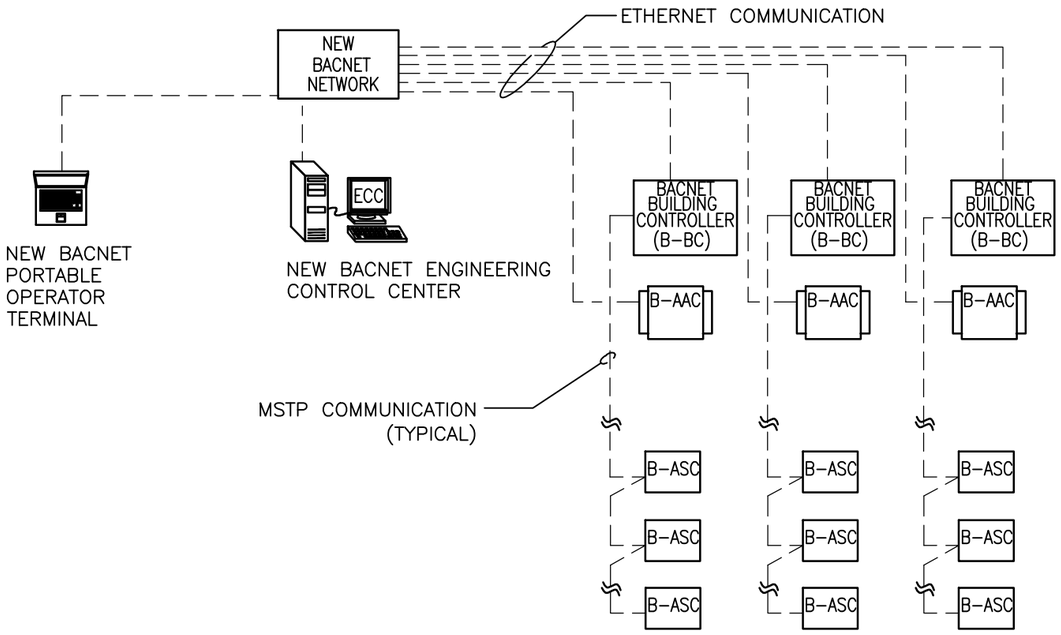
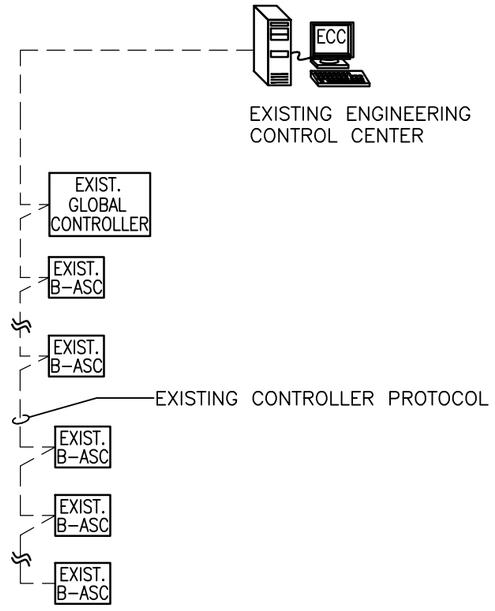
CAD DETAIL NO.: SD230923–12.DWG

Department of Veterans Affairs





CONTROL SYSTEM CONFIGURATION
OPTION 3 –
NEW BACNET ECC, INSTALL NEW BACNET CONTROLS ON CURRENT PROJECT. INSTALL NEW COMMUNICATIONS NETWORK. EXISTING ECC AND CONTROL TO REMAIN

NOTES:
1. INSTALL NEW BACNET (B–AWS) ENGINEERING CONTROL CENTER (ECC).
2. EXISTING ECC, ASSOCIATED COMMUNICATION NETWORK AND CONTROLLERS TO REMAIN.
3. INSTALL NEW BACNET COMMUNICATION NETWORK.
4. INSTALL MULTIPLE BUILDING CONTROLLERS (B–BC) AS REQUIRED.
5. INSTALL NEW CONTROLLERS (B–AAC, B–ASC) AS REQUIRED.
6. PROVIDE NEW PORTABLE OPERATORS TERMINAL.

BACNET SYSTEM ARCHITECTURE OPTION 3

NTS

DETAIL TITLE / BACNET SYSTEM ARCHITECTURE OPTION 3

SCALE :NONE

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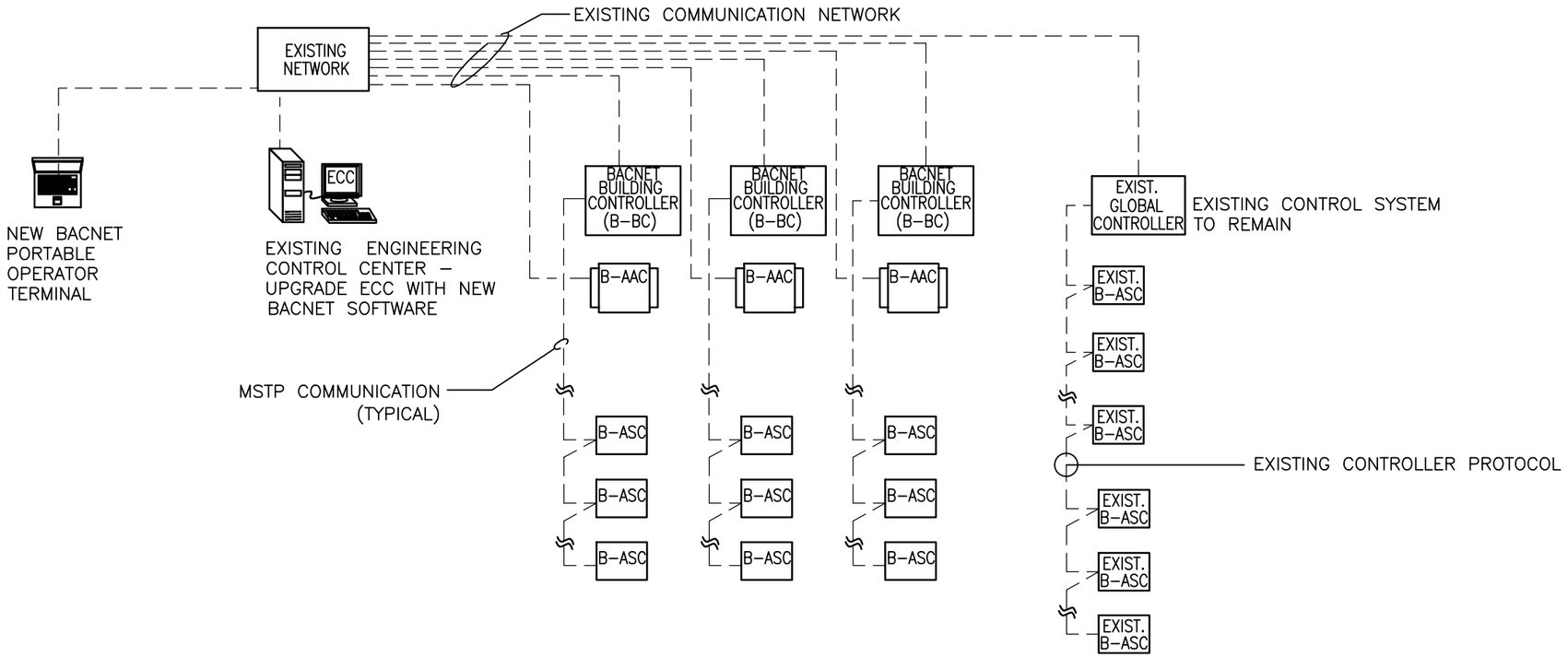
CAD DETAIL NO.: SD230923–13.DWG

Department of Veterans Affairs



CONTROL SYSTEM CONFIGURATION
OPTION 4 –
EXISTING ECC TO REMAIN, INSTALL NEW BACNET SOFTWARE ON EXISTING ECC. EXISTING CONTROL SYSTEM SOFTWARE TO CO–EXIST ON ECC. INSTALL NEW BACNET CONTROLS ON CURRENT PROJECT, EXISTING CONTROL SYSTEM TO REMAIN, RE–USE EXISTING COMMUNICATION NETWORK.

NOTES:
1. INSTALL NEW BACNET SOFTWARE ON EXISTING ENGINEERING CONTROL CENTER (ECC.)
2. REUSE EXISTING COMMUNICATION NETWORK.
3. EXISTING CONTROLLERS TO REMAIN.
4. INSTALL MULTIPLE BUILDING CONTROLLERS AS REQUIRED.
5. INSTALL NEW CONTROLLERS (B–AAC, B–ASC) AS REQUIRED,
6. PROVIDE NEW PORTABLE OPERATORS TERMINAL.

BACNET SYSTEM ARCHITECTURE OPTION 4

NTS

DETAIL TITLE / BACNET SYSTEM ARCHITECTURE OPTION 4

SCALE :NONE

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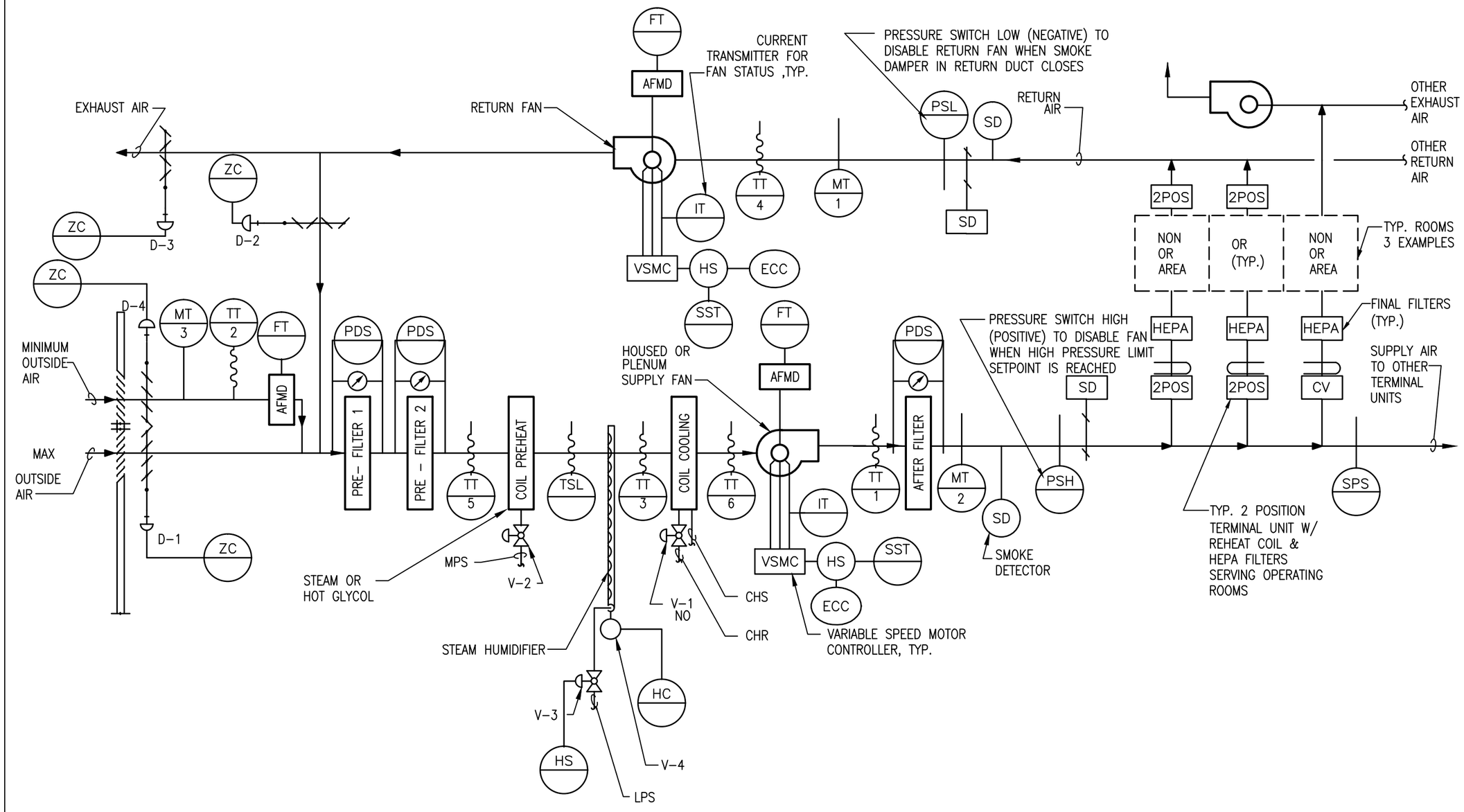
Department of Veterans Affairs



AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

NTS

DETAIL TITLE / AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD230923-15.DWG

Department of Veterans Affairs

SEQUENCE OF OPERATION FOR AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

1. GENERAL

_1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. THE UNIT WILL NORMALLY OPERATE 24 HOUR/DAY. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1, D-3, D-4 AND SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-4, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-1, D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

_2.1 SUPPLY AIR TEMPERATURE SETPOINT (AS SET BY ECC), SENSED BY SENSOR TT-1, SHALL BE MAINTAINED BY SEQUENCING V-1 AND V-2. HEATING AND COOLING CONTROL VALVES SHALL BE MODULATED VIA PID CONTROL LOOP TO MAINTAIN THE SUPPLY AIR TEMP. VALVES V-1 AND V-2 SHALL NOT BE OPENED SIMULTANEOUSLY.

2.2 WHEN THE OUTSIDE AIR ENTHALPY AS CALCULATED BY TT-2 AND MT-3 IS LOWER THAN THE RETURN AIR ENTHALPY AS CALCULATED BY TT-4 AND MT-1 AND THE OUTSIDE AIR DRY BULB IS LESS THAN THE RETURN/EXHAUST DRY BULB TT-4 THE UNIT ECONOMIZER MODE SHALL BE ENABLED. WHEN THE ECONOMIZER IS ENABLED DAMPERS D-1, D-2, AND D-3 SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR SETPOINT AS SENSED BY THE DISCHARGE AIR SENSOR TT-1.

2.3 WHEN THE OUTSIDE AIR ENTHALPY, OR TEMPERATURE, IS HIGHER THAN THE RETURN AIR ENTHALPY, OR TEMPERATURE, THE ECONOMIZER SHALL BE DISABLED, DAMPERS D-1 AND D-3 SHALL CLOSE, D-2 SHALL OPEN AND D-4 SHALL MODULATE TO MAINTAIN THE MINIMUM OUTSIDE AIR CFM SETPOINT.

3. AIR FLOW CONTROL

_3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN THE TOTAL SUPPLY AIR CFM DURING OCCUPIED MODE. RESET SUPPLY AIR CFM AS EACH 2 POSITION AIR TERMINAL UNIT SWITCHES TO UNOCCUPIED MODE.

3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

3.3 USING HIGH PRESSURE SENSOR PSH LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" [75mm] OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT PSH DOES EXCEED 3" [75mm] THE SUPPLY AIR FAN SHALL STOP. PSH SHALL BE HARDWIRED TO THE SUPPLY FAN AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. PSH WILL REQUIRE MANUAL RESET AT THE DEVICE.

3.4 USING LOW PRESSURE SENSOR PSL LOCATE AT THE RETURN FAN INLET, SHALL PREVENT THE RETURN FAN FROM DEVELOPING OVER – 3" [75mm] OF NEGATIVE STATICE PRESSURE (FIELD ADJUSTABLE) IF STATIC PRESSURE AT PSL DOES EXCEED – 3" [75mm] THE RETURN AIR FAN SHALL STOP. PSL SHALL BE HARDWIRED TO THE RETURN FAN AND UNIT SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. PSL WILL REQUIRE MANUAL RESET.

4. HUMIDITY CONTROL

_4.1 WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY MT-1, 2-WAY "ON-OFF" CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DIGITAL CONTROL PANEL IS CALLING FOR HUMIDITY, V-3 SHALL REMAIN OPEN.

4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 42° F [5.6° C] DEW POINT (ADJ) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V-4 TO MAINTAIN THE DESIRED HUMIDITY. THE DRYBULB TRANSMITTER T-4 AND HUMIDITY TRANSMITTER H-1 IN RETURN AIR SHALL BE USED TO CALCULATE RETURN AIR DEW POINT TEMPERATURE. V-3 SHALL BE CLOSED WHENEVER THE RETURN AIR DEWPOINT IS > 45° F [7°C]. DCP SHALL CLOSE VALVE V-3 WHENEVER THE SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH A TEMPERATURE SWITCH TO KEEP THE HUMIDIFIER OFF UNTIL CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

5. FREEZE PROTECTION

_5.1 IF THE AIR TEMPERATURE AS SENSED BY TT-3 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN AND RETURN FAN AND BOTH SHALL BE SHUTDOWN IN HAND, AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. LOSS OF COOLING PROTECTION

_6.1 IF THE AIR TEMPERATURE AS SENSED BY TT-1 RAISES ABOVE 65°F [18°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE RAISES ABOVE 70°F [21°C], AS SENSED BY TT-1 THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC.

7. AUTOMATIC SMOKE SHUTDOWN/RESTART

7.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.

7.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

8. EMERGENCY CONSTANT SPEED OPERATION

_8.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

DETAIL TITLE / SEQUENCE OF OPERATION FOR AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

SCALE :NONE

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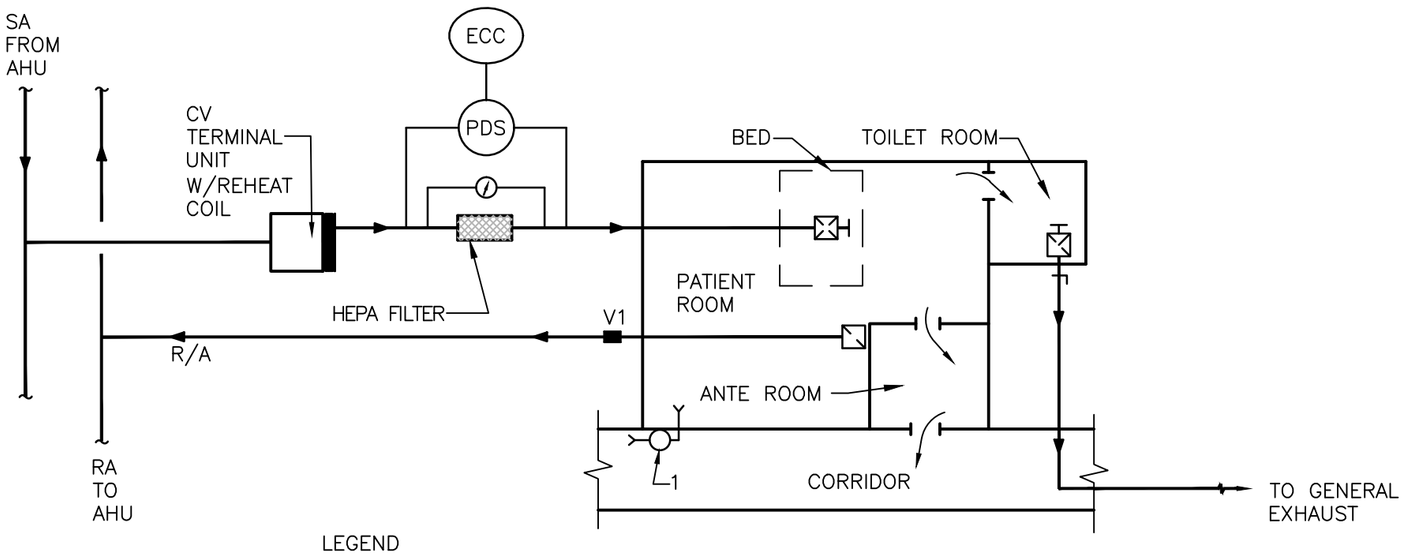
Department of Veterans Affairs



LEGEND

V1 AIR FLOW CONTROL VALVE PRESSURE INDEPENDENT TYPE

GENERAL NOTES:

1. MAINTAIN POSITIVE AIR PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL]) BETWEEN THE PE ROOM AND THE ANTEROOM AND THE ANTEROOM AND THE CORRIDOR BY MODULATING VALVE V1. PE ROOMS SHALL HAVE A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND THE CORRIDOR. A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER POSITIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED. (STROBE LITE)
2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE PE ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.
3. LOCATE THE SUPPLY AIR OUTLET OVER THE PATIENT BED ON THE CEILING WITHOUT CREATING A DRAFT CAUSING PATIENT DISCOMFORT. LOCATE RETURN AIR INLET NEAR THE ROOM DOOR.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER POSITIVE PRESSURE BY ENSURING AIR MOVEMENT FROM THE BEDROOM SPACE AND THE ADJOINING CORRIDOR INTO THE ANTE ROOM.
2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE, AS FOLLOWS:

A – PATIENT BEDROOM	12 ACPH (MINIMUM–ASHRAE STANDARD 170 2008). INCREASE THE SUPPLY AIR VOLUME IF REQUIRED TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODE. EXAMPLE: 400 CFM [190 L/S]
B – ANTE ROOM	SUPPLY AIR IS NOT REQUIRED FOR THIS SPACE. EXFILTRATE 100 CFM [47 L/S] OF AIR FROM PATIENT ROOM, THRU ANTE ROOM INTO THE CORRIDOR. EXAMPLE: 100 CFM [28 L/S]
C – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE–UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28]. EXAMPLE: 60 CFM [28 L/S]
D – RETURN AIR FROM PATIENT ROOM	400 CFM [189 L/S] (SUPPLY AIR) – 100 CFM [47 L/S] TO ANTE ROOM + 60 CFM [28 L/S] TO TOILET) = 240 CFM [115 L/S] RETURN AIR SETTING OF AFCV V1, IN THE RA DUCT.

AIR SYSTEM FOR PROTECTIVE ENVIRONMENT ROOM (PE) (WITH ANTEROOM)

#

NTS POSITIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.

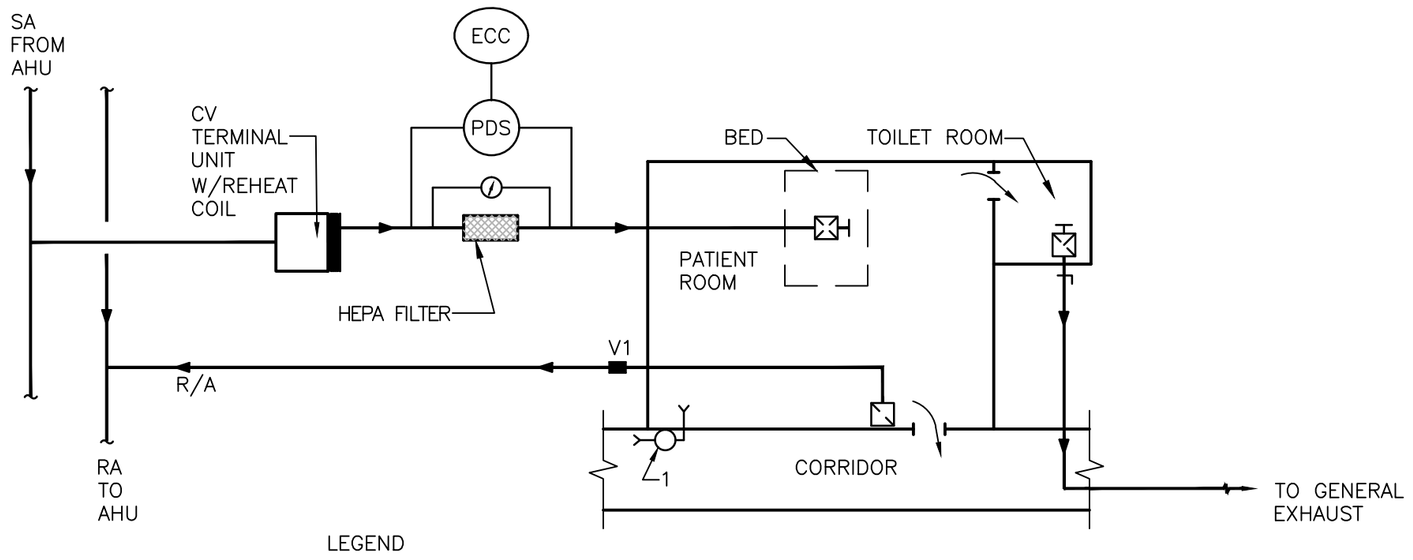
Department of Veterans Affairs

DETAIL TITLE / AIR SYSTEM FOR PROTECTIVE ENVIRONMENT ROOM W/ANTEROOM

SCALE :NONE

DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923–17.DWG



LEGEND

V1 AIR FLOW CONTROL VALVE PRESSURE INDEPENDENT TYPE

GENERAL NOTES:

1. MAINTAIN POSITIVE AIR PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL]) BETWEEN THE PE ROOM AND THE SPACES THAT ARE NOT THE PE ROOMS INCLUDING THE CORRIDOR BY MODULATING VALVE V1. PE ROOMS SHALL HAVE A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND THE CORRIDOR. A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER POSITIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED. (STROBE LITE)

2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE PE ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.

3. LOCATE THE SUPPLY AIR OUTLET OVER THE PATIENT BED ON THE CEILING WITHOUT CREATING A DRAFT CAUSING PATIENT DISCOMFORT. LOCATE RETURN AIR INLET NEAR THE ROOM DOOR.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER POSITIVE PRESSURE BY ENSURING AIR MOVEMENT FROM THE BEDROOM SPACE AND THE ADJOINING CORRIDOR.

2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE, AS FOLLOWS:

A – PATIENT BEDROOM	12 ACPH (MINIMUM–ASHRAE STANDARD 170 2008). INCREASE THE SUPPLY AIR VOLUME IF REQUIRED TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODE. EXAMPLE: 400 CFM [190 L/S]
B – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE–UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28 L/S]. EXAMPLE: 60 CFM [28 L/S]
C – RETURN AIR FROM PATIENT ROOM	400 CFM [189 L/S] (SUPPLY AIR) – 100 CFM [47 L/S] TO CORRIDOR + 60 CFM [28 L/S] TO TOILET) = 240 CFM [115 L/S] SETTING OF AFCV V1, IN THE RA DUCT.

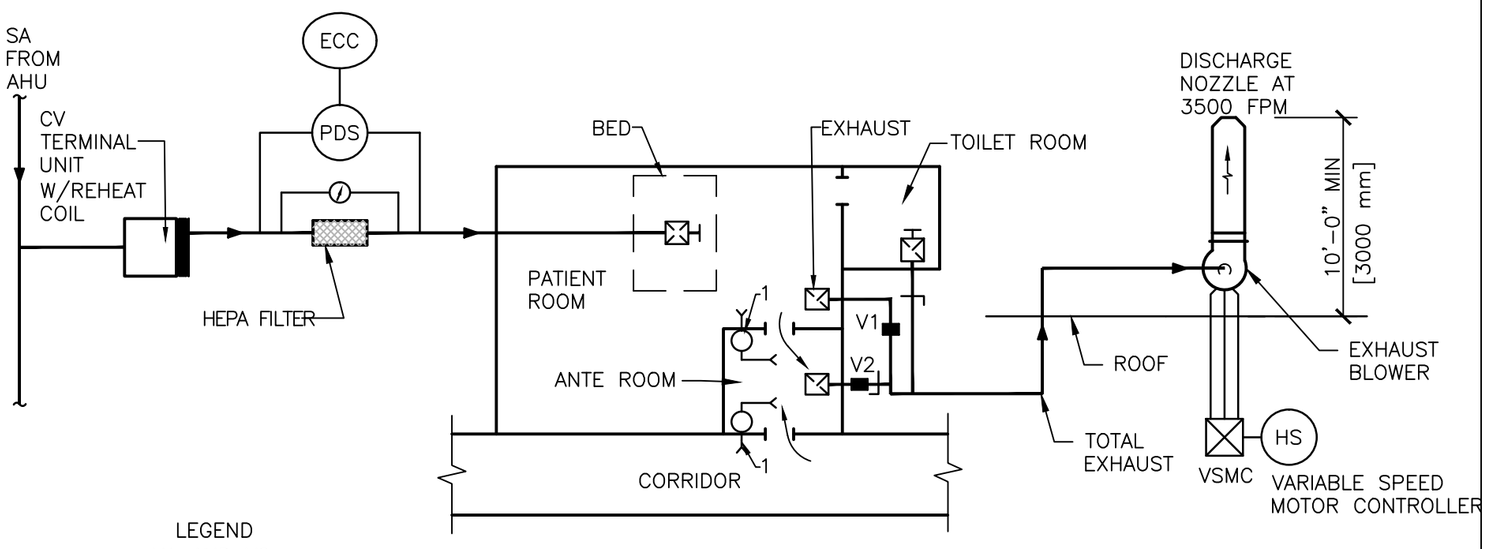
AIR SYSTEM FOR PROTECTIVE ENVIRONMENT ROOM (PE) (WITHOUT ANTEROOM)

#

NTS POSITIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.



LEGEND

V1 AND V2 AIR FLOW CONTROL VALVES PRESSURE INDEPENDENT TYPE

GENERAL NOTES:

1. ANTEROOM SHALL BE MAINTAINED AT A NEGATIVE PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL] WITH RESPECT TO BOTH AII/PE ROOM AND THE CORRIDOR OR ANY ADJOINING SPACE BY MODULATING VALVE V2. VALVE V1 IS USED TO MAINTAIN A POSITIVE PRESSURE BETWEEN THE PATIENT ROOM AND THE ANTE ROOM. COMBO ROOMS SHALL HAVE PERMANENTLY INSTALLED DEVICES AND/OR MECHANISMS TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND ANTE ROOM AND THE CORRIDOR AND THE ANTE ROOM. A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER POSITIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED IN THE PATIENT ROOM WITH RESPECT TO THE ANTE ROOM (STROBE LITE).A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER NEGATIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED IN THE ANTE ROOM WITH RESPECT TO THE CORRIDOR (STROBE LITE).

2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE AII/PE ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.

3. LOCATE THE SUPPLY AIR OUTLET OVER THE PATIENT BED ON THE CEILING WITHOUT CREATING A DRAFT CAUSING PATIENT DISCOMFORT. LOCATE EXHAUST AIR INLET NEAR THE PATIENT ROOM DOOR.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER POSITIVE PRESSURE BY ENSURING AIR MOVEMENT FROM THE BEDROOM SPACE TO THE ANTE ROOM BY MODULATING VALVE V1. THE ANTE ROOM IS KEPT AT NEGATIVE PRESSURE WITH RESPECT TO THE CORRIDOR BY MODULATING VALVE V2.

2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE AS FOLLOWS:

A – PATIENT BEDROOM	MINIMUM 12 ACPH SUPPLY AIR (ASHRAE STANDARD 170 2008). INCREASE SUPPLY AIR VOLUME, IF REQUIRED, TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODES. EXAMPLE: 400 CFM [190 L/S]
B – ANTE ROOM	SUPPLY AIR IS NOT REQUIRED FOR THIS SPACE. EX–FILTRATE PATIENT ROOM AIR AND CORRIDOR AIR TO EXHAUST MINIMUM 10 ACPH (ASHRAE STANDARD 170) AS MEASURED AND CONTROLLED BY VALVE V–2. FOR THIS EXAMPLE INFILTRATE 100 CFM [47 L/S] FROM CORRIDOR INTO THE ANTEROOM + 60 CFM [28 L/S] FROM THE AII/PE ROOM. THIS WILL ENSURE THE ANTE ROOM IS NEGATIVE WITH RESPECT TO THE AII/PE ROOM AND WITH RESPECT TO THE CORRIDOR.
C – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE–UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28 L/S]. EXAMPLE: 60 CFM [28 L/S]

3. THE DEDICATED EXHAUST AIR SYSTEM SHALL BE BALANCED AS FOLLOWS:

A – PATIENT BEDROOM	400 CFM [190 L/S](SUPPLY) – 60 CFM [28 L/S](TOILET) – 40 CFM [19 L/S] (ANTE ROOM). 300 CFM [140 L/S] AII/PE ROOM EXHAUST. 100 CFM [47 L/S] INFILTRATED FROM CORRIDOR INTO ANTE ROOM + 40 CFM [19 LS] EXFILTRATE FROM AII/PE ROOM INTO ANTE ROOM, 140 CFM [65 L/S] EXHAUST, TOTAL EXHAUST 500 CFM [240 L/S]

4. COORDINATE DOORS UNDER CUTS FOR DOOR BETWEEN ANTE ROOM AND PATIENT (1")[2.54 CM], DOOR TO CORRIDOR.

AIR SYSTEM FOR COMBINATION AIRBORNE INFECTION ISOLATION (AII)/PROTECTIVE ENVIRONMENT (PE) ROOM WITH NEGATIVE ANTEROOM

#

NTS NEGATIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.

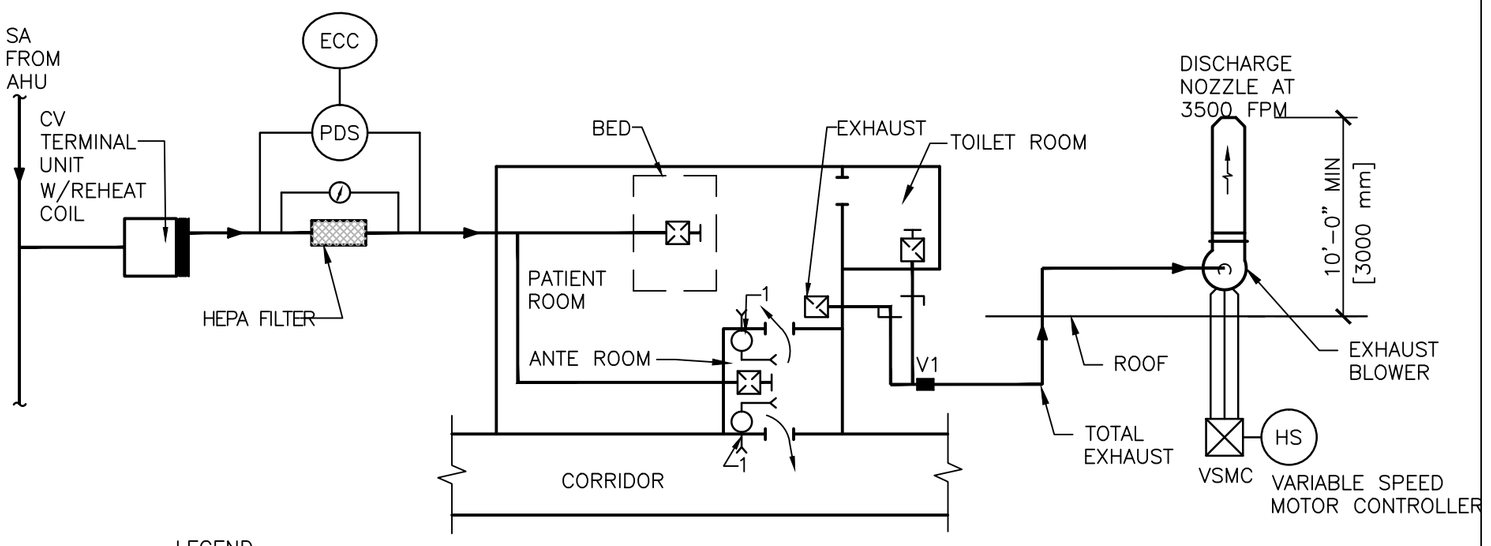
Department of Veterans Affairs

DETAIL TITLE / AIR SYSTEM FOR COMBINATION AIRBORNE INFECTION ISOLATION/ PROTECTIVE ENVIRONMENT ROOM W/ NEGATIVE ANTE ROOM

SCALE :NONE

DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923–19.DWG



LEGEND

V1 AIR FLOW CONTROL VALVE PRESSURE INDEPENDENT TYPE

GENERAL NOTES:

1. ANTEROOM SHALL BE MAINTAINED AT A POSITIVE PRESSURE (0.01 INCH WATER COLUMN [2.5 PASCAL]) WITH RESPECT TO BOTH AII/PE ROOM AND THE CORRIDOR OR ANY ADJOINING SPACE BY MODULATING VALVE V1. COMBO ROOMS SHALL HAVE PERMANENTLY INSTALLED DEVICES AND/OR MECHANISMS TO CONSTANTLY MONITOR THE DIFFERENTIAL AIR PRESSURE BETWEEN THE PATIENT ROOM AND ANTE ROOM AND THE CORRIDOR AND ANTE ROOM. A LOCAL VISUAL MEANS SHALL BE PROVIDED TO INDICATE WHENEVER POSITIVE DIFFERENTIAL PRESSURE IS NOT MAINTAINED WITH RESPECT TO ANTE ROOM AND EITHER THE AII/PE ROOM OR THE CORRIDOR. (STOBE LITE)

2. MAINTAIN THE ATTACHED TOILET, IF ANY, AT NEGATIVE AIR PRESSURE WITH RESPECT TO THE PE ROOM. HOWEVER, THE DESIGN NEED NOT INCLUDE A PRESSURE DIFFERENTIAL SENSOR FOR VERIFICATION.

3. LOCATE THE SUPPLY AIR OUTLET OVER THE PATIENT BED ON THE CEILING WITHOUT CREATING A DRAFT CAUSING PATIENT DISCOMFORT. LOCATE EXHAUST AIR INLET NEAR THE PATIENT ROOM DOOR.

TYPICAL AIR BALANCE EXAMPLE:

1. THE PATIENT BEDROOM IS KEPT UNDER POSITIVE PRESSURE WITH RESPECT TO THE ADJOINING CORRIDOR BY MODULATING VALVE V1.

2. THE SUPPLY AIR SYSTEM SHALL CONSIST OF THE CONSTANT VOLUME AIR DELIVERY FROM A DEDICATED AIR TERMINAL UNIT WITH REHEAT COIL TO THE ISOLATION SUITE AS FOLLOWS:

A – PATIENT BEDROOM	MINIMUM 12 ACPH SUPPLY AIR (ASHRAE STANDARD 170 2008). INCREASE SUPPLY AIR VOLUME, IF REQUIRED, TO MEET THE INSIDE DESIGN CONDITIONS IN COOLING AND/OR HEATING MODES. EXAMPLE: 400 CFM [190 L/S]
B – ANTE ROOM	MINIMUM 10 ACPH (ASHRAE STANDARD 170 2008) TO BE EX-FILTRATED TO THE CORRIDOR AND INTO AII/PE ROOM AS FOLLOWS: SUPPLY ANTE ROOM AT THE RATE OF 140 CFM [66 L/S] WITH 40 CFM [19 L/S] ENTERING THE AII/PE ROOM AND 100 CFM [47 L/S] EX-FILTRATED INTO THE CORRIDOR. EXAMPLE: 140 CFM [66 L/S] TOTAL SUPPLY AIR
C – PATIENT TOILET	DO NOT SUPPLY AIR INTO THE TOILET. DRAW MAKE-UP AIR FROM THE PATIENT'S BEDROOM AND EXHAUST AT THE RATE OF 10 ACPH OR 60 CFM [28 L/S]. EXAMPLE: 60 CFM [28 L/S]

3. THE DEDICATED EXHAUST AIR SYSTEM SHALL BE BALANCED AS FOLLOWS:

A – PATIENT BEDROOM	400 CFM [190 L/S] (SUPPLY) – 60 CFM [28 L/S] (TOILET) + 40 CFM [19 L/S] INFILTRATED FROM ANTE ROOM (ANTE ROOM) 380 CFM [180 L/S] EXHAUSTED FROM AII/PE ROOM. 100 CFM [47 L/S] IS EXFILTRATED TO CORRIDOR FROM ANTE ROOM. TOTAL EXHAUST 440 CFM [210 L/S]

4. COORDINATE DOORS UNDER CUTS FOR DOOR BETWEEN ANTE ROOM AND PATIENT (1") [2.54 CM], DOOR TO CORRIDOR.

AIR SYSTEM FOR COMBINATION AIRBORNE INFECTION ISOLATION (AII)/PROTECTIVE ENVIRONMENT (PE) ROOM WITH POSITIVE ANTEROOM

#

NTS POSITIVE PRESSURE

DESIGNER'S NOTE:

1. ENSURE FINAL DESIGN REFLECTS PROJECT SPECIFIC REQUIREMENTS AND MEETS ASHRAE 170, LATEST EDITION WITH **ALL** ADDENDUMS.

Department of Veterans Affairs

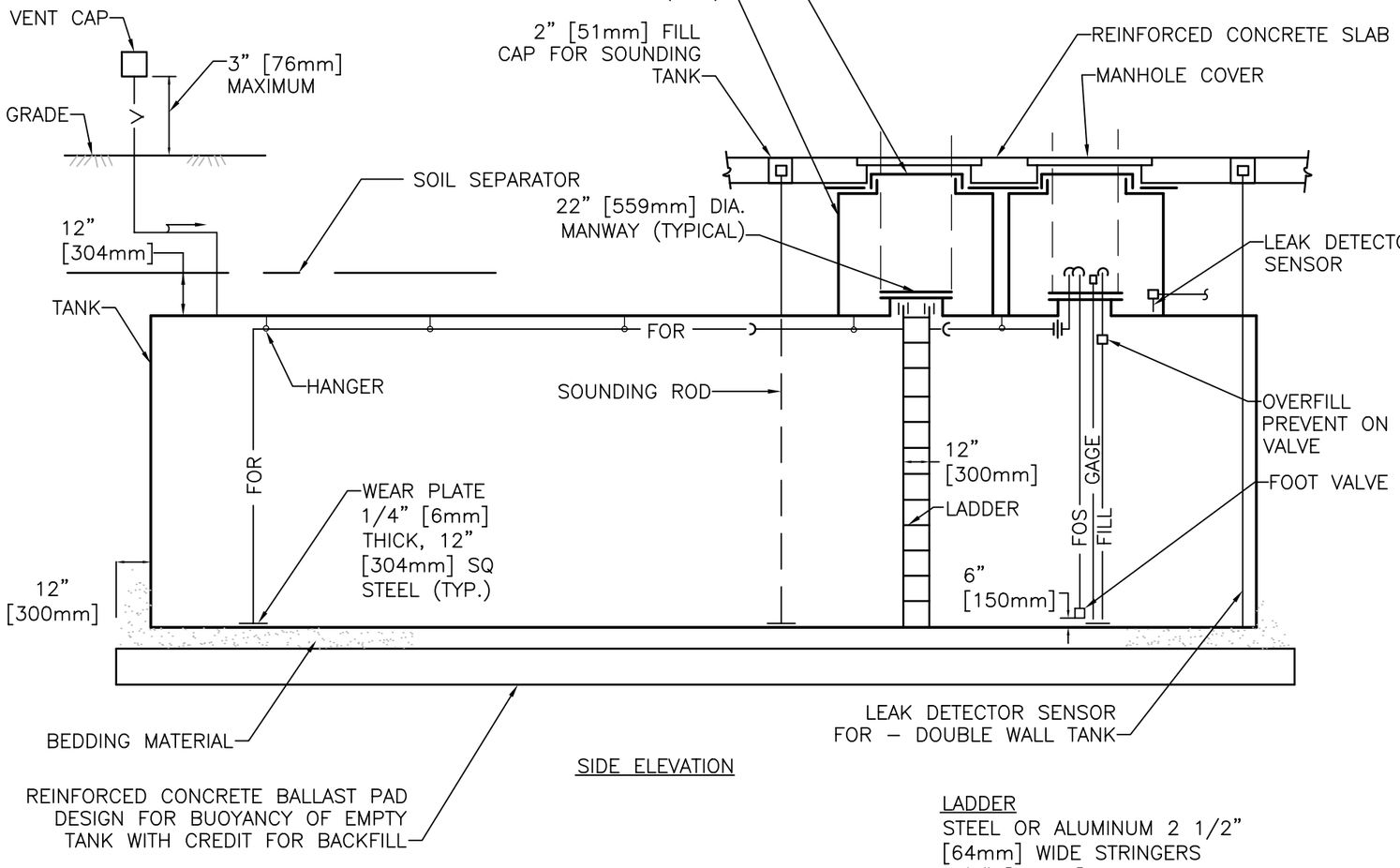
DETAIL TITLE / AIR SYSTEM FOR COMBINATION AIRBORNE INFECTION ISOLATION/ PROTECTIVE ENVIRONMENT ROOM W/POSITIVE ANTE ROOM

SCALE :NONE

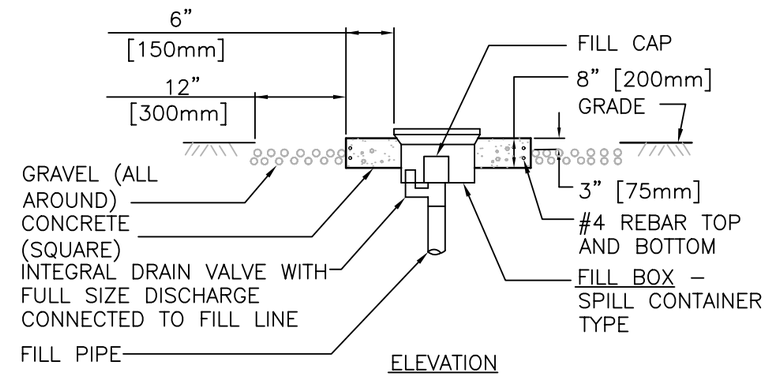
DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923-20.DWG

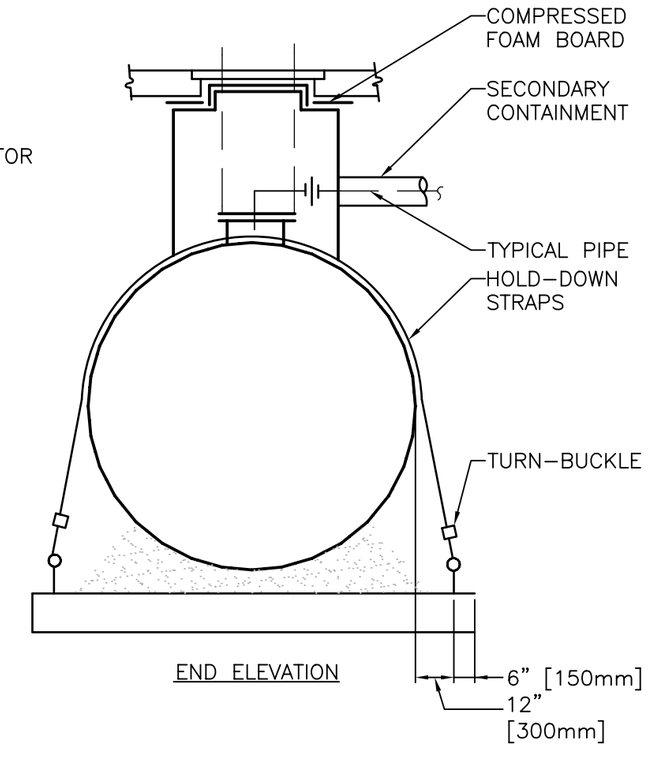
NOTE: THIS DETAIL SHOWS BASIC REQUIREMENTS ONLY AND IS NOT INTENDED FOR USE ON PROJECT DRAWINGS. THE PROJECT ENGINEER MUST PROVIDE A COMPLETE DESIGN WHICH CONFORMS TO PROJECT REQUIREMENTS.



SIDE ELEVATION



ELEVATION



END ELEVATION

LADDER
STEEL OR ALUMINUM 2 1/2" [64mm] WIDE STRINGERS
3/4" [19mm] DIA. RUNGS
ANCHOR AT BOTTOM GUIDE AT TOP

UNDERGROUND FUEL OIL STORAGE TANK

#

NTS

DETAIL TITLE / UNDERGROUND FUEL OIL STORAGE TANK

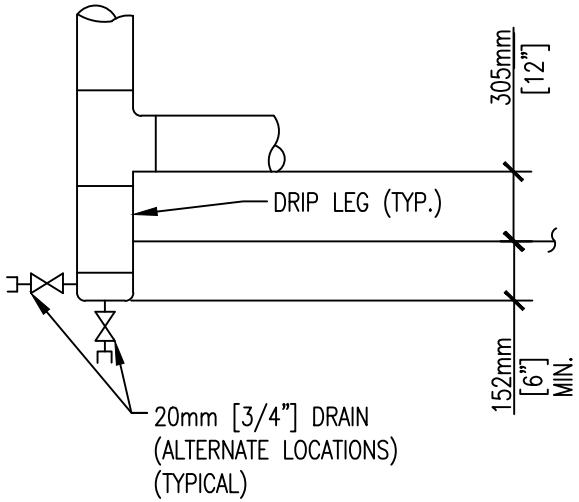
SCALE :NONE

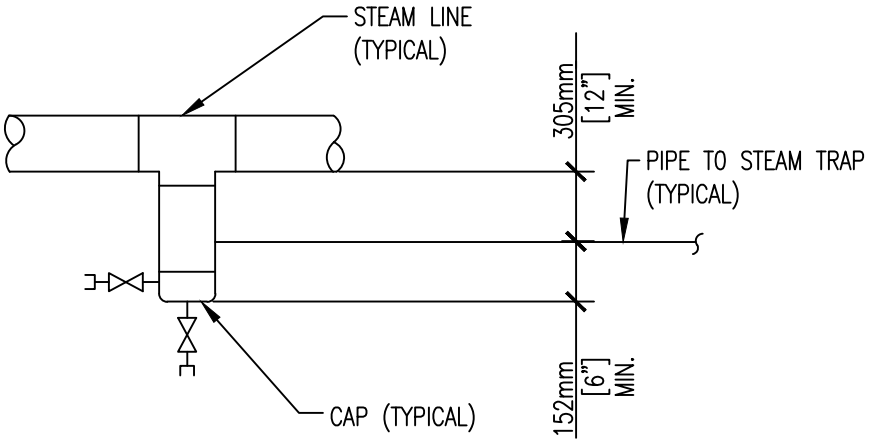
DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. SD231000-01.DWG

Department of Veterans Affairs

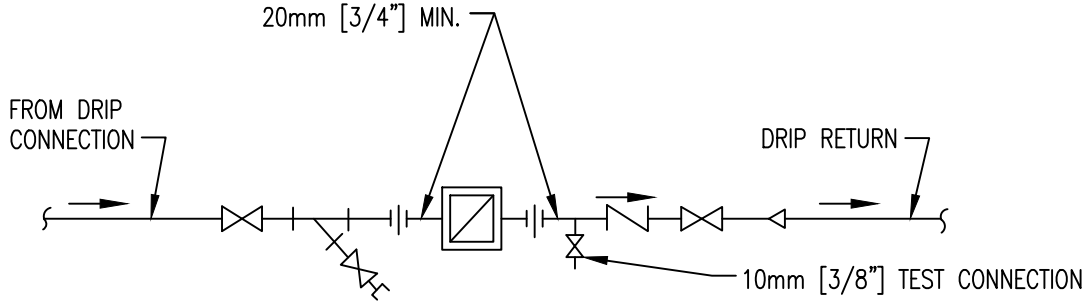
Department of Veterans Affairs





STEAM LINE DRIP POCKET

NOTE:
DRIP POCKET PIPE SIZE SAME AS STEAM MAIN UNLESS OTHERWISE NOTED.



STEAM TRAP ASSEMBLY

DETAIL TITLE: STEAM LINE DRIP POCKET
STEAM TRAP ASSEMBLY

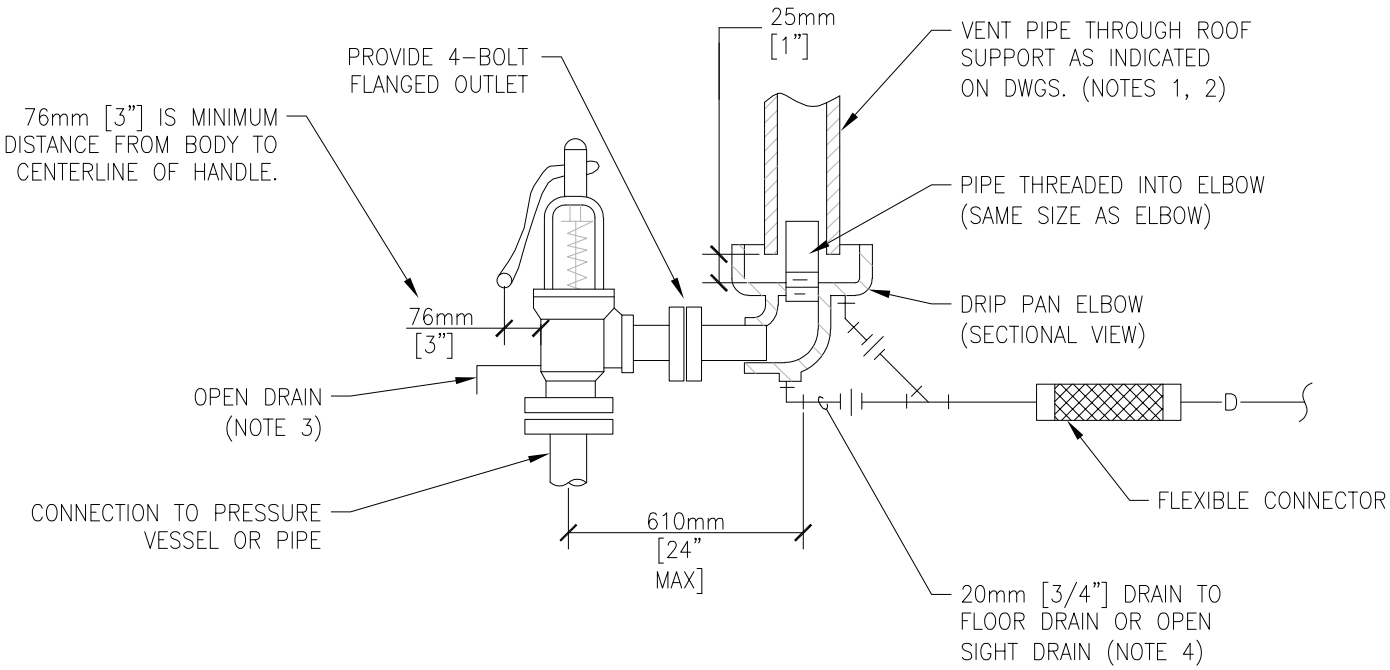
SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD232111-01.DWG

STEAM LINE DRIP POCKET AND STEAM TRAP ASSEMBLY

NTS



NOTES:

1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1. POWER PIPING CODE, APPENDIX II.

2. VENT PIPE SHALL TERMINATE 1829mm [6'] MIN. ABOVE FINISHED ROOF.

3. DISCHARGE OF DRAIN SHALL BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.

4. NO OTHER DRAIN SHALL BE CONNECTED TO THE DRIP PAN ELBOW DRAIN PIPE.

STEAM SAFETY VALVE

NTS

VA | U.S. Department of Veterans Affairs

DETAIL TITLE / STEAM SAFETY VALVE

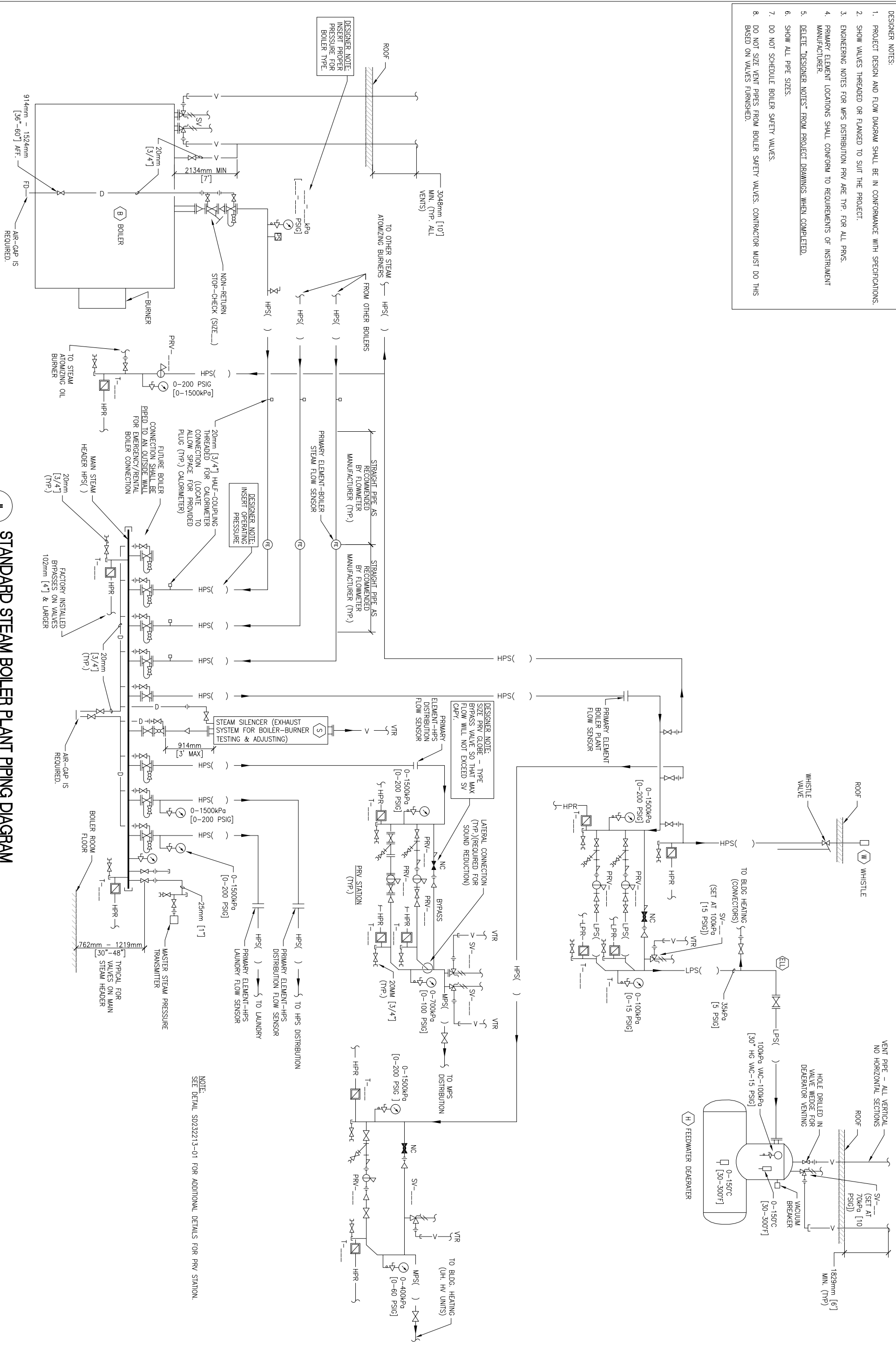
SCALE: NONE

DATE ISSUED: NOVEMBER 1, 2020

SD232111-02 DWG

DESIGNER NOTES:

1. PROJECT DESIGN AND FLOW DIAGRAM SHALL BE IN CONFORMANCE WITH SPECIFICATIONS.
2. SHOW VALVES THREADED OR FLANGED TO SUIT THE PROJECT.
3. ENGINEERING NOTES FOR MPS DISTRIBUTION PRV ARE TYP. FOR ALL PRVS.
4. PRIMARY ELEMENT LOCATIONS SHALL CONFORM TO REQUIREMENTS OF INSTRUMENT MANUFACTURER.
5. DELETE "DESIGNER NOTES" FROM PROJECT DRAWINGS WHEN COMPLETED.
6. SHOW ALL PIPE SIZES.
7. DO NOT SCHEDULE BOILER SAFETY VALVES.
8. DO NOT SIZE VENT PIPES FROM BOILER SAFETY VALVES. CONTRACTOR MUST DO THIS BASED ON VALVES FURNISHED.



NOTE:
SEE DETAIL SD232213-01 FOR ADDITIONAL DETAILS FOR PRV STATION.

STANDARD STEAM BOILER PLANT PIPING DIAGRAM

NTS

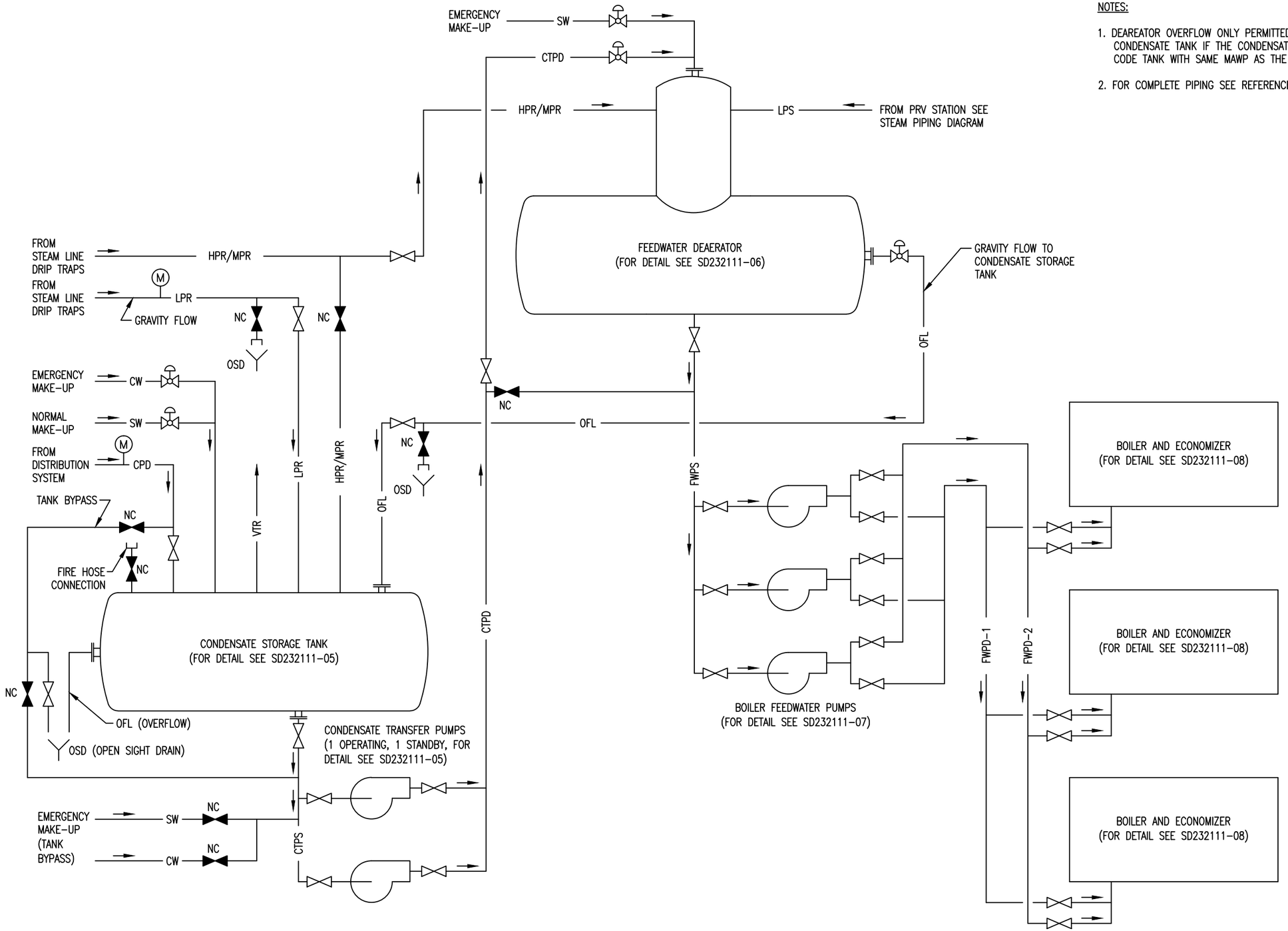
U.S. Department of Veterans Affairs

DETAIL TITLE / STANDARD STEAM BOILER PLANT PIPING DIAGRAM

SCALE: NONE

DATE ISSUED: AUGUST 1, 2022

SD232111-03.DWG



NOTES:

1. DEAREATOR OVERFLOW ONLY PERMITTED TO GO TO CONDENSATE TANK IF THE CONDENSATE TANK IS A ASME CODE TANK WITH SAME MAWP AS THE DEAREATOR.
2. FOR COMPLETE PIPING SEE REFERENCED DETAILS.

BASIC FLOW DIAGRAM - CONDENSATE AND BOILER FEEDWATER

#

NTS

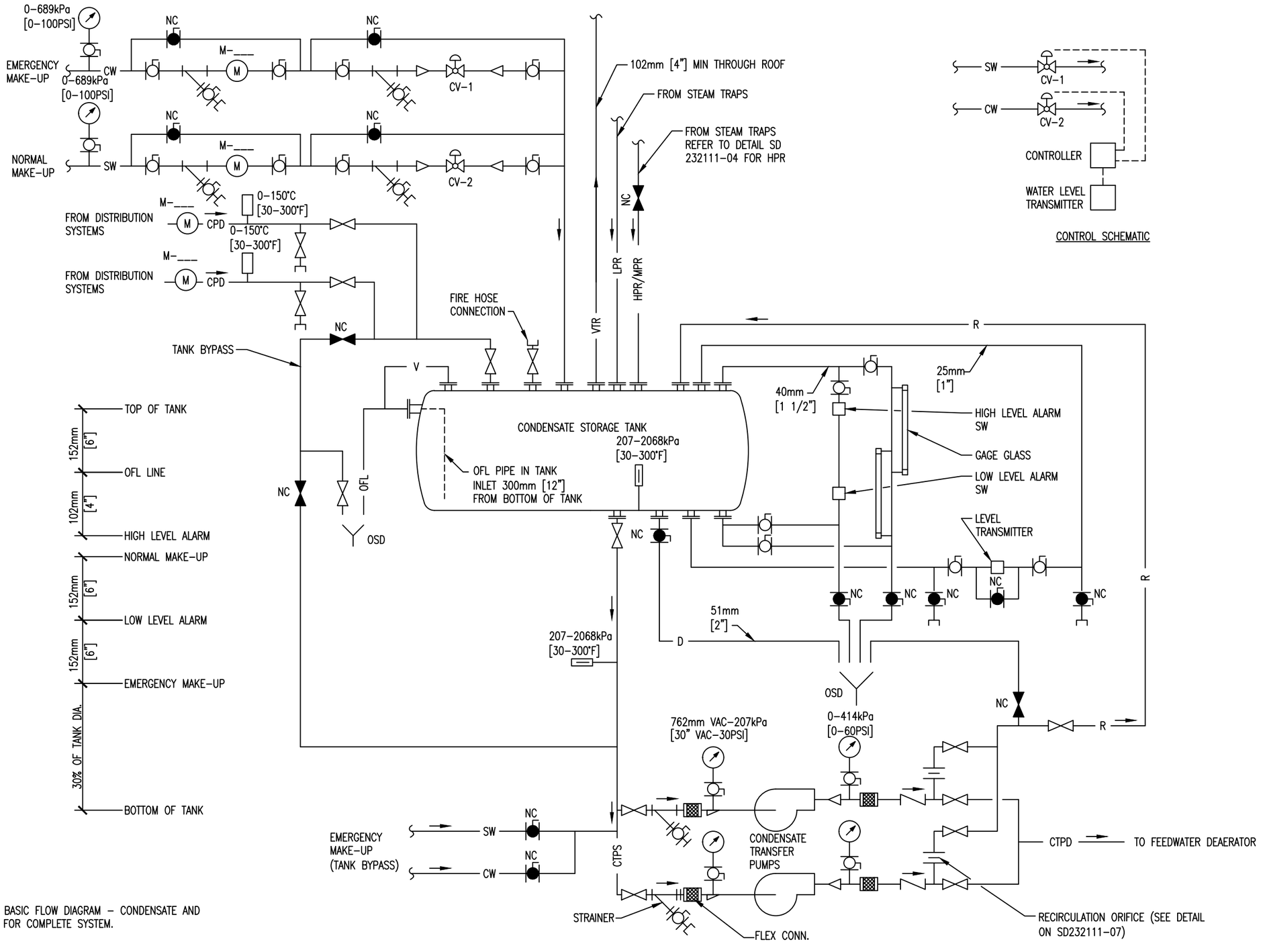
DETAIL TITLE: CONDENSATE, BOILER FEEDWATER, BLOWOFF, CHEMICAL FEED, WATER SAMPLE

SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD232111-04.DWG

Department of Veterans Affairs



DESIGNER'S NOTE:
SEE SD232111–04 BASIC FLOW DIAGRAM – CONDENSATE AND BOILER FEEDWATER FOR COMPLETE SYSTEM.

CONDENSATE STORAGE AND TRANSFER FLOW DIAGRAM

NTS

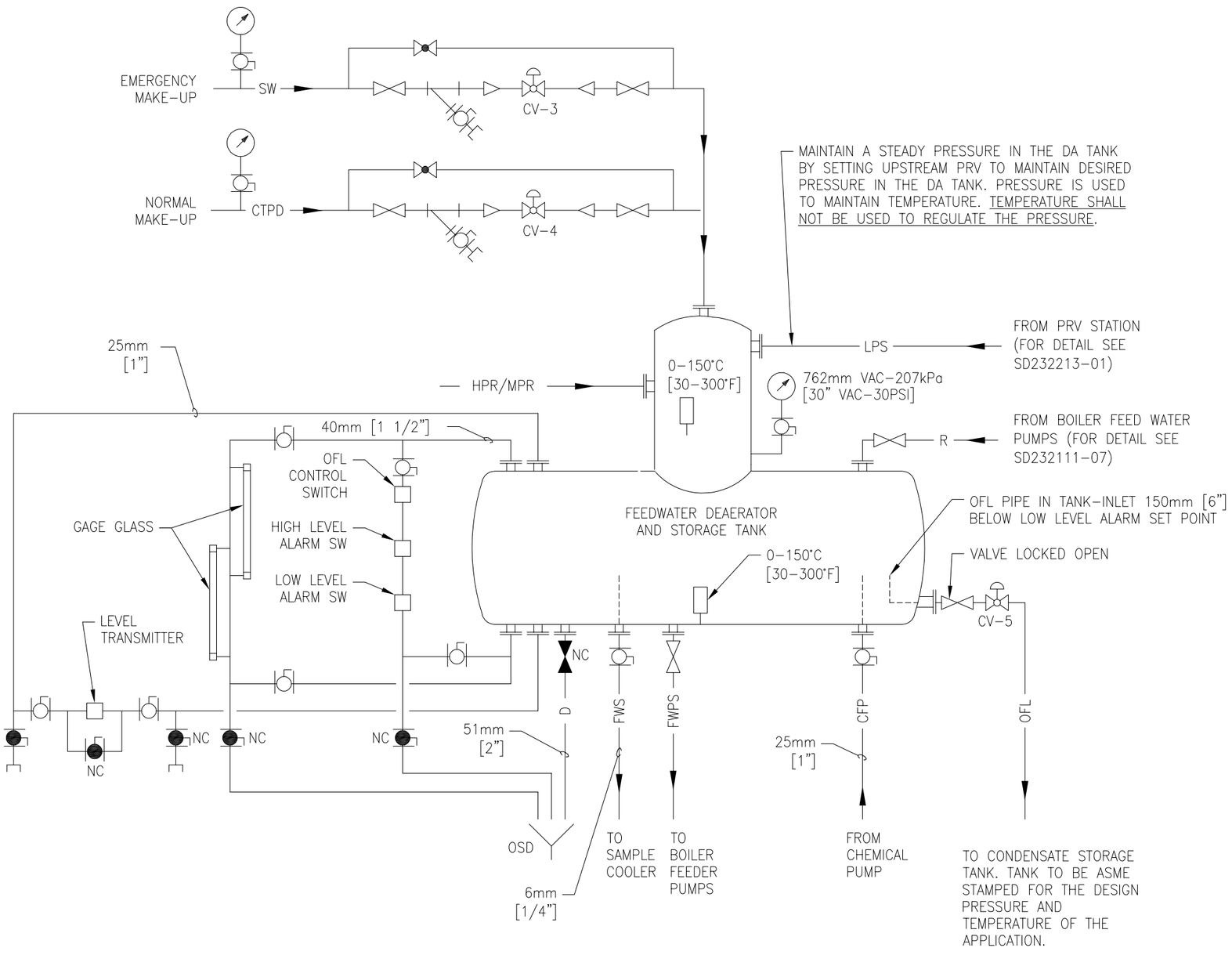
DETAIL TITLE: CONDENSATE STORAGE AND TRANSFER FLOW DIAGRAM

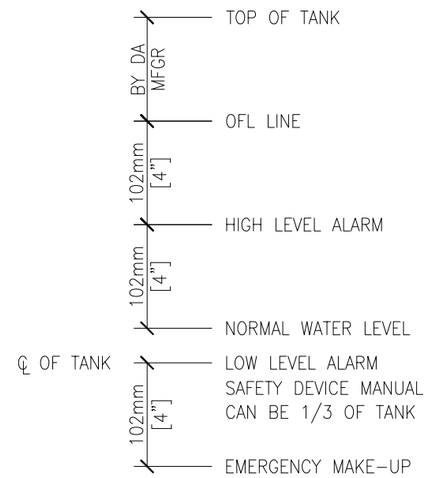
SCALE :NONE

DATE ISSUED: 11/01/2017

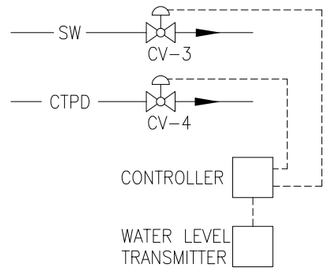
CAD DETAIL NO.: SD232111–05.DWG

Department of Veterans Affairs

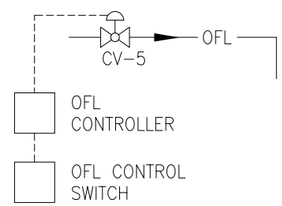




WATER LEVEL CONTROL/ALARM POINTS



WATER LEVEL CONTROL SCHEMATIC



OVERFLOW CONTROL SCHEMATIC

DESIGNER'S NOTE:
1. SEE SD232111-04 BASIC FLOW DIAGRAM – CONDENSATE AND BOILER FEEDWATER FOR COMPLETE SYSTEM.
2. DELETE DESIGNER'S NOTE WHEN COMPLETED.

FEEDWATER DEAERATOR FLOW DIAGRAM

NTS

DETAIL TITLE / FEEDWATER DEAERATOR FLOW DIAGRAM

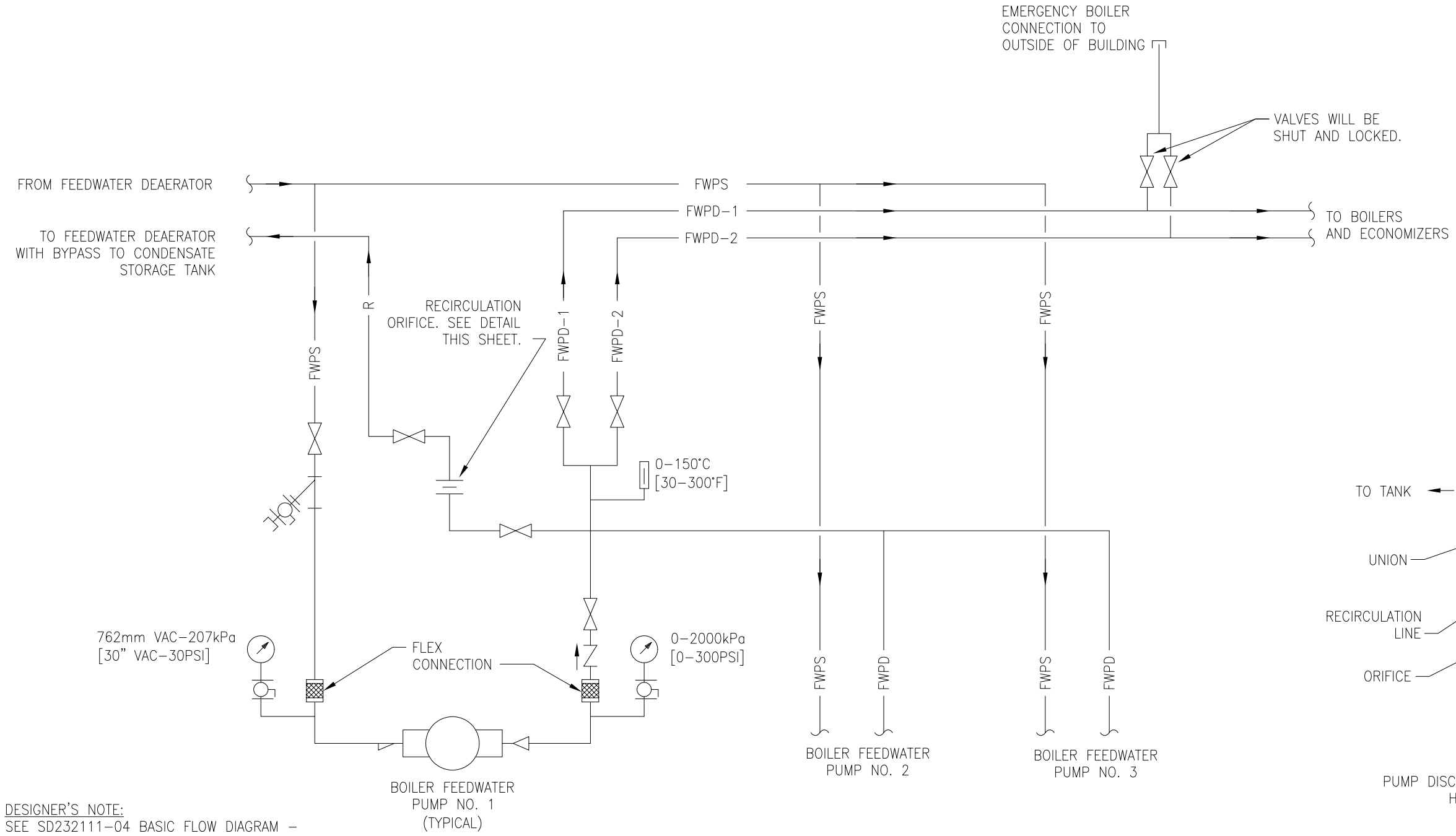
U.S. Department of Veterans Affairs

VA

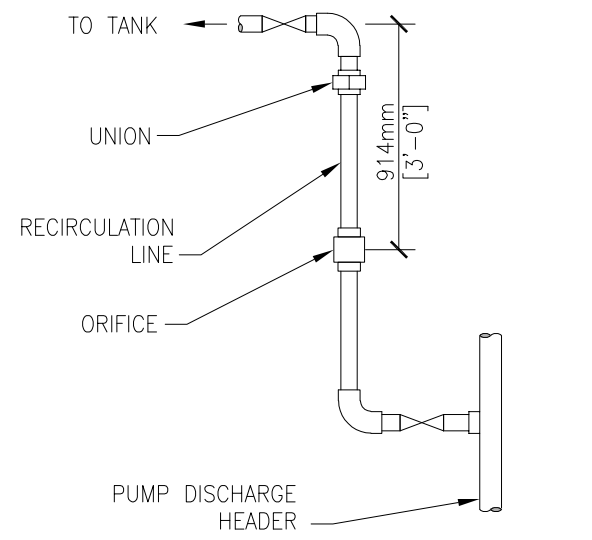
SCALE: NONE

DATE ISSUED: NOVEMBER 1, 2020

SD232111-06.DWG



DESIGNER'S NOTE:
SEE SD232111-04 BASIC FLOW DIAGRAM - CONDENSATE AND BOILER FEEDWATER FOR COMPLETE SYSTEM.



DETAIL - PUMP RECIRCULATION ORIFICE ASSEMBLY

NOTE:
CAPACITY OF EACH PUMP APPROX. 125% OF ONE BOILER.

BOILER FEEDWATER PUMPS FLOW DIAGRAM

NTS

DETAIL TITLE / BOILER FEEDWATER PUMPS FLOW DIAGRAM

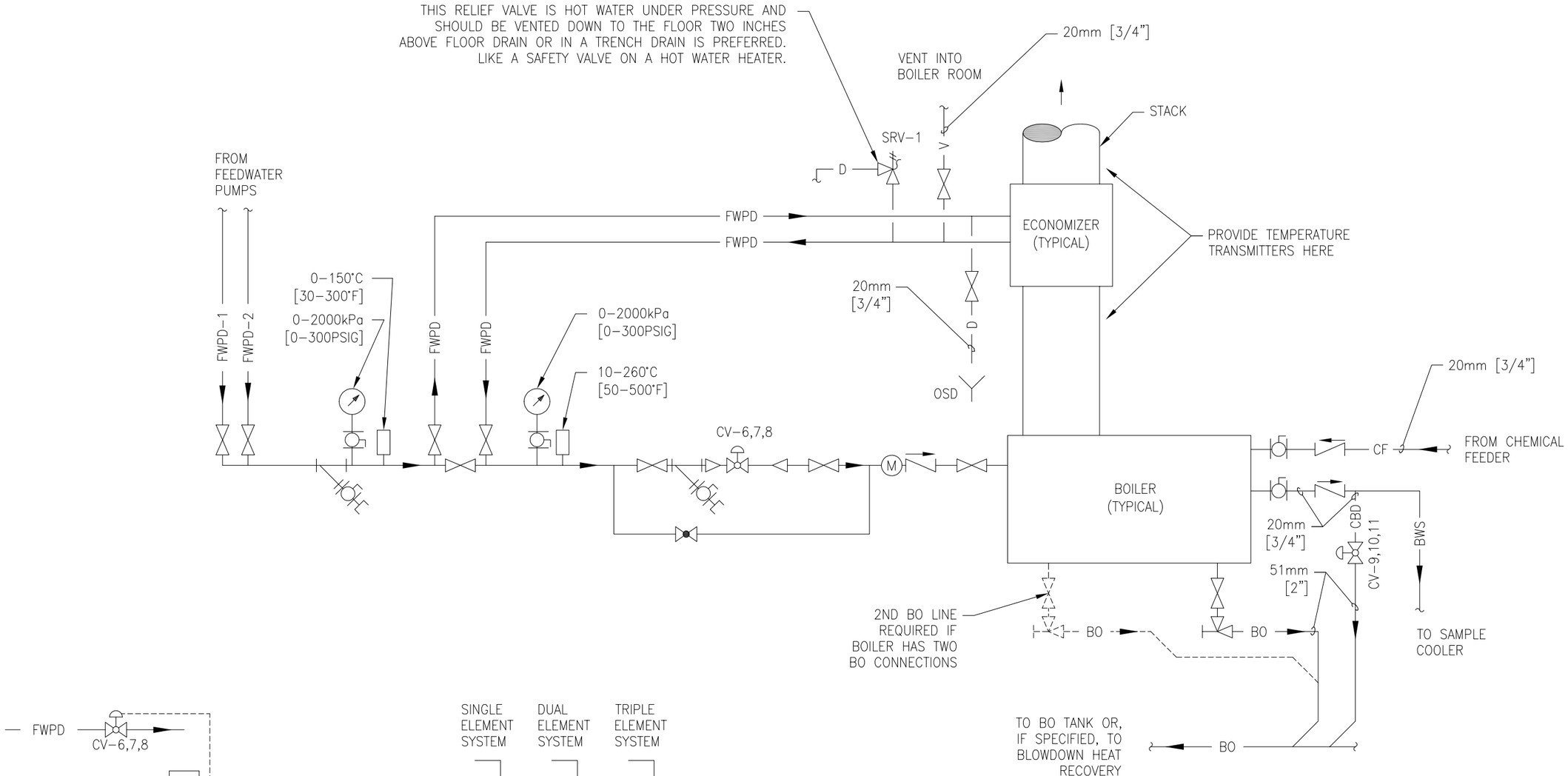
U.S. Department of Veterans Affairs

VA

SCALE: NONE

DATE ISSUED: AUGUST 1, 2022

SD232111-07.DWG



BOILER WATER LEVEL CONTROL SCHEMATIC
(SEE SPECS FOR TYPE OF SYSTEM)

BOILER FLOW DIAGRAM

NTS

DETAIL TITLE / BOILER FLOW DIAGRAM

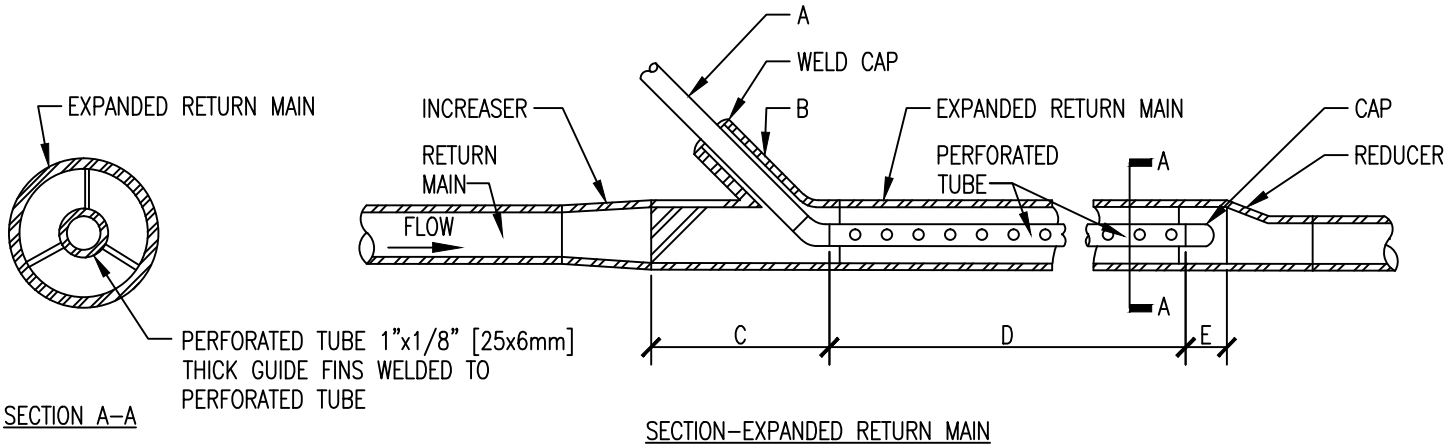
U.S. Department of Veterans Affairs

VA

SCALE: NONE

DATE ISSUED: NOVEMBER 1, 2020

SD232111-08.DWG



A	SIZE, TRAP DISCHARGE LINE	15mm [1/2"]	20mm [3/4"]
B	SIZE, 45° WELDING NIPPLE	25mm [1"]	32mm [1–1/4"]
C	LENGTH OF EXPANDED MAIN AHEAD OF TRAP DISCHARGE PIPE	175mm [7"]	175mm [7"]
D	LENGTH OF PERFORATED PIPE	415mm [16–1/2"]	415mm [16–1/2"]
E	LENGTH OF EXPANDED MAIN FOLLOWING PERFORATED PIPE	50mm [2"]	50mm [2"]

RETURN MAIN SIZE	UP TO 40mm [1–1/2"]	50mm [2"]	75mm [3"] & OVER
EXPANDED RETURN MAIN SIZE		65mm [2–1/2"]	SAME SIZE

NOTES:
1. 15mm [1/2"] PERFORATED TUBE SHALL HAVE 40 – 16mm [1/8"] DIAMETER HOLES SPACED 40mm [1–1/2"] O.C. IN 4 ROWS.
2. 20mm [3/4"] PERFORATED TUBE SHALL HAVE 78 – 6mm [1/8"] DIAMETER HOLES SPACED 40mm [1–1/2"] O.C. IN 6 ROWS.
3. HOLES IN TUBE SHALL BE SPACED EQUALLY AROUND PERIMETER.

DESIGNER'S NOTE:
THIS DETAIL SHALL ONLY BE USED FOR LIMITED SITUATIONS WHERE THE DESIGNER CONDUITS A FULL ANALYSIS OF THE SYSTEM AND ITS IMPACTS, TO ENSURE THAT CONDENSATE DOES NOT FLASH AND CREATE A WATER HAMMER. REFERENCE THE STEAM DESIGN MANUAL VOLUME 3.

HIGH PRESSURE STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE RETURN LINE

#

NTS

Department of Veterans Affairs

DETAIL TITLE: HIGH PRESSURE STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE RETURN LINE

SCALE :NONE

DATE ISSUED: 11/01/2017 CAD DETAIL NO.: SD232111–09.DWG

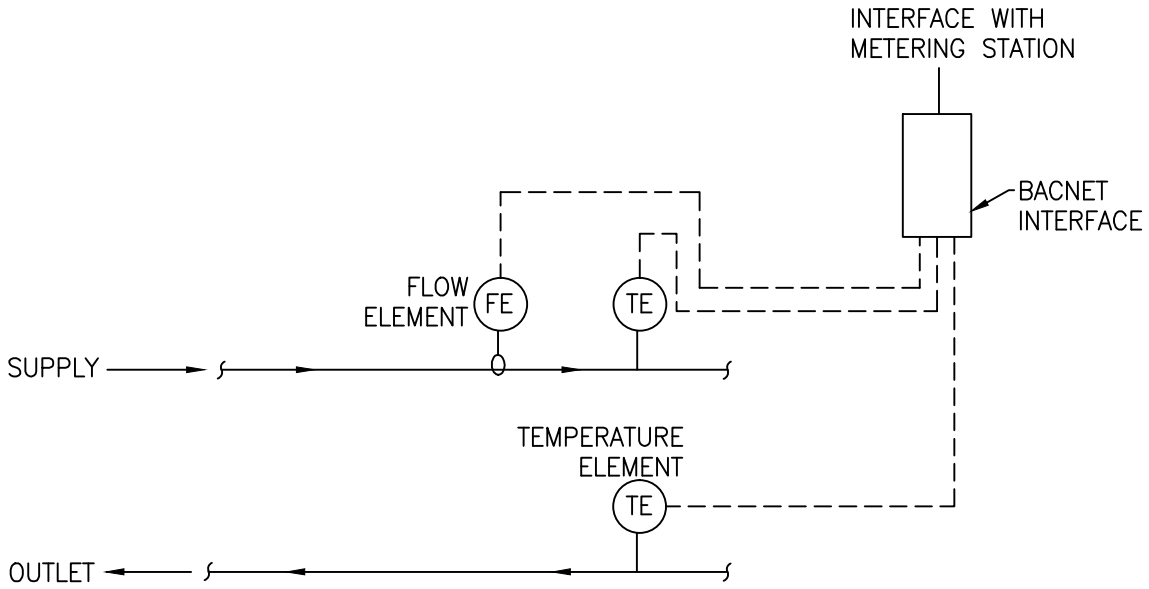
Department of Veterans Affairs

DETAIL TITLE: WATER FLOW MEASURING STATION

SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD232113-01.DWG



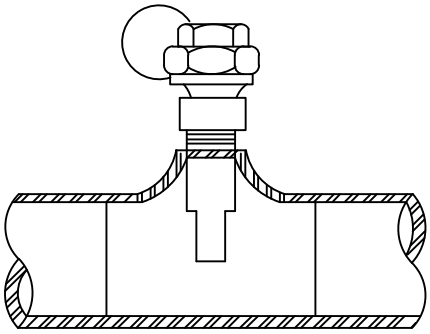
NOTE:
MAINTAIN UPSTREAM AND DOWNSTREAM DISTANCES RECOMMENDED BY METER MANUFACTURERS.

DESIGNER'S NOTE:
MODIFY DETAIL AS REQUIRED TO BE PROJECT SPECIFIC FOR THE TYPE OF METER BEING USED.

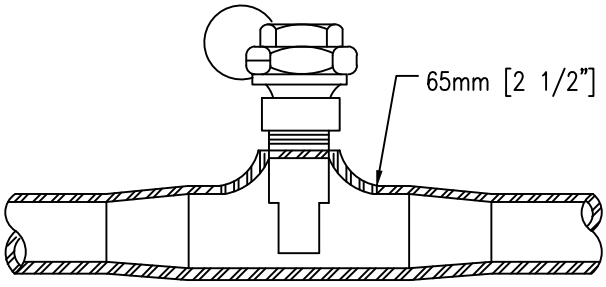
WATER FLOW MEASURING STATION (WITH BTU METER)

#

NTS

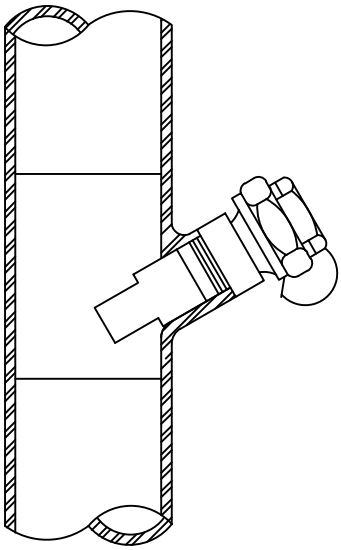


GREATER THAN 50mm [2"] DIA. PIPE

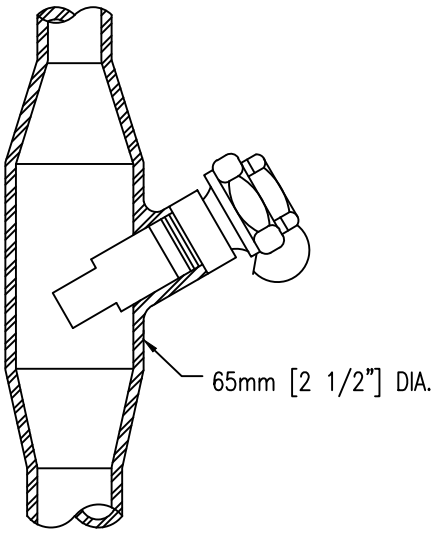


50mm [2"] DIA. & SMALLER

HORIZONTAL



GREATER THAN 50mm [2"] DIA. PIPE



50mm [2"] DIA. & SMALLER

VERTICAL

NOTE:
PROVIDE THE APPROPRIATE WELL DEPTH TO HAVE THE NECESSARY INSULATION STAND-OFF DISTANCE.

INSTALLATION OF THERMOMETER WELLS

NTS

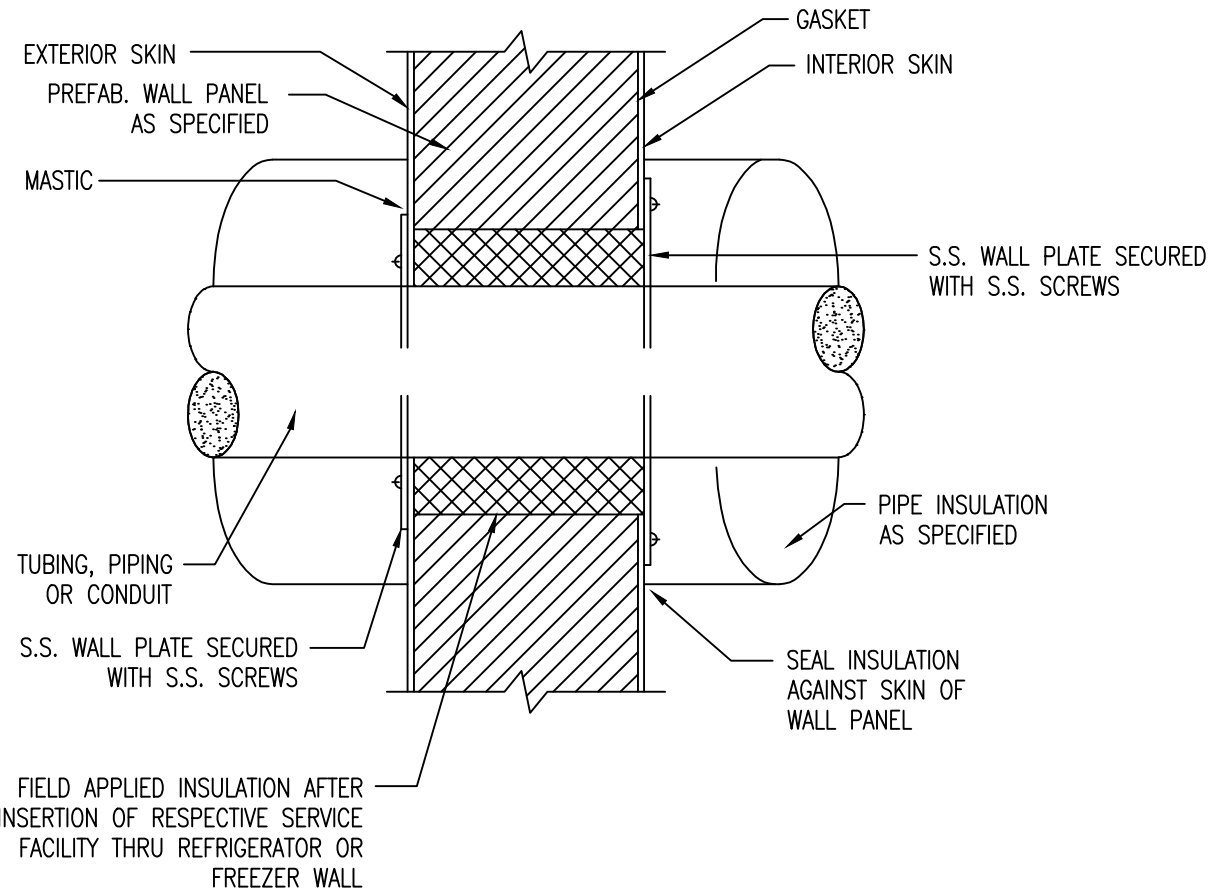
Department of Veterans Affairs

DETAIL TITLE: INSTALLATION OF THERMOMETER WELLS

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. : SD232113-02.DWG



TUBING, PIPING, AND CONDUITS PASSING THROUGH PRE-FAB INSULATED WALL PANELS

#

NTS

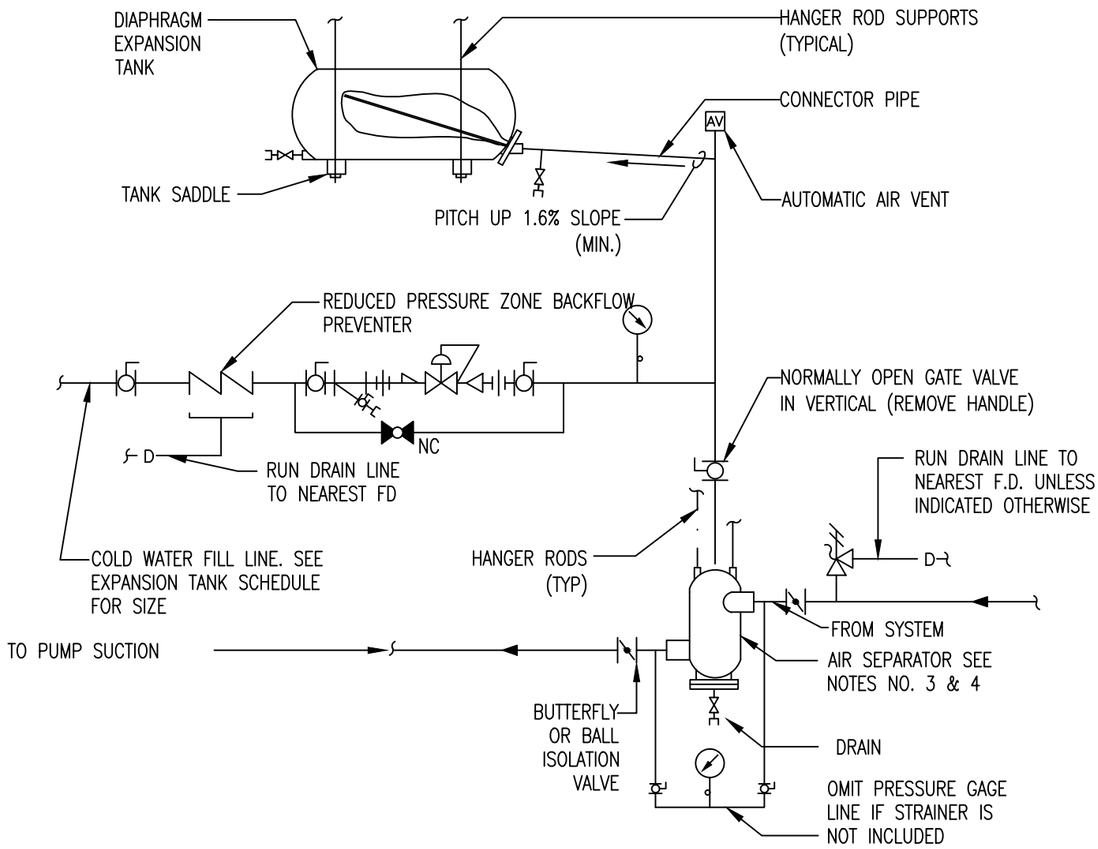
Department of Veterans Affairs

DETAIL TITLE: TUBING, PIPING, AND CONDUITS PASSING THROUGH PRE-FAB INSULATED WALL PANELS

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. : SD232113-03.DWG



NOTES:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. RELIEF VALVE FOR CHILLED WATER SYSTEM IS SHOWN. OMIT WHEN RELIEF VALVE IS SHOWN ON HEAT EXCHANGER DETAIL & SYSTEM IS USED ONLY FOR HOT WATER HEATING.
3. PROVIDE STRAINER IN AIR SEPARATOR WHEN INDICATED IN EXPANSION TANK SCHEDULE.
4. FOR HOT WATER SYSTEMS 50mm [2"] AND SMALLER AND CHILLED WATER SYSTEMS USE IN-LINE AIR PURGER IN LIEU OF AIR SEPARATOR.
5 SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 28kPa. [4 PSIG]

DESIGNER'S NOTE:
VALVES SHALL BE INDICATED ON EITHER SIDE OF AIR SEPARATOR AS REQUIRED BY CLOSENESS OF VALVES SERVING ADJACENT EQUIPMENT. WHERE CHARGING OF TANK IS PROPOSED PROVIDE NECESSARY TAPPINGS. PROVIDE AND SHOW A LOW WATER ALARM ON CHARGED SYSTEMS TO INDICATE NO WATER IN TANK.

HORIZONTAL EXPANSION TANK - PIPING CONNECTIONS

#

NTS

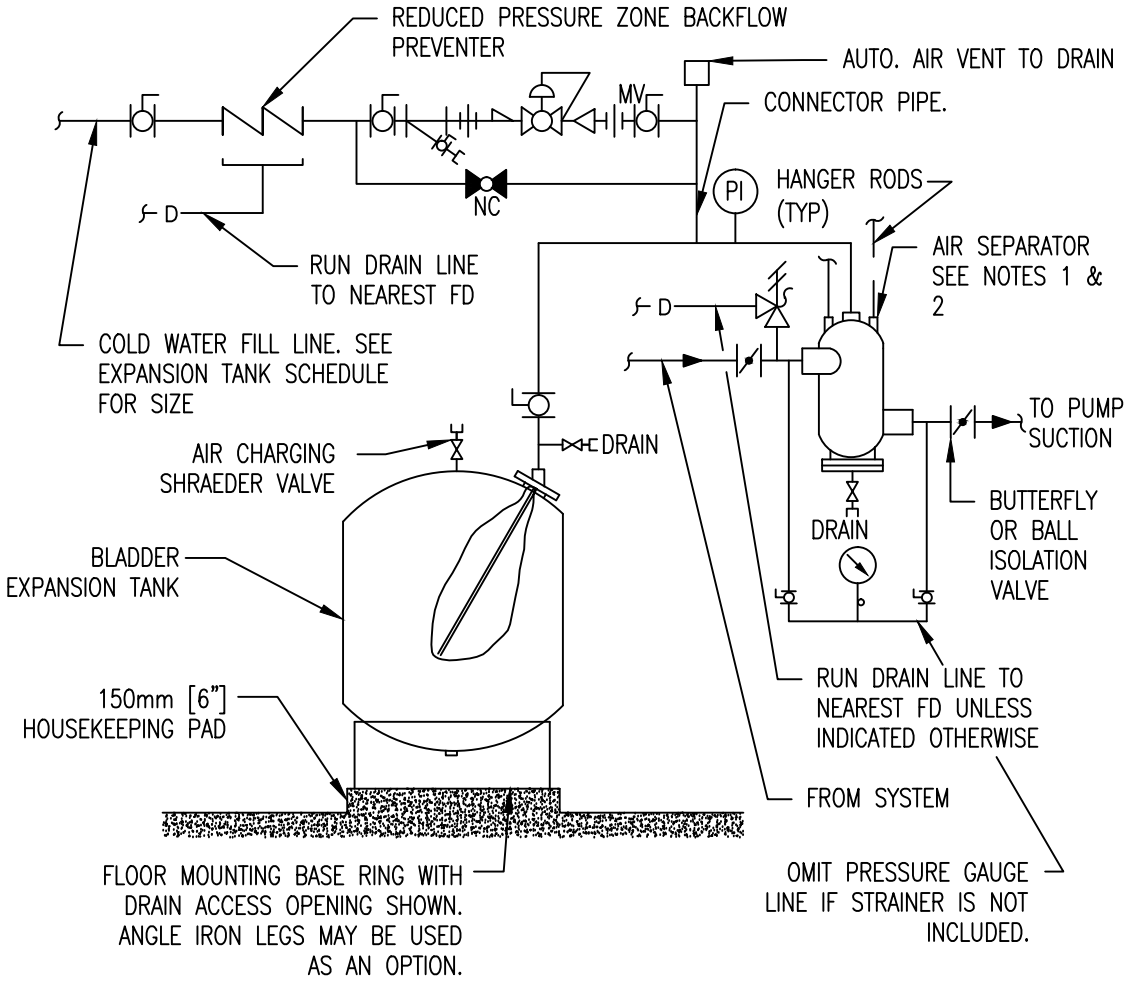
Department of Veterans Affairs

DETAIL TITLE: HORIZONTAL EXPANSION TANK - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. SD232113-04.DWG



NOTES:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. FOR HOT WATER SYSTEMS 50mm [2"] AND SMALLER AND CHILLED WATER SYSTEMS USE IN-LINE AIR PURGER IN LIEU OF AIR SEPARATOR.
3. SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 28kPa [4 PSIG].
4. PROVIDE STRAINER IN AIR SEPARATOR IF INDICATED IN EXPANSION TANK SCHEDULE.
5. RELIEF VALVE FOR CHILLED WATER SYSTEM IS SHOWN. OMIT WHEN RELIEF VALVE IS SHOWN ON HEAT EXCHANGER DETAIL AND SYSTEM IS USED ONLY FOR HOT WATER HEATING.

DESIGNER'S NOTE:
GATE VALVES SHALL BE INDICATED ON EITHER SIDE OF AIR SEPARATOR AS REQUIRED BY CLOSENESS OF VALVES SERVING ADJACENT EQUIPMENT. WHERE CHARGING OF TANK IS PROPOSED PROVIDE NECESSARY TAPPINGS. PROVIDE AND SHOW A LOW WATER ALARM ON CHARGED SYSTEMS TO INDICATE NO WATER IN TANK.

FLOOR MOUNTED EXPANSION TANK - PIPING CONNECTIONS

NTS

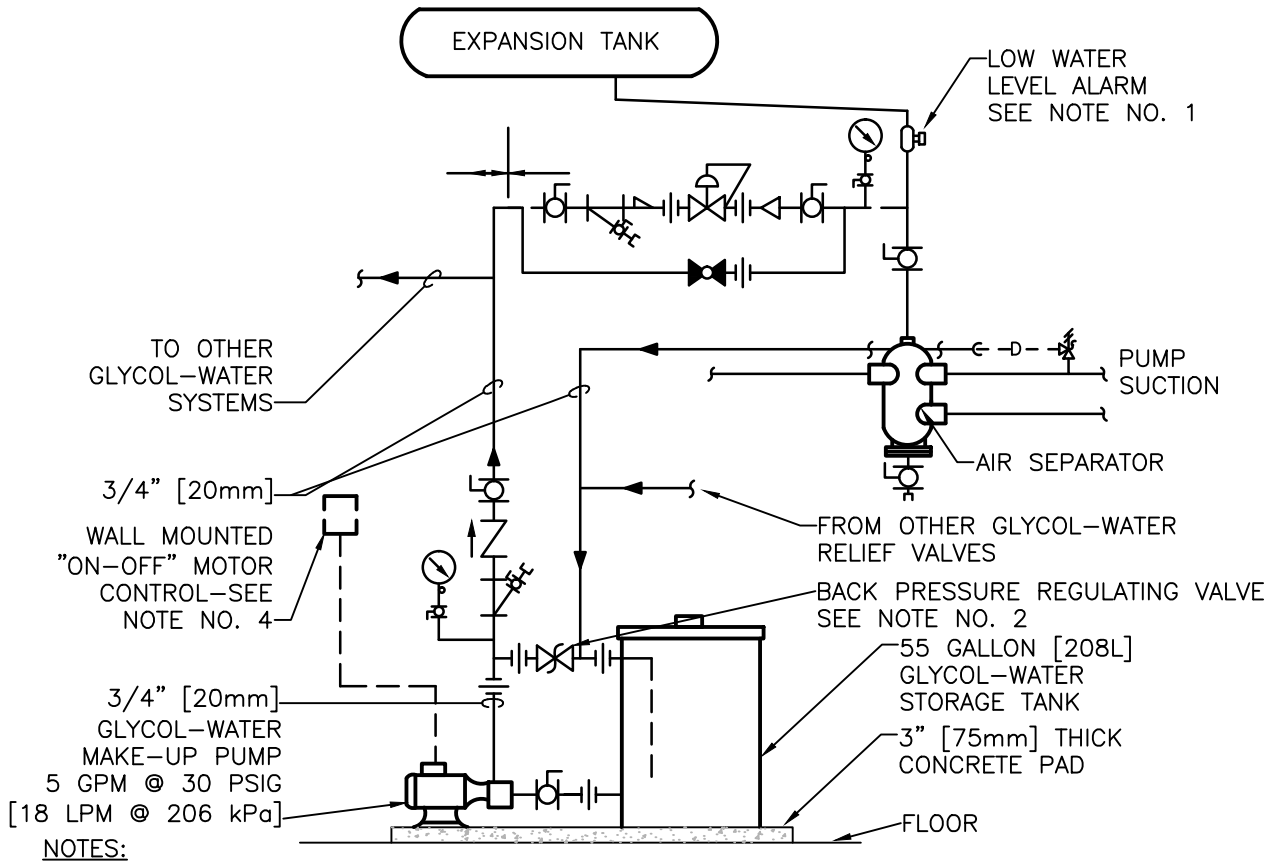
Department of Veterans Affairs

DETAIL TITLE: FLOOR MOUNTED EXPANSION TANK-PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD232113-05.DWG



NOTES:

1. PROVIDE LOW WATER LEVEL ALARM. PROVIDE A LOW WATER LEVEL AT ECC. RELIEF VALVE DRAIN SHALL RETURN TO TANK AS SHOWN ON THIS DETAIL.

2. SET REGULATING VALVE TO MAINTAIN MAKE–UP PRESSURE AT 15 PSIG [103 kPa] ABOVE HIGHEST SYSTEM PRV SETTING.

3. MAKE–UP PIPING SYSTEM DOES NOT REQUIRE INSULATION.

4. OPERATE PUMP MANUALLY AS REQUIRED TO FILL.

INDIRECT GLYCOL MAKE-UP SYSTEM (PIPING AND CONTROLS)

#

NTS

DESIGNER'S NOTE:
PLUMBING DRAWINGS SHOULD INCLUDE DOMESTIC COLD–WATER HOSE BIB NEAR THE GLYCOL–WATER MAKE–UP SYSTEM. FOR SMALL SYSTEMS (50 GAL [200 L] OR LESS) A POT FEEDER, AT THE HIGH POINT IN THE PIPING, MAY BE USED FOR MAKE–UP IN LIEU OF THE PUMPED MAKE–UP.

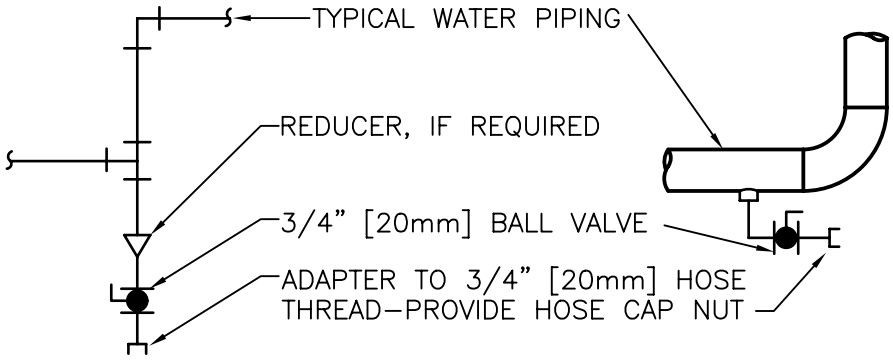
Department of Veterans Affairs

DETAIL TITLE / INDIRECT GLYCOL MAKE–UP SYSTEM (PIPING AND CONTROLS)

SCALE :NONE

DATE ISSUED :MARCH 2010

CADD DETAIL NO. : SD232113–06.DWG



ELEVATION
THREADED PIPING

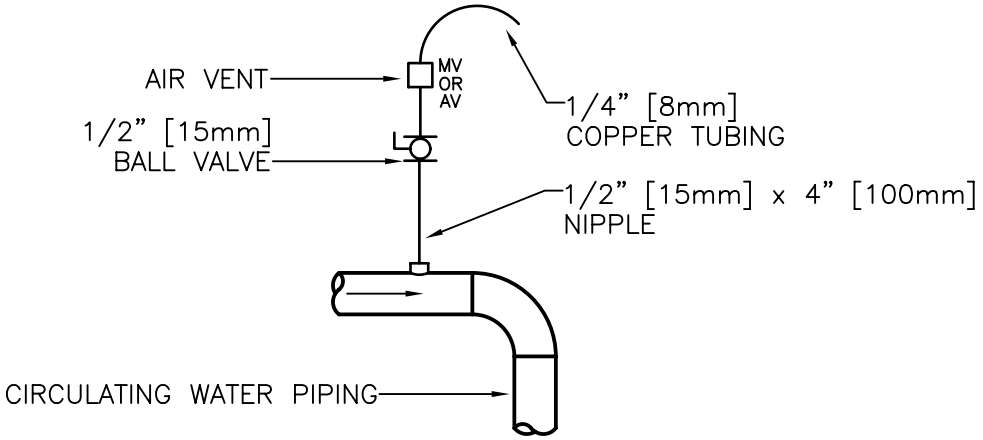
ELEVATION
WELDED PIPING

TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.

2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

DESIGNER'S NOTE:
SHOW SCALE POCKETS ON MAJOR CIRCULATING WATER PIPING RISER DIAGRAMS AND/OR PLANS.



ELEVATION

TYPICAL MANUAL AIR VENT

NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)

#

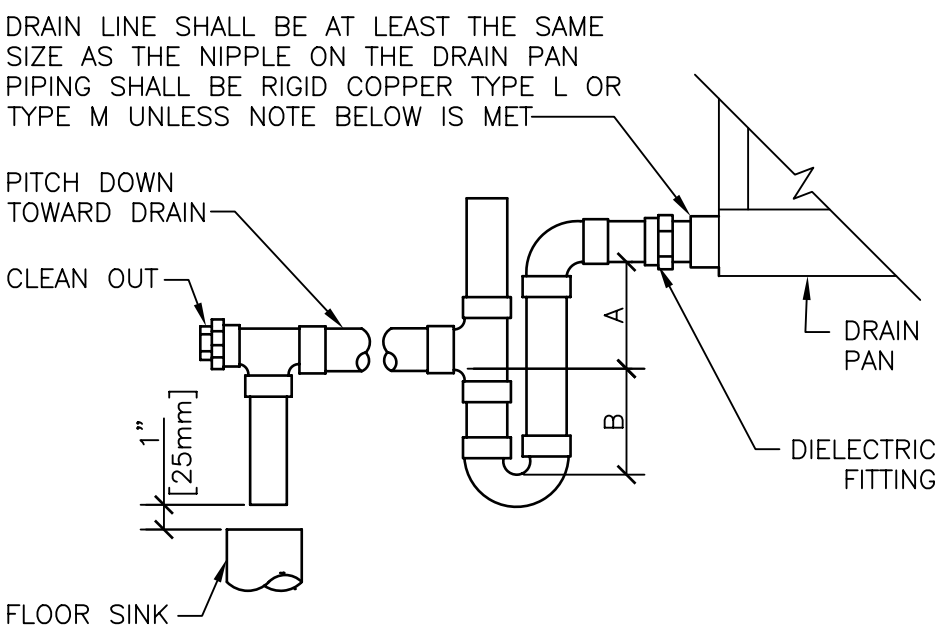
NTS

Department of Veterans Affairs

DETAIL TITLE / DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232113-07.DWG



NOTE: 1. CPVC PIPE MAY BE USED ONLY IF APPROVED BY LOCAL VA AND IS INDOORS AND DOES NOT PASS THROUGH RATED BARRIERS.
2. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

UNIT TYPE	A	B
DRAW THRU	2" [50mm] PLUS X	X
BLOW THRU	1" [25mm] MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

AIR HANDLING UNIT DRAIN TRAP DETAIL

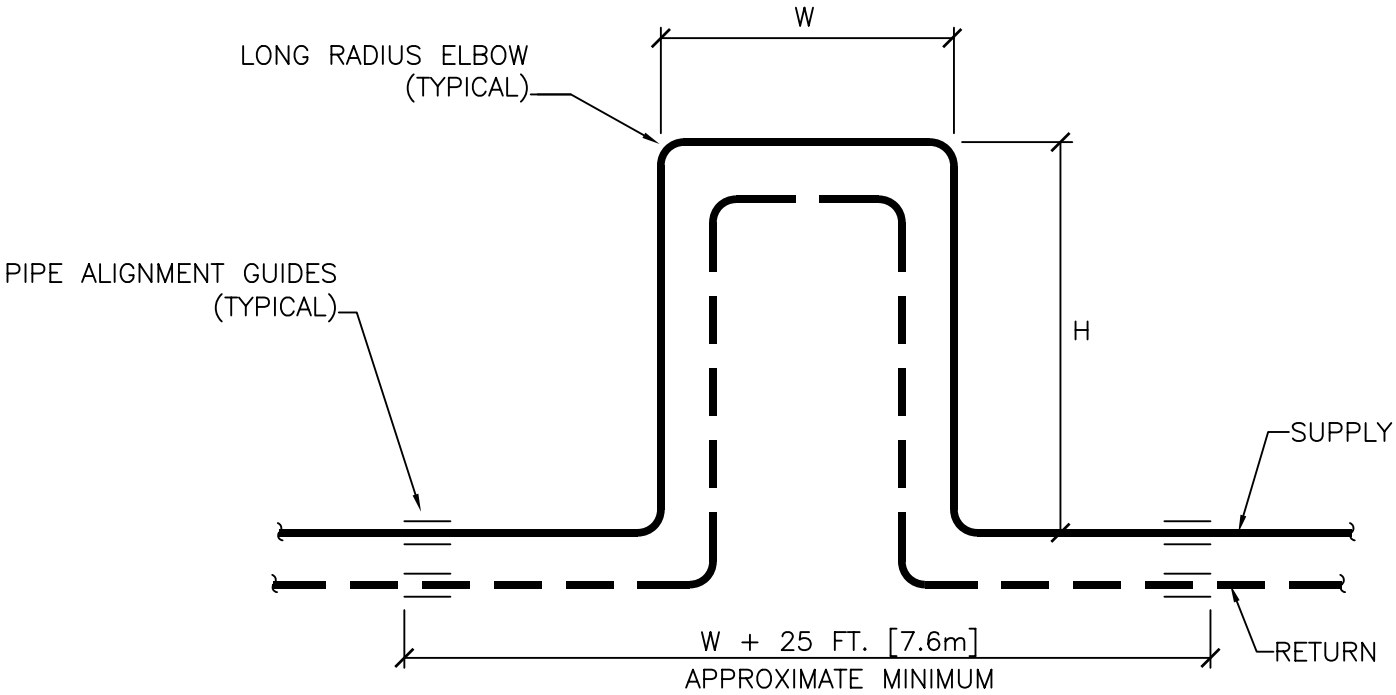
NTS

Department of Veterans Affairs

DETAIL TITLE / AIR HANDLING UNIT DRAIN TRAP DETAIL

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232113-08.DWG



PLAN

EXPANSION LOOP		
LOOP NO.	W	H
100–ELI	---	---
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EXPANSION LOOP DETAIL

EXPANSION LOOP DETAIL

NTS

Department of Veterans Affairs

DETAIL TITLE / EXPANSION LOOP DETAIL

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD232113–09.DWG

SEQUENCE OF OPERATION:

1. STEAM CONTROL VALVE SHALL MODULATE TO MAINTAIN THE LEAVING HOT WATER TEMPERATURE AT SET POINT.

2. THE LEAVING HOT WATER TEMPERATURE SHALL BE RESET INVERSELY WITH THE OUTDOOR TEMPERATURE AS SCHEDULED.

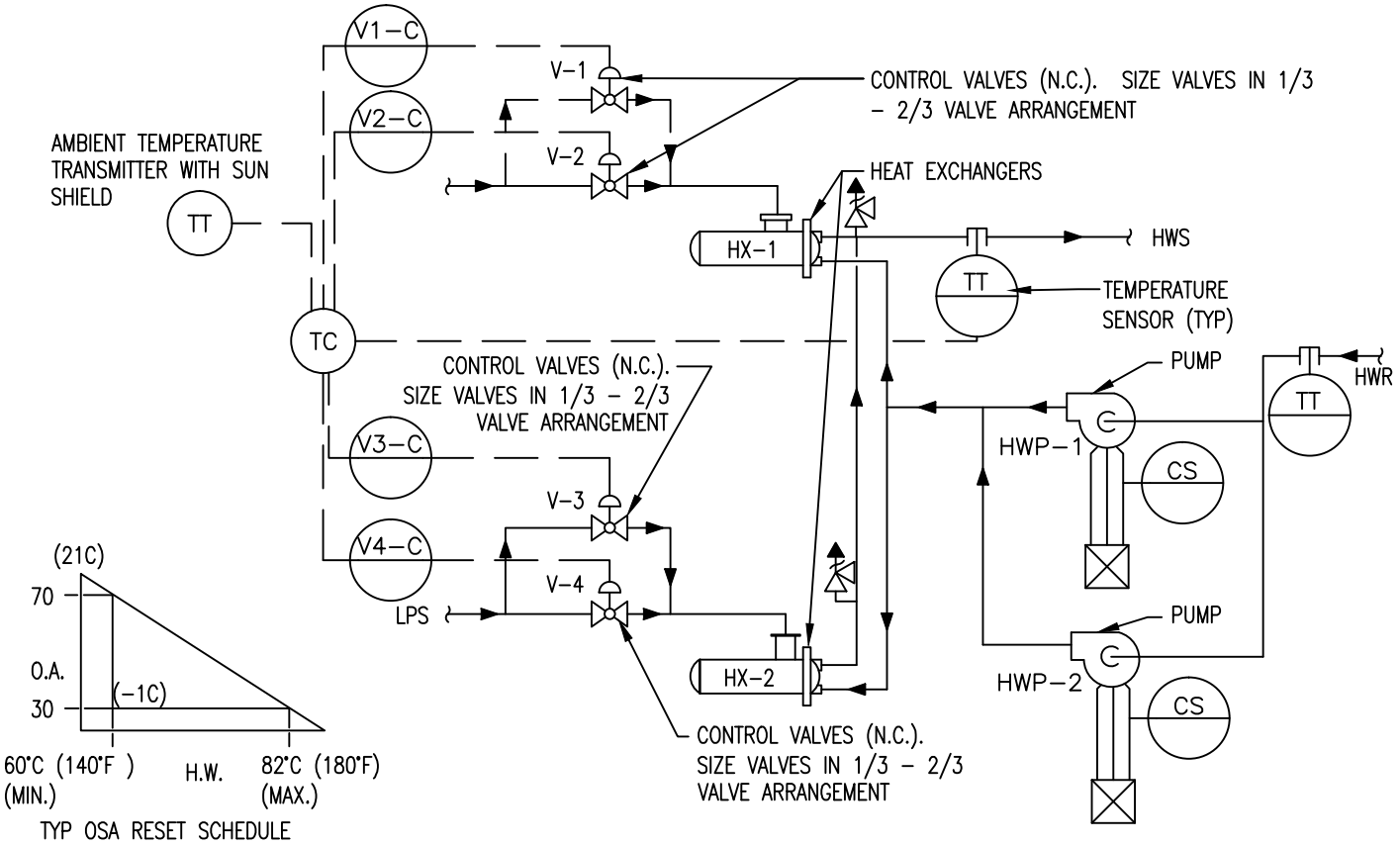
3. THE LEAD AND LAG PUMPS AND HEAT EXCHANGERS SHALL BE SEQUENTIAL BY THE OPERATOR CONTROLS AT THE PRE-DETERMINED INTERVAL (USUALLY 7 DAYS). IN THE EVENT THE PUMP FAILS TO START WITHIN 30 SECONDS, AN ALARM SHALL BE INITIATED AND THE SECOND PUMP SHALL START AUTOMATICALLY.

VALVE SEQUENCE:

1. SUGGESTED VALVE SEQUENCE. DELETE THIS SEQUENCE FROM THIS DETAIL IF SEQUENCE IS SHOWN ON CONTROLS DRAWINGS OR SPECS.

2. V-1 (1/3) MODULATES TO MAINTAIN HW TEMPERATURE AT SETPOINT. WHEN V-1 HAS REACHED FULLY OPEN POSITIONS, V-2 (2/3) STARTS TO MODULATE OPEN.

3. IF HX-2, V-3 AND V-4 ARE NOT REDUNDANT BACKUP, THEN THE STAGING ABOVE CONTINUES AS FOLLOWS: PROVIDE, ADDITIONAL MOTORIZED ISOLATION VALVES AT THE THE HWS AND HWR FOR EACH HX'S. WHEN V-2 HAS REACHED FULLY OPEN POSITION, THE ISOLATION VALVES AT HX-2 HWS HWS AND HWR LINES FULLY OPEN, AFTER WHICH V-3 (1/3) STARTS TO MODULATE OPEN. WHEN V-3 HAS REACHED FULLY OPEN POSITION. V-4 (2/3) STARTS TO MODULATE OPEN.



DUAL HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

NTS

Department of Veterans Affairs

DETAIL TITLE: DUAL HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

SCALE :NONE

DATE ISSUED :11/01/2017

CADD DETAIL NO. : SD232113-10.DWG

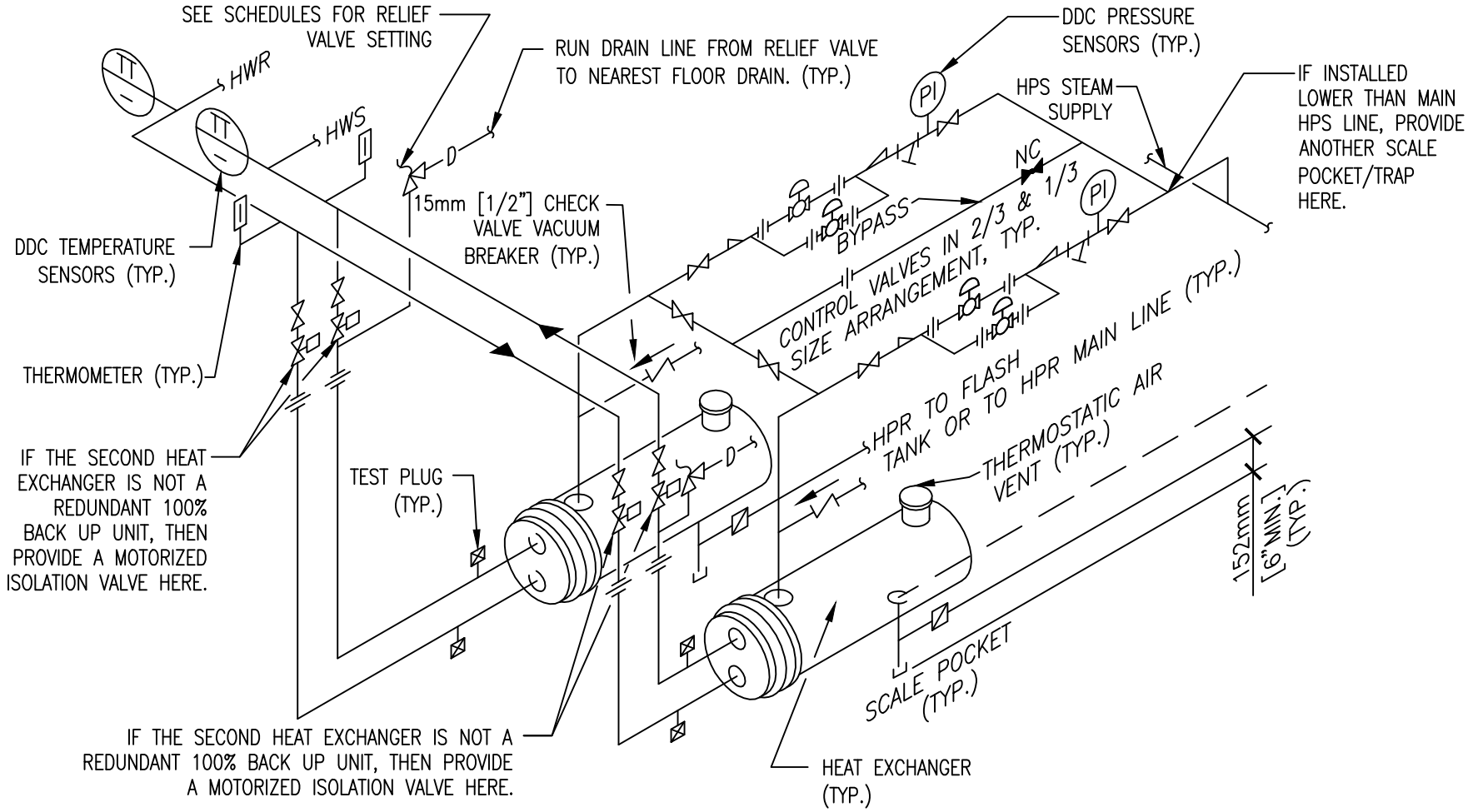
Department of Veterans Affairs

DETAIL TITLE: HEAT EXCHANGER - STEAM TO HOT WATER

SCALE :NONE

DATE ISSUED: 11/01/2017

CAD DETAIL NO.: SD232113-11.DWG

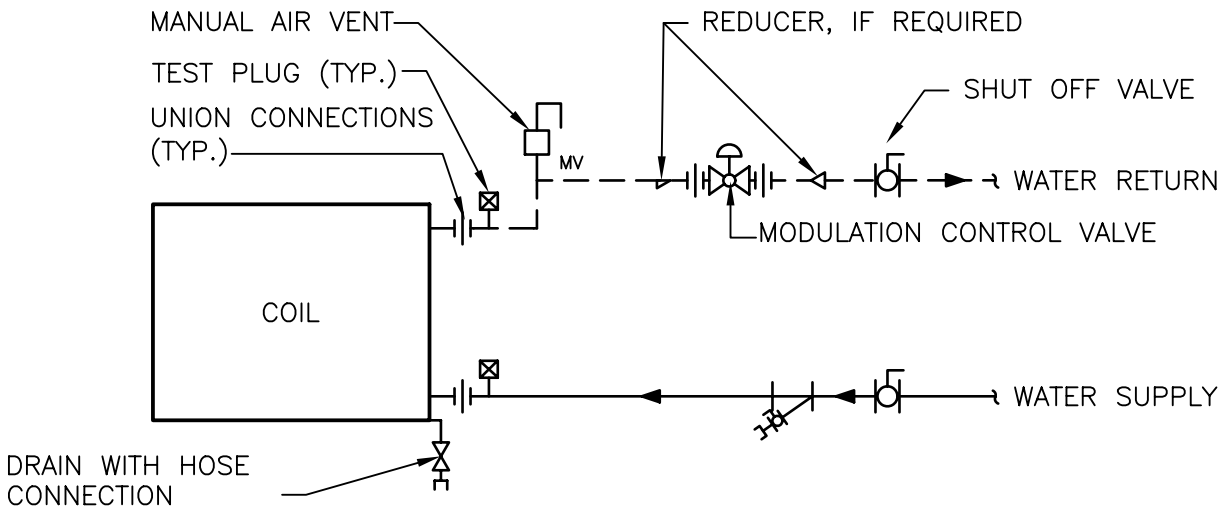


NOTES:

1. THE ABOVE DETAIL SHOWS REQUIRED PIPING FOR TWO HEAT EXCHANGERS IN PARALLEL. INDICATE IF 100% REDUNDANT OR NOT.
2. PROVIDE SADDLE SUPPORTS AND LEGS OR HANGERS FOR HEAT EXCHANGER. MOUNTING HEIGHT SHALL BE ADJUSTED TO FACILITATE GRAVITY RETURN OF STEAM CONDENSATE.
3. MAKE THE BYPASS THE SAME SIZE AS THE CONNECTIONS TO THE CONTROL VALVES.
4. CONTROL VALVES SHALL BE IN A $\frac{1}{3}$ AND $\frac{2}{3}$ SIZE ARRANGEMENT.

HEAT EXCHANGER - STEAM TO HOT WATER

NTS



TERMINAL UNIT WATER COILS - PIPING CONNECTIONS

#

NTS

DESIGNER'S NOTE:

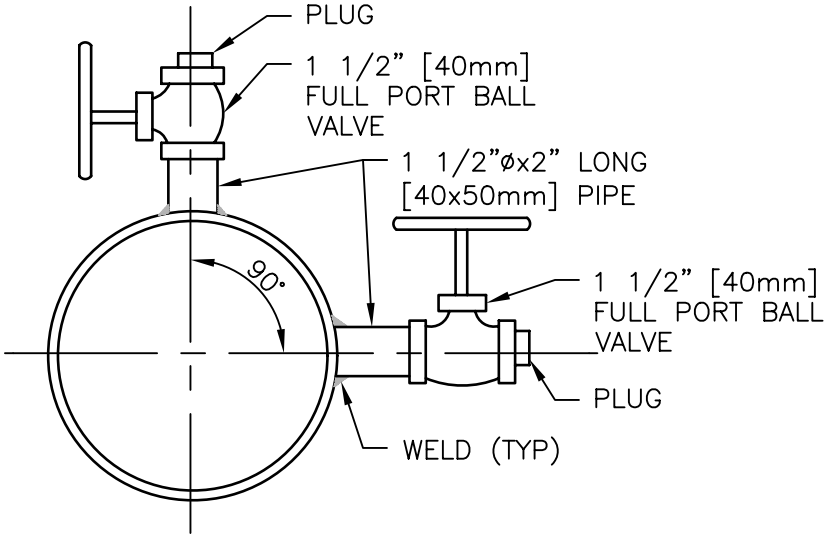
1. THIS DETAIL IS APPLICABLE TO: 2-PIPE FAN COIL UNITS (CHILLED OR HOT WATER)
   - VAV/CV AIR TERMINAL UNITS (REHEAT COIL)
   - DUCT-MOUNTED REHEAT COIL
   - CABINET UNIT HEATERS

Department of Veterans Affairs

DETAIL TITLE / TERMINAL UNIT WATER COILS - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232113-12.DWG



NOTE:

1. PROVIDE IN CHILLED WATER MAIN AND IN CONDENSER WATER MAIN.
2. LOCATE PILOT TUBE TAPS 20 PIPE DIAMETERS DOWNSTREAM AND 10 PIPE DIAMETERS UPSTREAM FROM THE NEAREST PIPE FITTING.

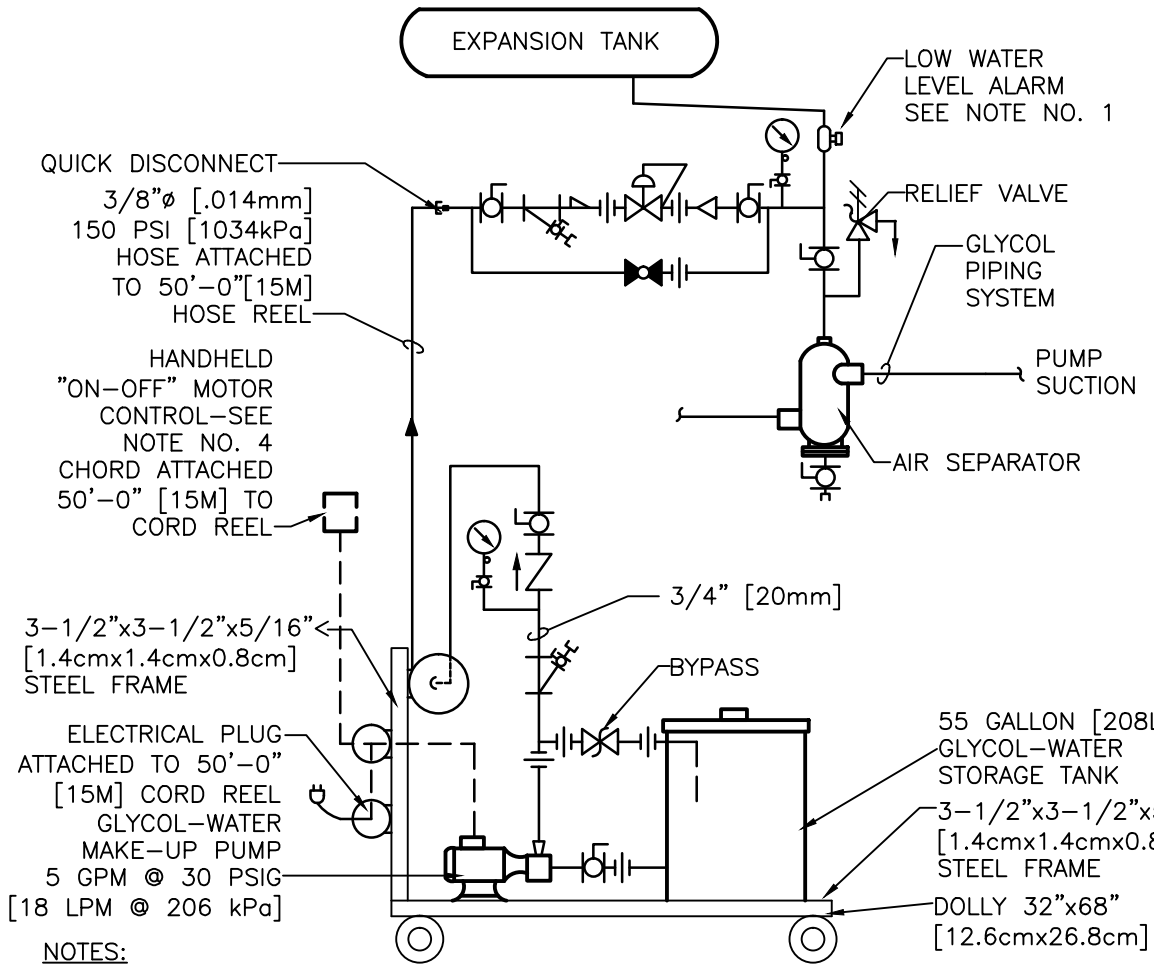
   EITHER TOP OR SIDE LOCATION. BOTH ARE NOT REQUIRED AT SAME LOCATION.

PITOT TEST CONNECTIONS

NTS

DESIGNER'S NOTE:

SHOW LOCATION OF PILOT TEST CONNECTIONS ON FLOOR PLANS FOR CONDENSER WATER PIPING TO COOLING TOWER. THIS IS REQUIRED FOR FLOW MEASUREMENT BY ASME COOLING TOWERS TEST CODE.



NOTES:

1. PROVIDE LOW WATER LEVEL ALARM. PROVIDE A LOW WATER LEVEL AT ECC. RELIEF VALVE DRAIN SHALL RETURN TO A 55 GALLON DRUM.

2. SET REGULATING VALVE TO MAINTAIN MAKE-UP PRESSURE AT 15 PSIG [103 kPa] ABOVE HIGHEST SYSTEM PRV SETTING.

3. MAKE-UP PIPING SYSTEM DOES NOT REQUIRE INSULATION.

4. OPERATE PUMP MANUALLY AS REQUIRED TO FILL.

MOBILE INDIRECT GLYCOL MAKE-UP SYSTEM (PIPING AND CONTROLS)

#

NTS

DESIGNER'S NOTE:

PLUMBING DRAWINGS SHOULD INCLUDE DOMESTIC COLD-WATER HOSE BIB NEAR THE GLYCOL-WATER MAKE-UP SYSTEM. FOR SMALL SYSTEMS (50 GAL [200 L] OR LESS) A POT FEEDER, AT THE HIGH POINT IN THE PIPING, MAY BE USED FOR MAKE-UP IN LIEU OF THE PUMPED MAKE-UP.

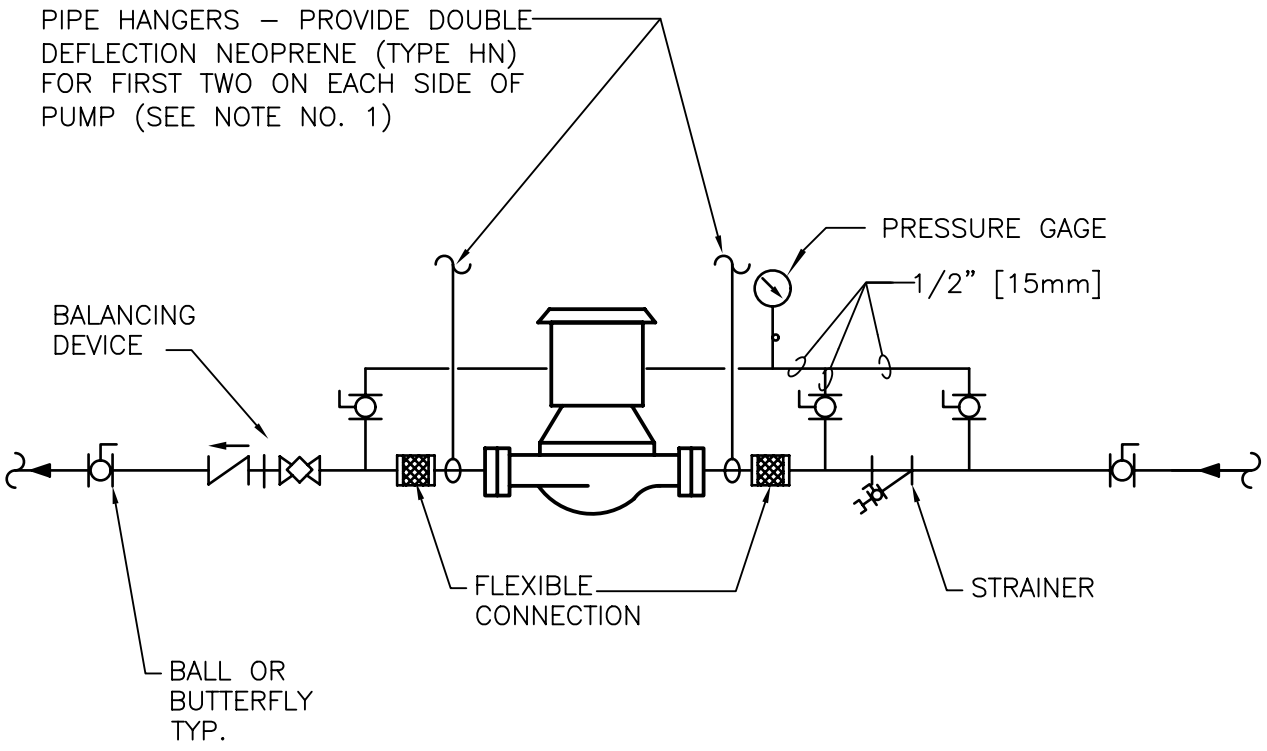
Department of Veterans Affairs

DETAIL TITLE / MOBILE INDIRECT GLYCOL MAKE-UP SYSTEM (PIPING AND CONTROLS)

SCALE :NONE

DATE ISSUED :MARCH 2010

CADD DETAIL NO. : SD232113-14.DWG



NOTES:

1. SUPPORT PUMP FROM PIPING ONLY. DO NOT SUPPORT PUMP FROM MOTOR.

IN-LINE PUMPS - CONNECTIONS

NTS

DESIGNER'S NOTE:

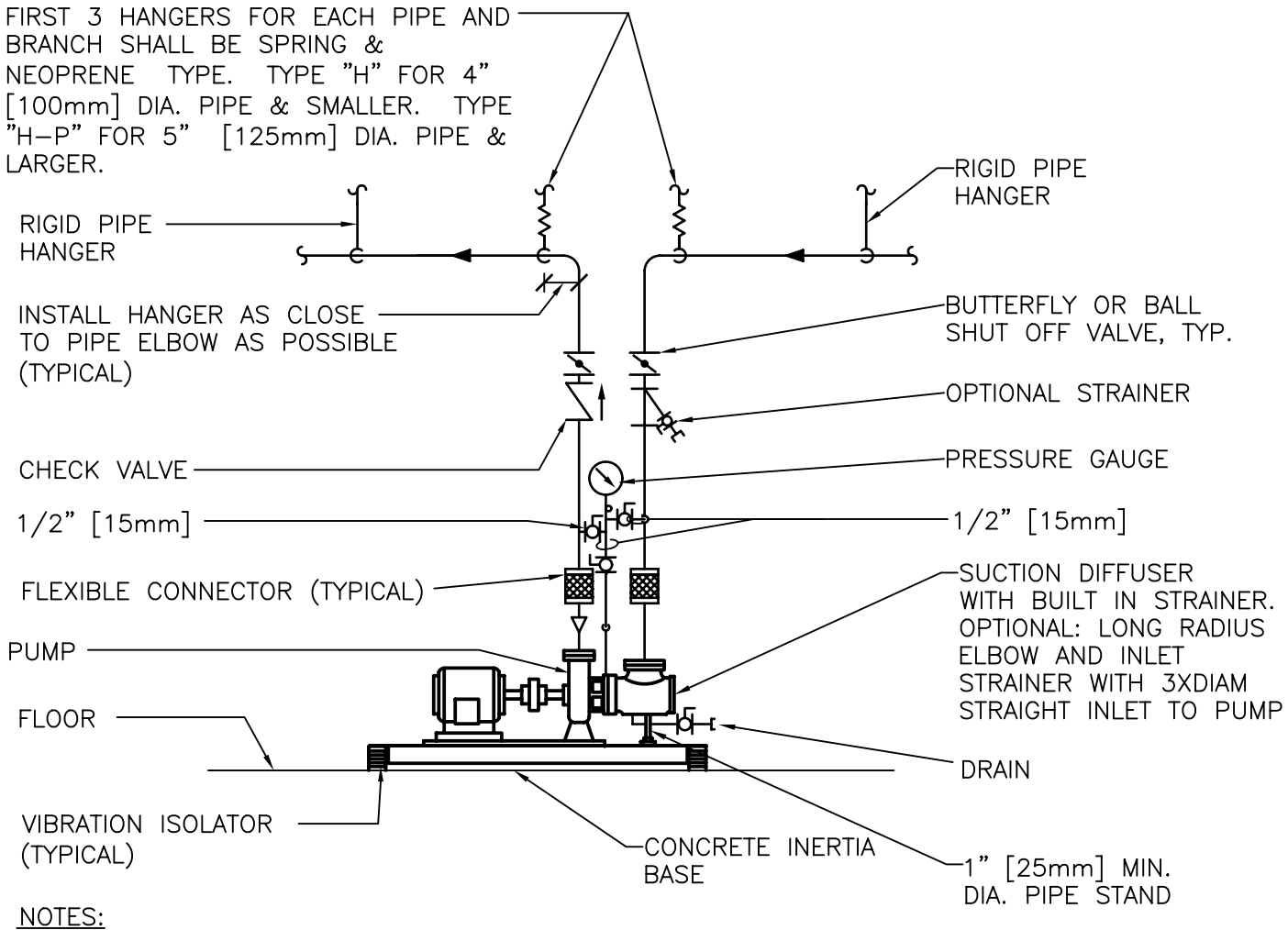
1. CHECK VALVE IS OPTIONAL FOR SINGLE PUMP, EXCEPT FOR COOLING TOWER PUMP.
2. ELIMINATE BALANCING DEVICE WHEN PUMP CONTROLLED BY VARIABLE SPEED DRIVE.

Department of Veterans Affairs

DETAIL TITLE / IN-LINE PUMPS – CONNECTIONS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-01.DWG



NOTES:
SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION

SINGLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH FLEXIBLE CONNECTORS

#

NTS

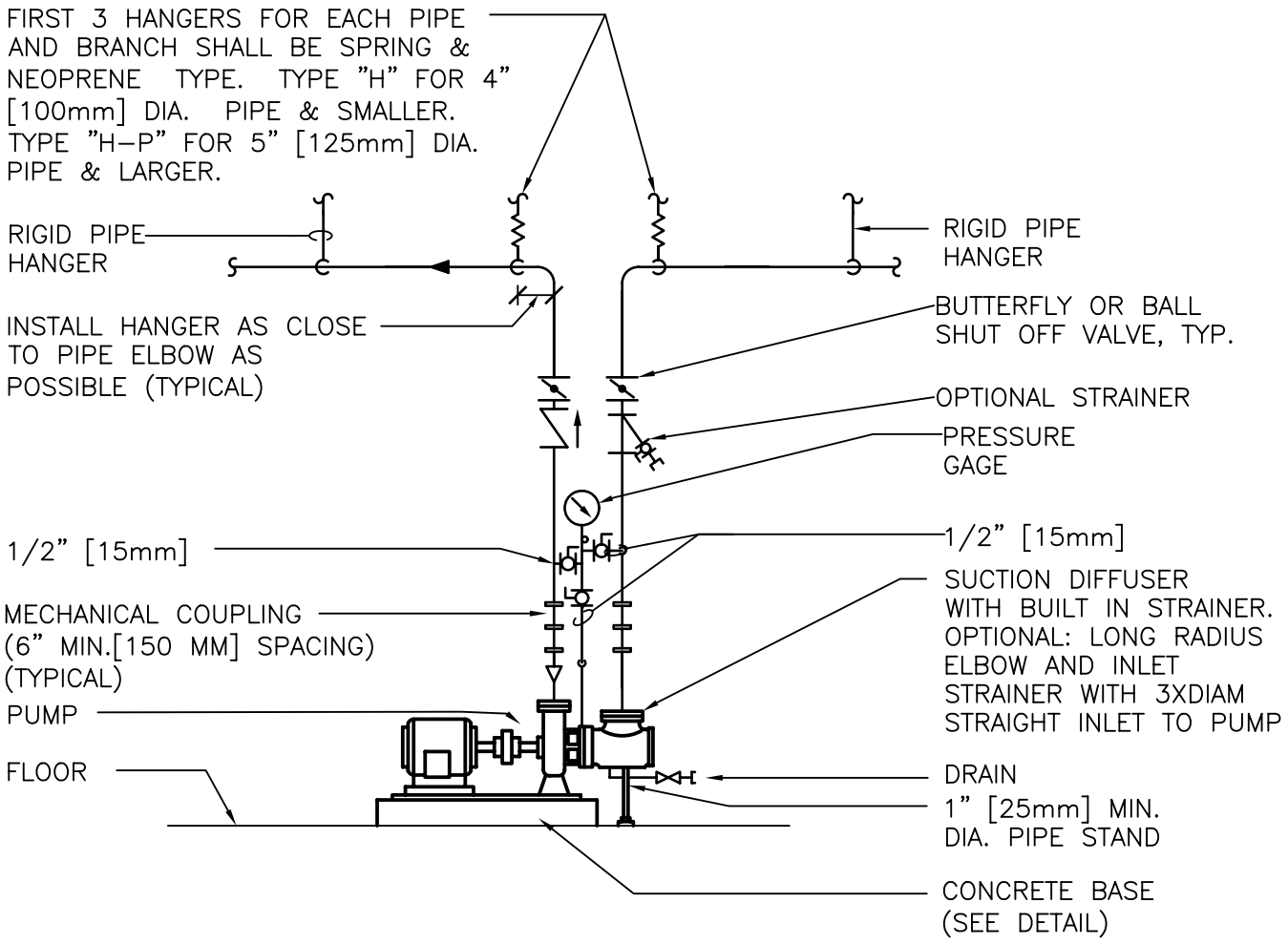
DESIGNER'S NOTE:
CHECK VALVE IS OPTIONAL FOR SINGLE PUMP, EXCEPT FOR COOLING TOWER PUMP.

Department of Veterans Affairs

DETAIL TITLE / SINGLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH FLEXIBLE CONNECTORS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-02.DWG



NOTES:
SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION

SINGLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH MECHANICAL COUPLINGS

#

NTS

DESIGNER'S NOTE:

1. CHECK VALVE IS OPTIONAL FOR SINGLE PUMP, EXCEPT FOR COOLING TOWER PUMP. USE THIS DETAIL ONLY FOR PUMPS IN A MECHANICAL BUILDING WHERE POSSIBLE VIBRATION WILL NOT BE OBJECTIONABLE AND WHERE APPROVED BY VA.

2. COUPLINGS SHALL NOT BE USED ON HOT WATER SYSTEMS.

Department of Veterans Affairs

DETAIL TITLE / SINGLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH MECHANICAL COUPLINGS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-03.DWG