DESIGNER'S NOTES FOR DETAILS AND SCHEDULES

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

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 TRADE NAMES OR A MANUFACTURER'S NAME OR MODEL ON THE CONSTRUCTION DOCUMENTS.

   C. DO NOT USE DITTO MARKS FOR REPETITIVE ENTRIES. A VERTICAL LINE MAY BE USED TO SHOW REPETITION.

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

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

6. SCHEDULE THE COIL CAPACITY DATA WITH AND WITHOUT THE BENEFIT OF THE HEAT RECOVERY SYSTEM.

7. ALL DUCTWORK, WITHOUT EXCEPTION, AND ALL PIPING 6" [150mm] 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 THE HARD SUSPENDED 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.

4. TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, COILS, ETC.

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 7" [175mm] ABOVE FINISHED FLOOR.

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

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

11. ALTITUDE–BOILER ROOM FLOOR: ___ FT. [M] 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: DECEMBER 2008 CAD DETAIL NO.: SD230511–02.DWG

ABBREVIATIONS

A/E	ARCHITECT / ENGINEER
AAHX	AIR TO AIR HEAT EXCHANGER
AB	AIR BLENDER
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCH	AIR COOLED CHILLER
ACCU	AIR-COOLED CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
ACD	AUTOMATIC CONTROL DAMPER,MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER,TWO POSITION
AD	ACCESS DOOR
AF	AFTER FILTER
AFCV	AIR FLOW CONTROL VALVE
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR-HANDLING UNIT
AMP	AMPERGE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
AS	AIR SEPARATOR
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 (CELCIUS)
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
D-1	OUTDOOR AIR DAMPER
D-2	RETURN AIR DAMPER
D-3	RELIEF AIR DAMPER
DB	DECIBELS
Db	DRY-BULB TEMPERATURE
DD-1	DESIGN DEVELOPMENT (SUBMISSION1)
DD-2	DESIGN DEVELOPMENT (SUBMISSION2)
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DF	DIFFUSER
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: DECEMBER 2008 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-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
H&CW HOT & COLD WATER
HAC HOUSEKEEPING AID CLOSET
HB HOSE BIBB
HC HEATING COIL
HD HEAD
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

Department of Veterans Affairs

DETAIL TITLE / ABBREVIATIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-04.DWG

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 LIQUID PROPANE 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 1000 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
NO NORMALLY OPEN
NOAA NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION
NOM NOMINAL
NPLV NON-STANDARD PART LOAD VALUE
NPSH NET POSITIVE SUCTION HEAD
NTS NOT TO SCALE

OA OUTSIDE AIR
OAG OUTSIDE AIR GRILLE
OAI OUTSIDE AIR INTAKE
OD OUTSIDE DIAMETER
OFM OIL FLOWMETER
OR OPERATING ROOM

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DETAIL TITLE / ABBREVIATIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-05.DWG

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	REFRIGERANT AIR DRYER
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
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
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: DECEMBER 2008 CAD DETAIL NO.: SD230511-06.DWG

ABBREVIATIONS

UC UNDER CUT
UC UNIT COOLER
UH UNIT HEATER
UL 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
VIV VARIABLE INLET VANES
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

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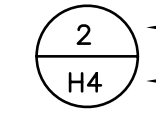
DETAIL TITLE / ABBREVIATIONS

SCALE :NONE

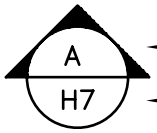
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511–07.DWG

DRAWING SYMBOLS



DETAIL NUMBER

DRAWING NUMBER WHERE DRAWN



SECTION LETTER

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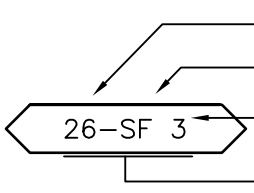
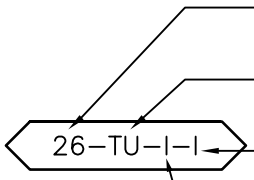


BUILDING NO. WHERE EQUIPMENT IS LOCATED.

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

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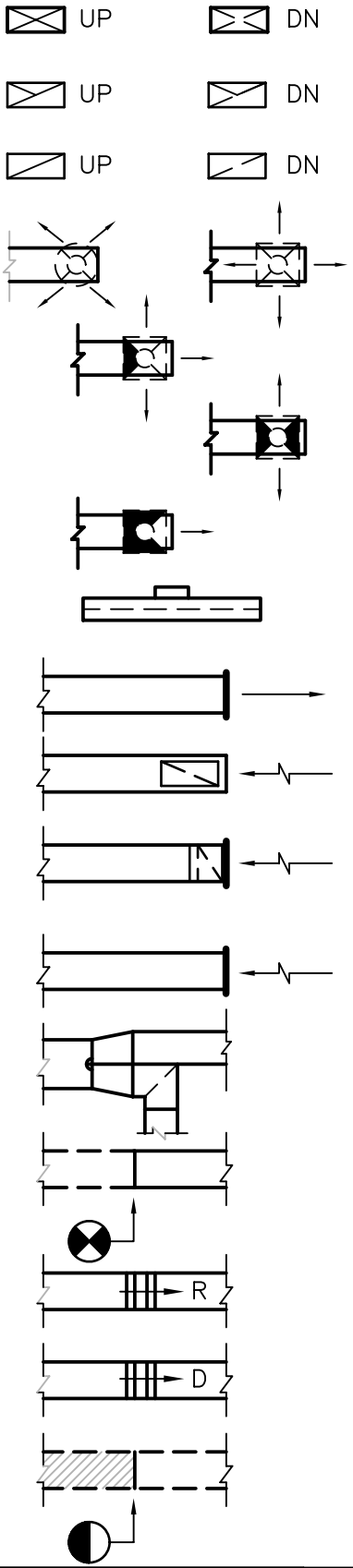
DETAIL TITLE / DRAWING SYMBOLS

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

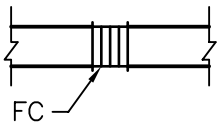
Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SYMBOLS

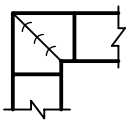
SCALE :NONE

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

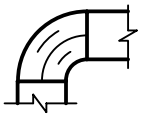
DUCTWORK SYMBOLS



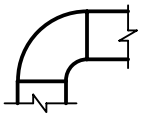
FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC



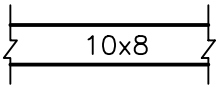
VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)



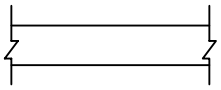
VANED ELBOW (SHORT RADIUS)



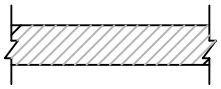
STANDARD RADIUS ELBOW (LONG RADIUS)



NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH)

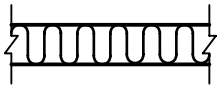


EXISTING DUCT TO REMAIN

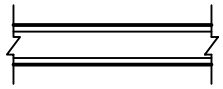


EXISTING DUCT TO BE REMOVED

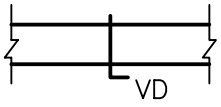
LOUVER (LOUVER SPECIFIED IN ARCHITECTURAL SECTION.)



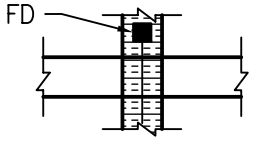
FLEXIBLE DUCTWORK (INSULATED)



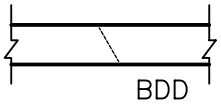
DUCT WITH SOUND LINING



MANUAL VOLUME DAMPER



FIRE DAMPER



BACK DRAFT DAMPER

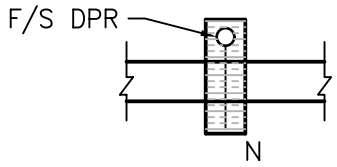
Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SYMBOLS

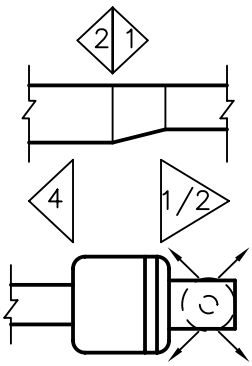
SCALE :NONE

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

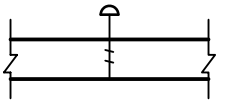
DUCTWORK SYMBOLS



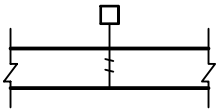
COMBINATION FIRE/SMOKE DAMPER



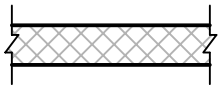
POINT OF CHANGE IN DUCT CONSTRUCTION BY STATIC PRESSURE CLASS. THE NUMBER ASSIGNS PRESSURE CLASS (IN. OF WATER) WHICH WILL ACCOMMODATE MAXIMUM OPERATING PRESSURE IN THE DUCT SUBSECTION. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS. A "N" SUPERSCRIPT INDICATES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



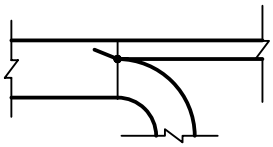
AUTOMATIC CONTROL DAMPER MODULATING



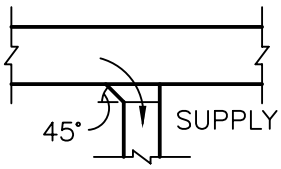
AUTOMATIC CONTROL DAMPER TWO POSITION



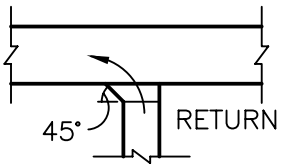
STAINLESS STEEL DUCT

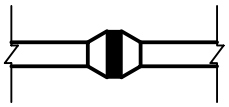


MANUAL SPLITTER DAMPER

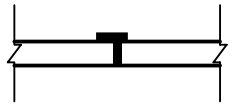


STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP)





DUCT MOUNTED COIL (HOT WATER OR STEAM COIL)



DUCT MOUNTED COIL (ELECTRIC)

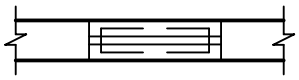
Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SYMBOLS

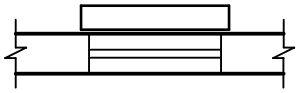
SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-11.DWG

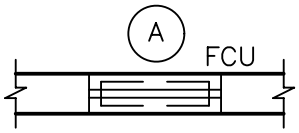
TERMINAL UNIT SYMBOLS



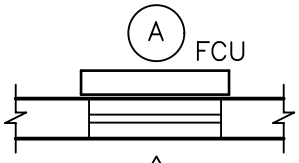
CONVECTOR OR RADIATOR (RECESSED)



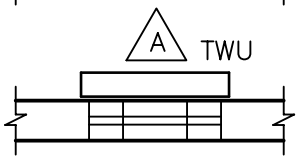
CONVECTOR OR RADIATOR (WALL HUNG)



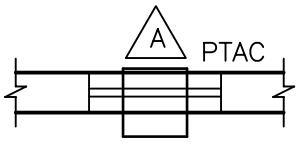
FLOOR MOUNTED VERTICAL RECESSED FAN COIL UNIT. LETTER INDICATES UNIT SIZE.



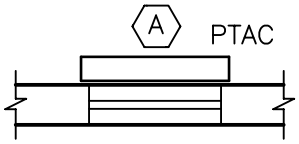
FLOOR MOUNTED VERTICAL CABINET FAN COIL UNIT. LETTER INDICATES UNIT SIZE.



THRU WALL AIR CONDITIONING UNIT. LETTER INDICATES UNIT SIZE.

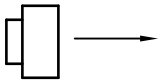


WINDOW TYPE AIR CONDITIONING UNIT. LETTER INDICATES UNIT SIZE.

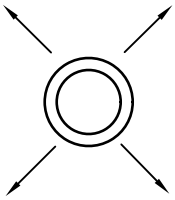


FLOOR MOUNTED HEAT PUMP. LETTER INDICATES UNIT SIZE.

AIR CURTAIN

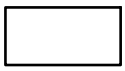


UNIT HEATER (HORIZONTAL)



UNIT HEATER (VERTICAL)

2'x2' RADIANT CEILING PANEL



2'x4' RADIANT CEILING PANEL

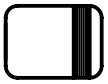
Department of Veterans Affairs

DETAIL TITLE / TERMINAL UNIT SYMBOLS

SCALE :NONE

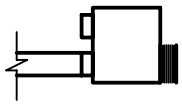
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-12.DWG

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

——HPS——	HIGH PRESSURE STEAM (60 PSIG AND ABOVE)
— — — —HPR— — — —	HIGH PRESSURE STEAM CONDENSATE RETURN
——MPS——	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)
— — — —MPR— — — —	MEDIUM PRESSURE STEAM CONDENSATE RETURN
——LPS——	LOW PRESSURE STEAM (15 PSIG AND BELOW)
— — — —LPR— — — —	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: SEPTEMBER 2010 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

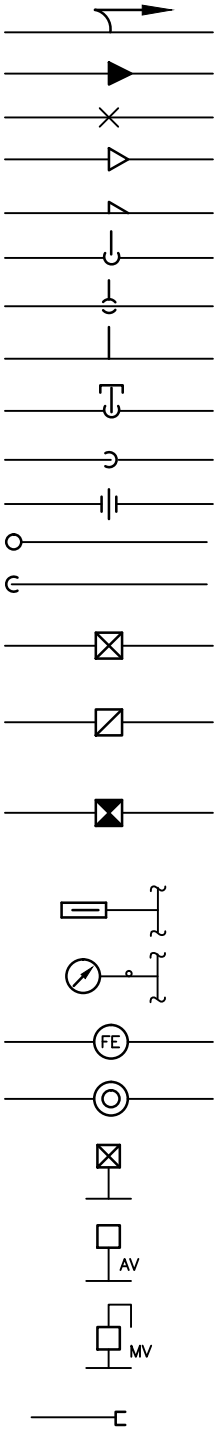
Department of Veterans Affairs

DETAIL TITLE / PIPING SYMBOLS

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010 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

FLOW ELEMENT

REFRIGERANT SIGHT GLASS

TEST PLUG (PRESSURE/TEMPERATURE)

AUTOMATIC AIR VENT

MANUAL AIR VENT

QUICK–COUPLE HOSE CONNECTOR

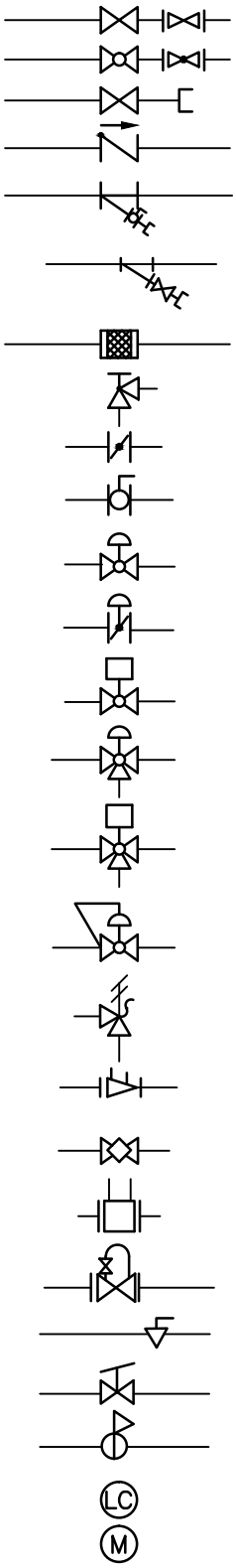
Department of Veterans Affairs

DETAIL TITLE / GENERAL SYMBOLS

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010 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

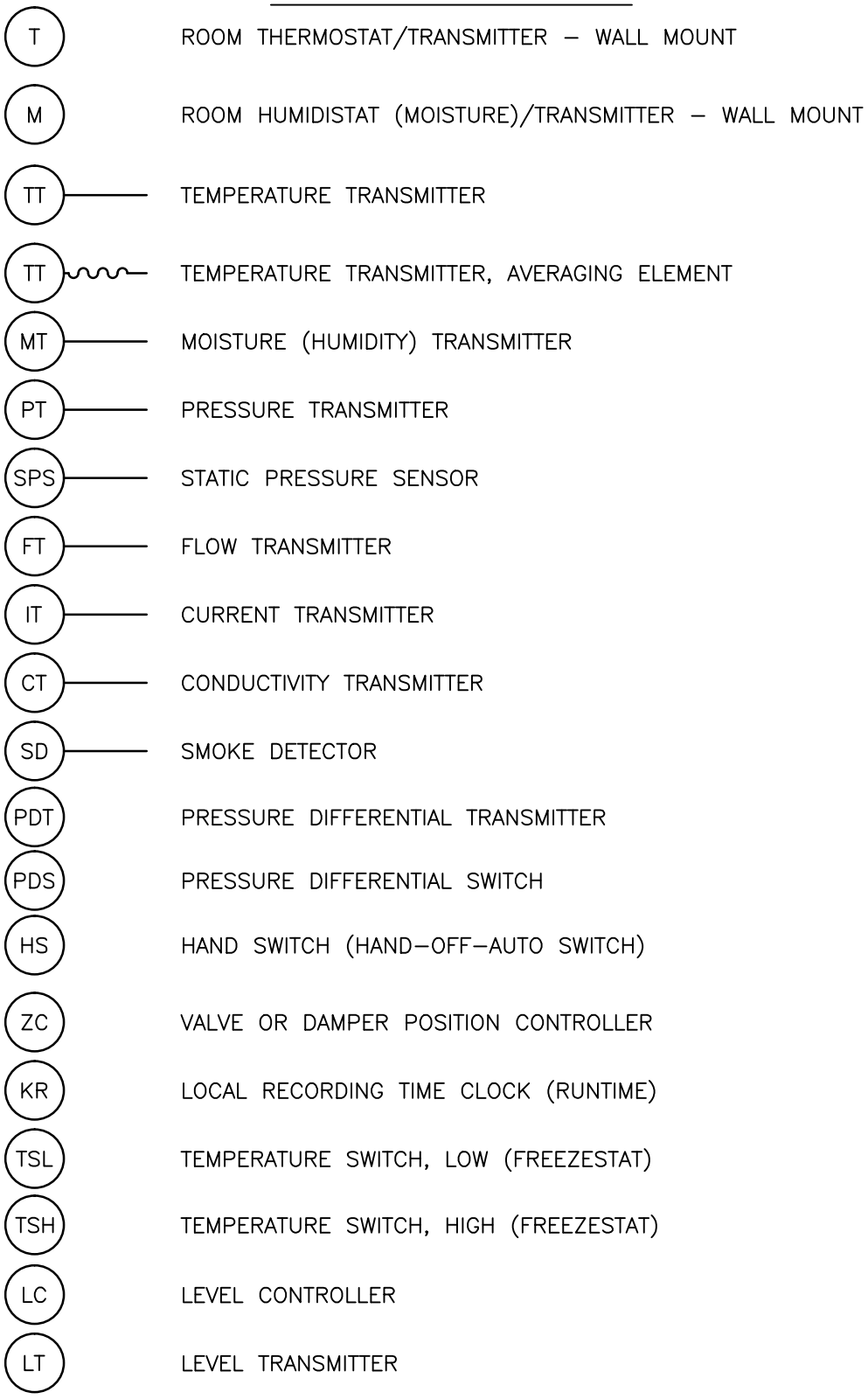
Department of Veterans Affairs

DETAIL TITLE / VALVE SYMBOLS

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010 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

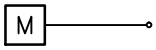
DATE ISSUED: SEPTEMBER 2010 CAD DETAIL NO.: SD230511-19.DWG

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



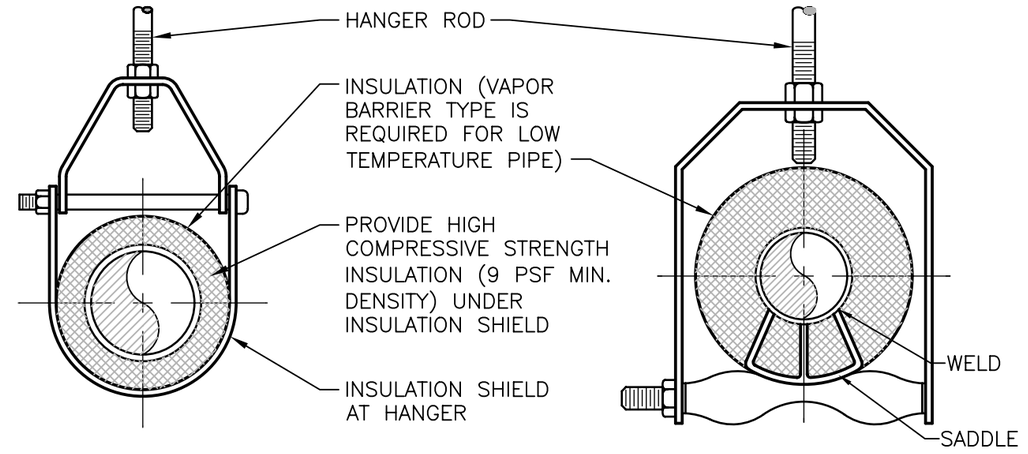
ELECTRIC OPERATED CONTROL DAMPER/OR VALVE

Department of Veterans Affairs

DETAIL TITLE / CONTROLS SYMBOLS

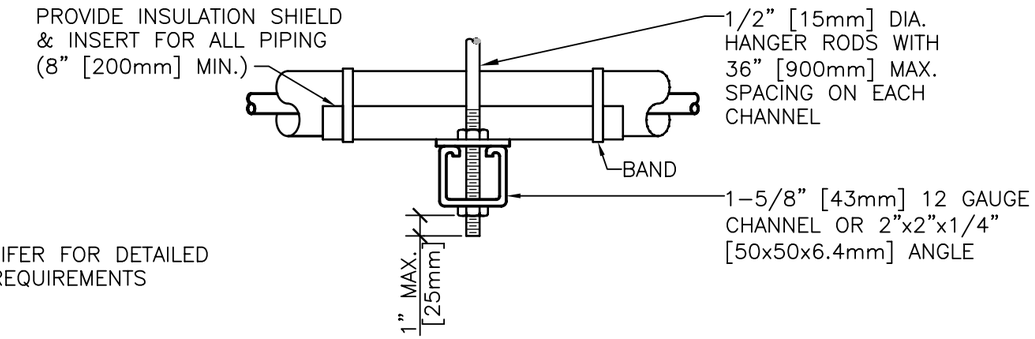
SCALE :NONE

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



ADJUSTABLE CLEVIS HANGER
TYPE 1 – SEE SPECIFICATIONS

ADJUSTABLE CLEVIS HANGER
TYPE 43 – SEE SPECIFICATIONS



NOTES:
SEE SPECIFER FOR DETAILED HANGER REQUIREMENTS

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

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

PIPE HANGERS

NTS

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

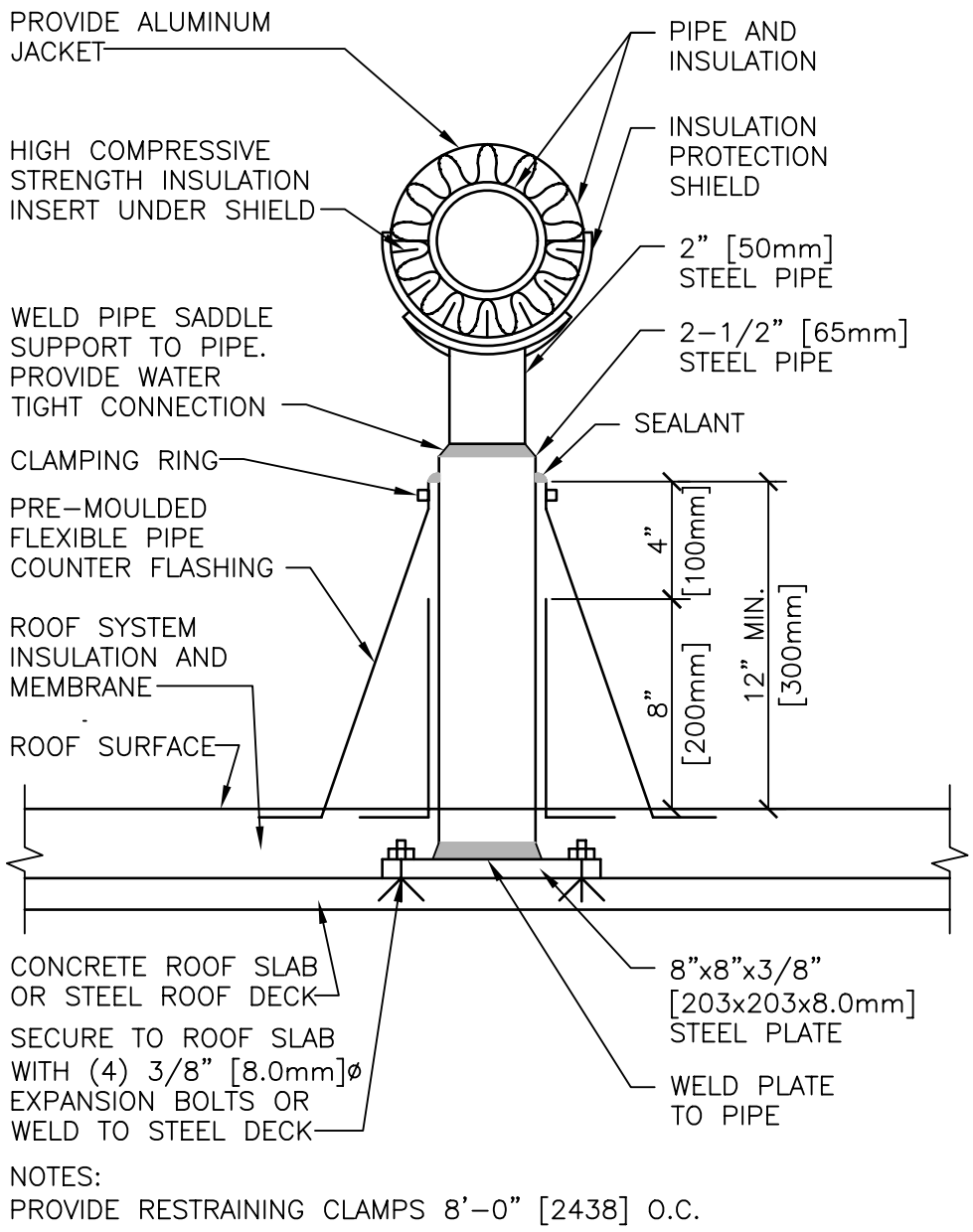
DETAIL TITLE / PIPE HANGERS

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. SD230511-21.DWG

Department of Veterans Affairs



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

DETAIL FOR SUPPORTING PIPE ON ROOF

NTS

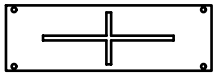
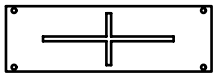
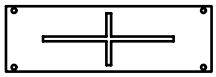
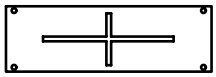
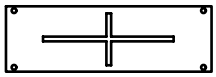
Department of Veterans Affairs

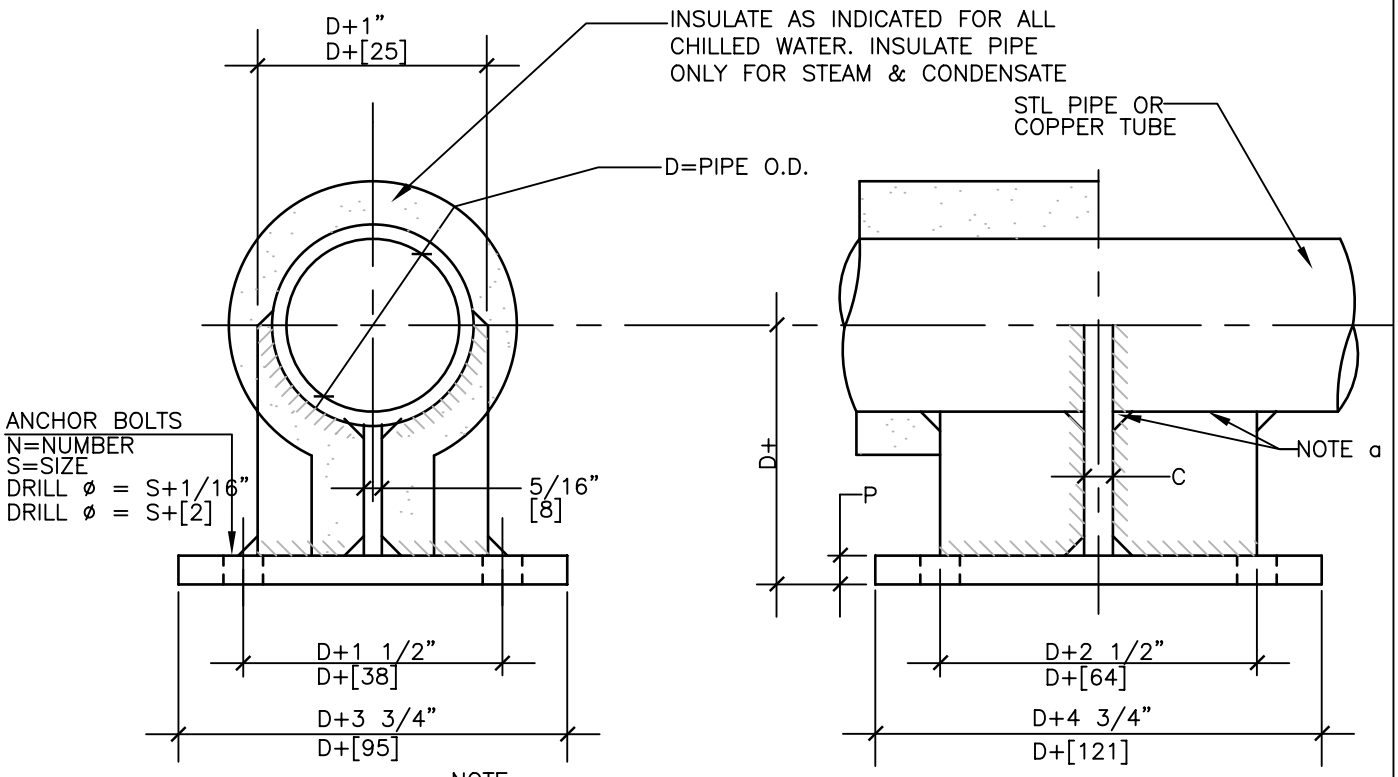
DETAIL TITLE / DETAIL FOR SUPPORTING PIPE ON ROOF

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-22.DWG

PIPE ANCHOR SCHEDULE

D		P		C		N		S		BOLT PATTERN
IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	
4"	102	5/8"	16	3/4"	19	4"	102	3/4"	19	
3"	76	1/2"	13	1/2"	13	4"	102	5/8"	16	
2 1/2"	64	3/8"	10	3/8"	10	4"	102	5/8"	16	
2"	51	3/8"	10	3/8"	10	4"	102	5/8"	16	
1 1/2"	38	3/8"	10	1/4"	6	4"	102	1/2"	13	



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

SMALL PIPE ANCHOR 1 1/2" - 4"

NTS

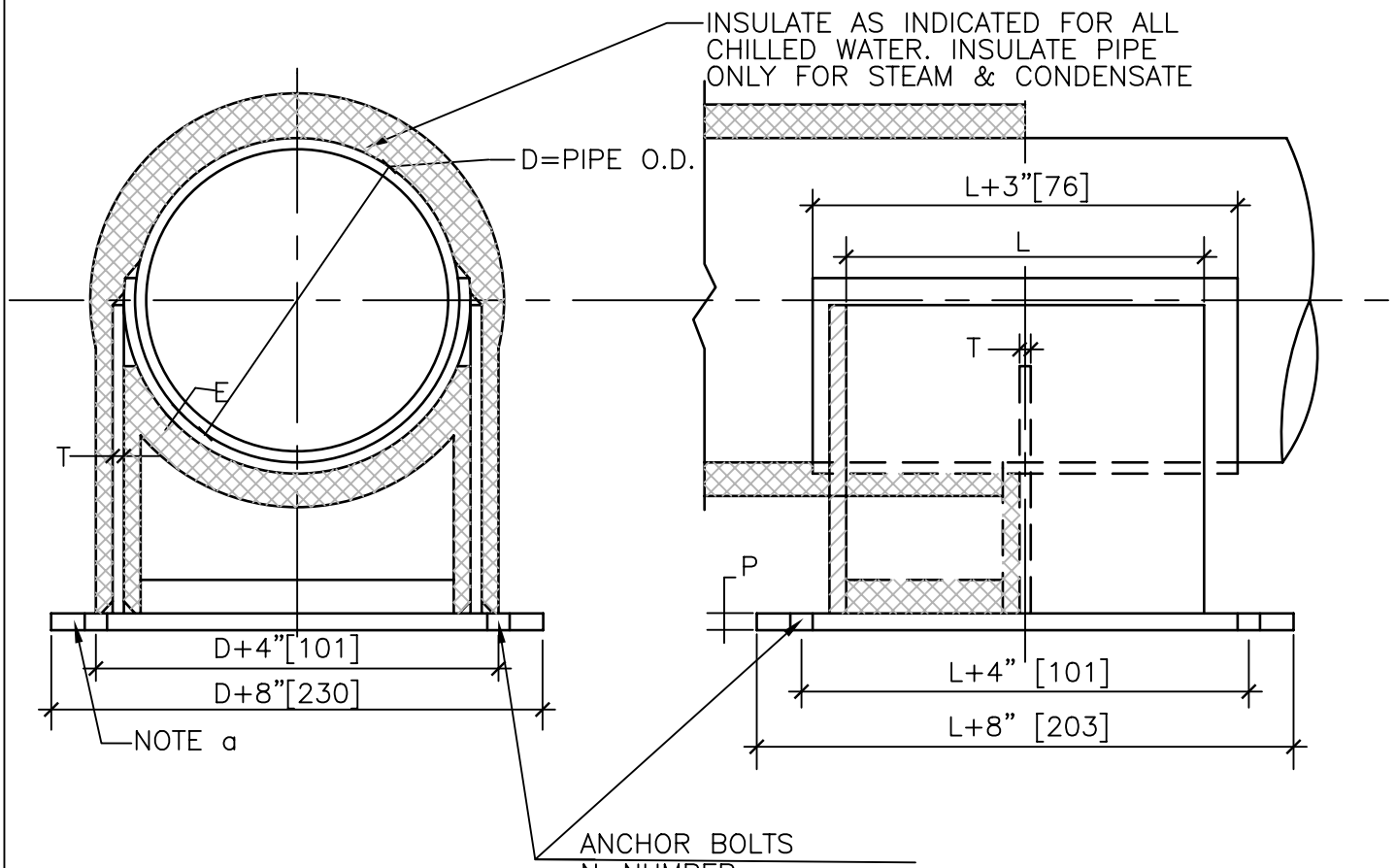
Department of Veterans Affairs

DETAIL TITLE / SMALL PIPE ANCHOR 1-1/2"-4"

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-23.DWG

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



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

LARGE PIPE ANCHOR 6" -18"

#

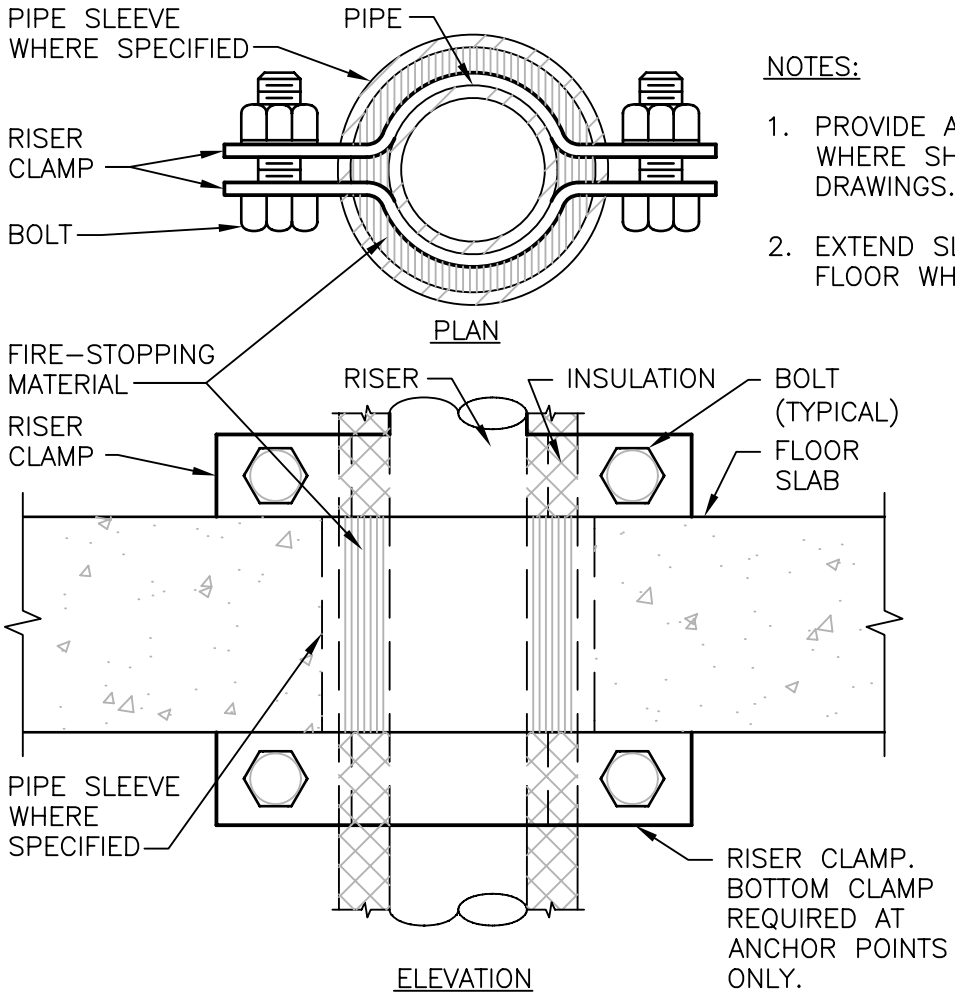
NTS

Department of Veterans Affairs

DETAIL TITLE / LARGE PIPE ANCHOR 6"-18"

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD230511-24.DWG



NOTES:

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

SUPPORT/ANCHOR FOR PIPE RISERS

NTS

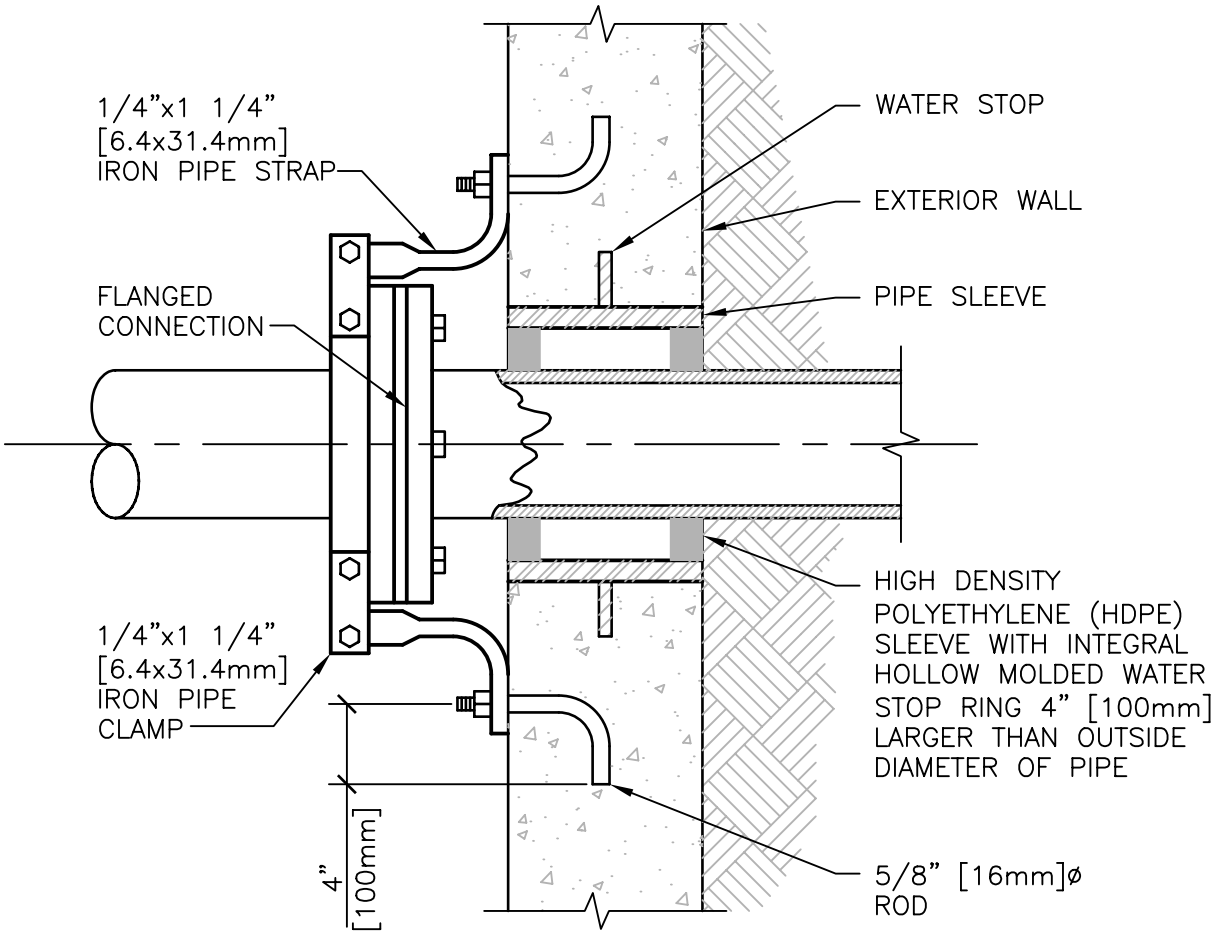
DESIGNER'S NOTE:
SHOW REQUIRED ANCHORS ON PLAN, SECTIONS OR DIAGRAMS.

Department of Veterans Affairs

DETAIL TITLE / SUPPORT/ANCHOR FOR PIPE RISERS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 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

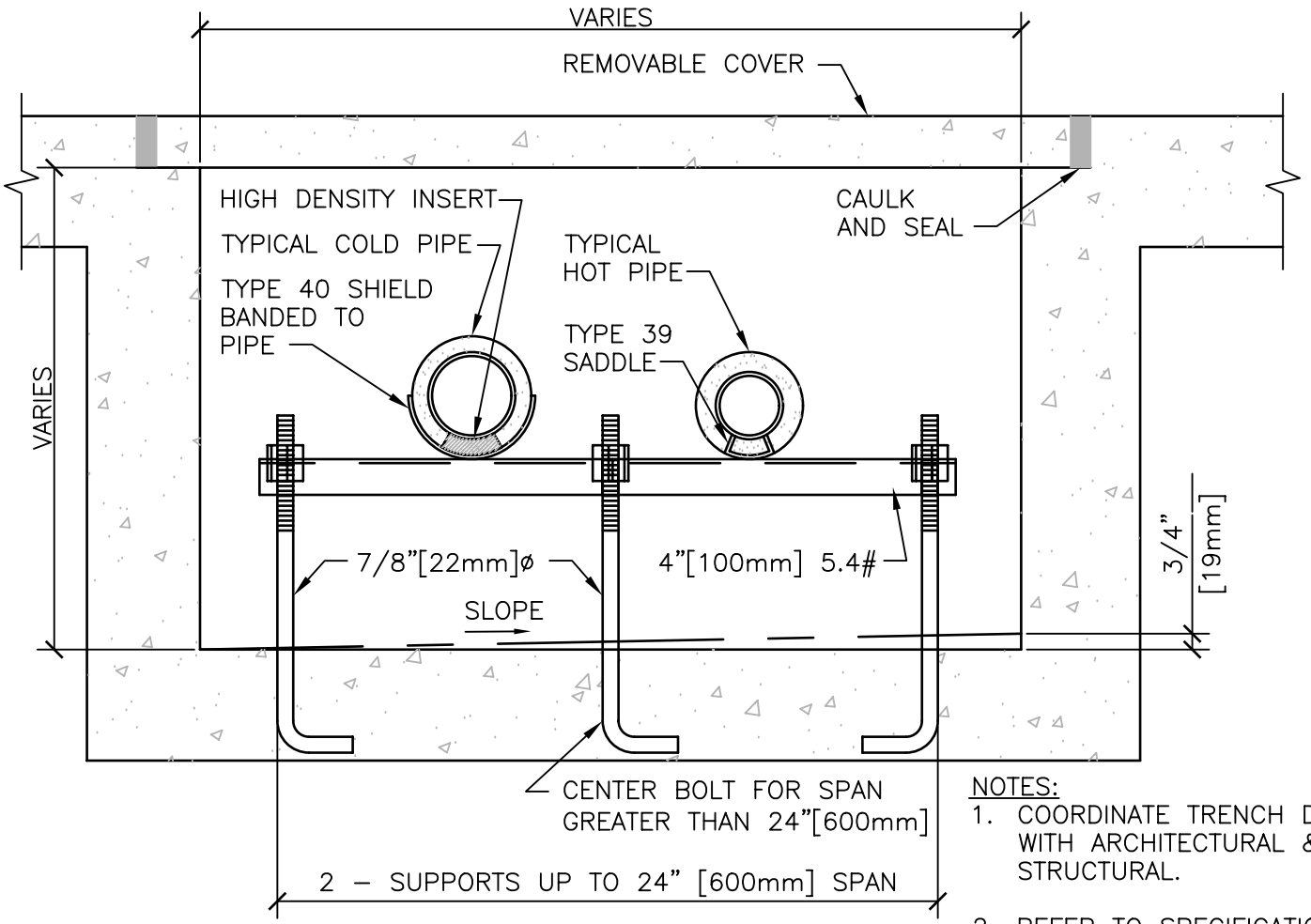
Department of Veterans Affairs

DETAIL TITLE / PIPE TRENCH IN BUILDING

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD230511-27.DWG



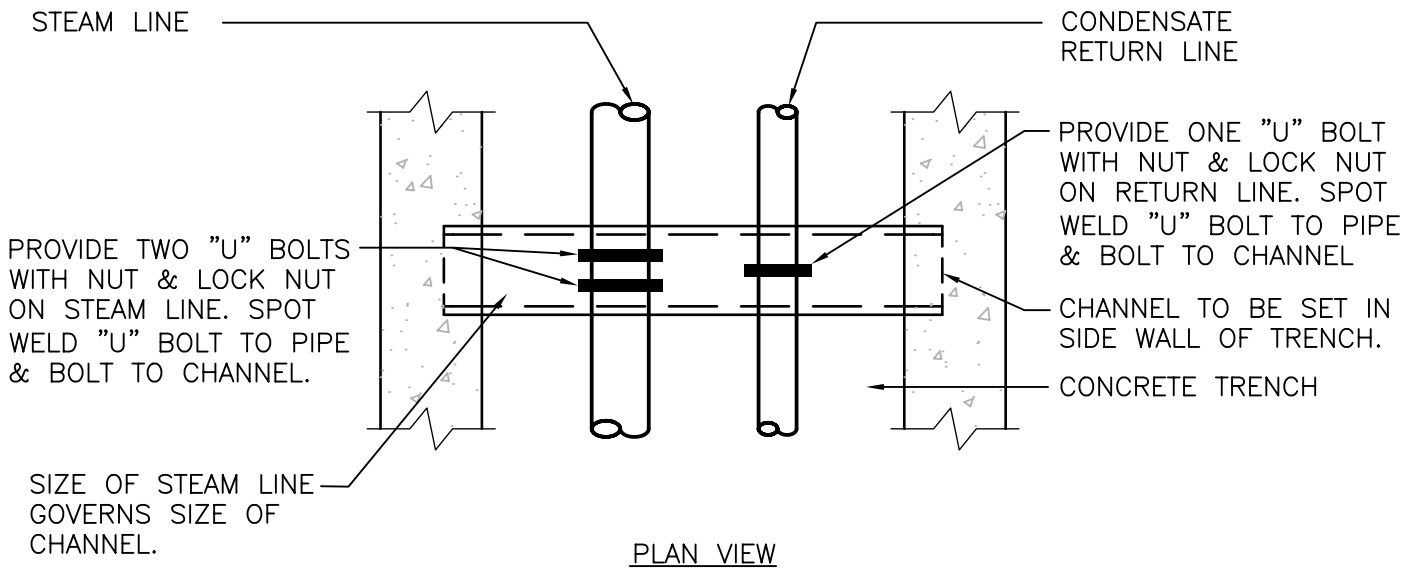
NOTES:

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

#

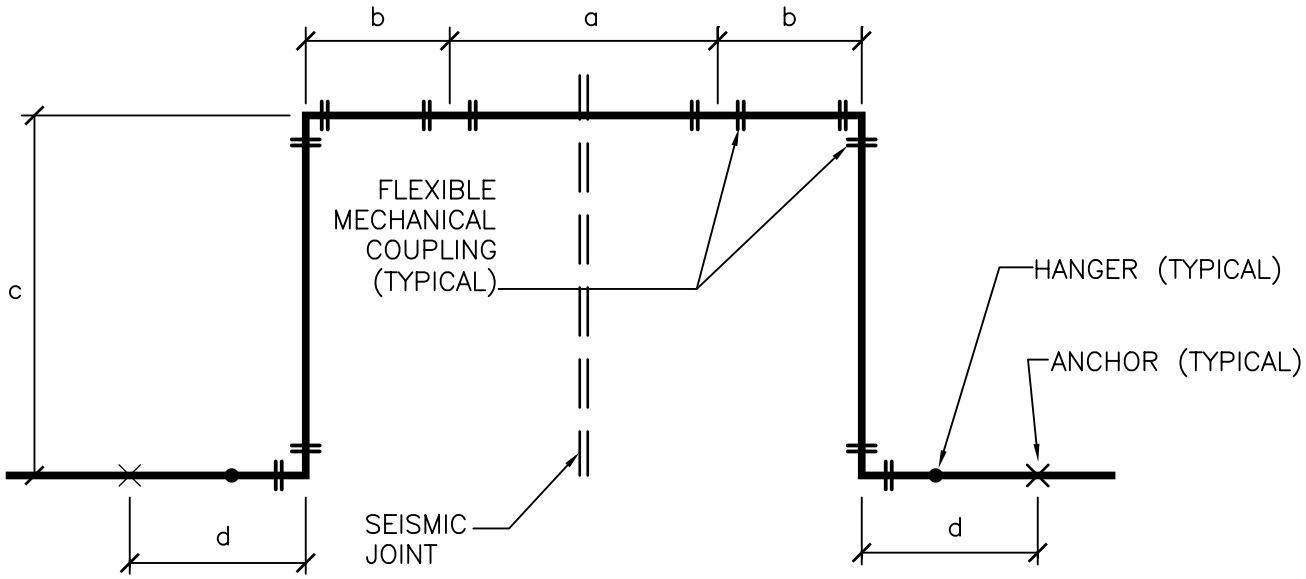
NTS

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:

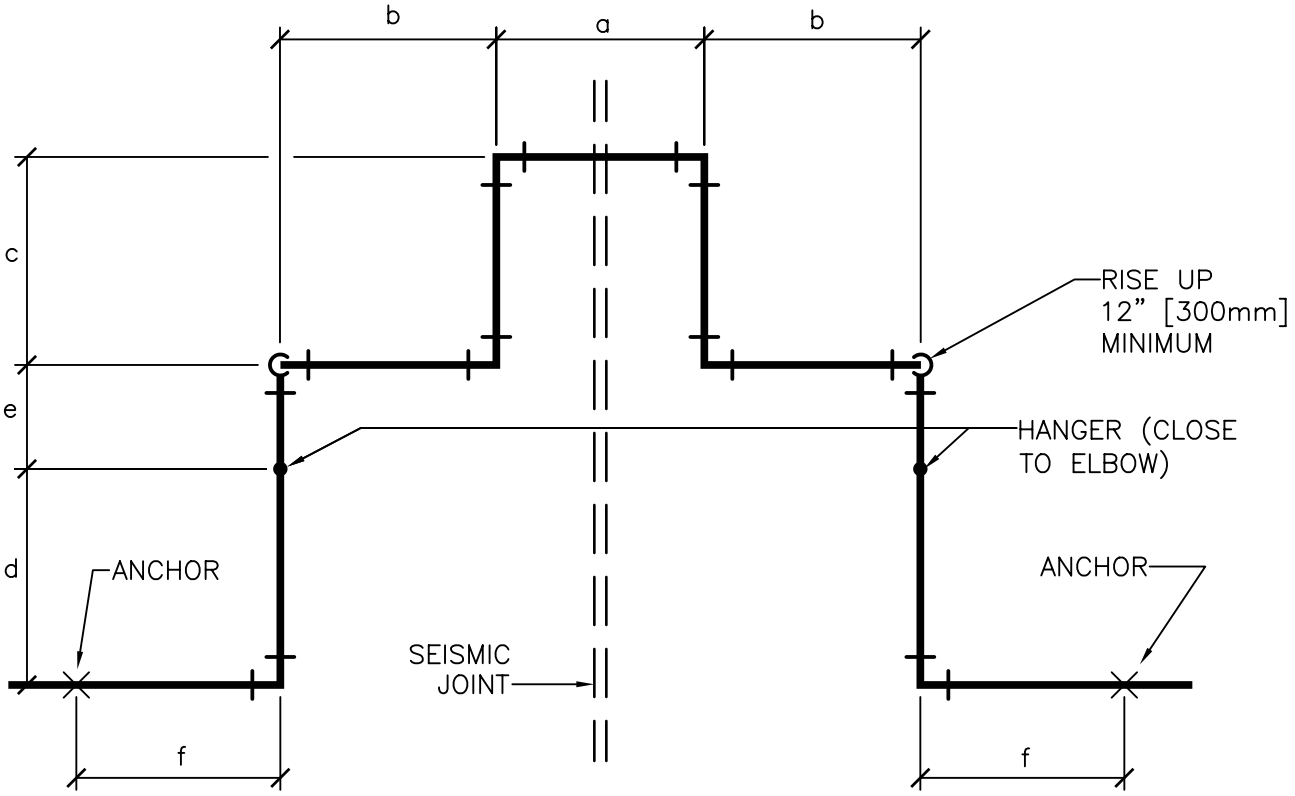
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. 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:

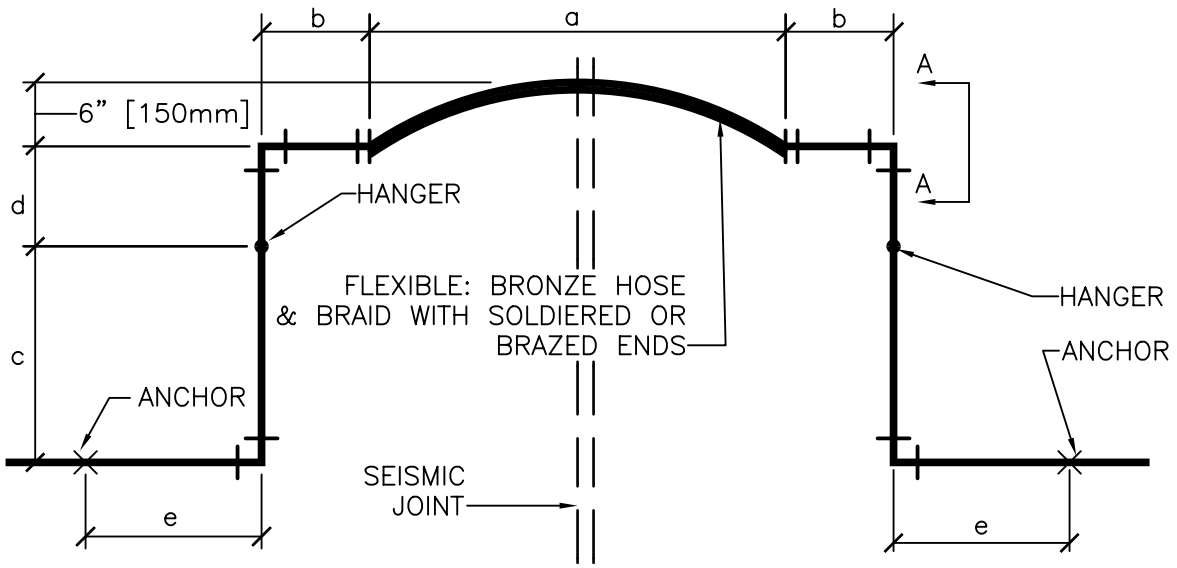
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. 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

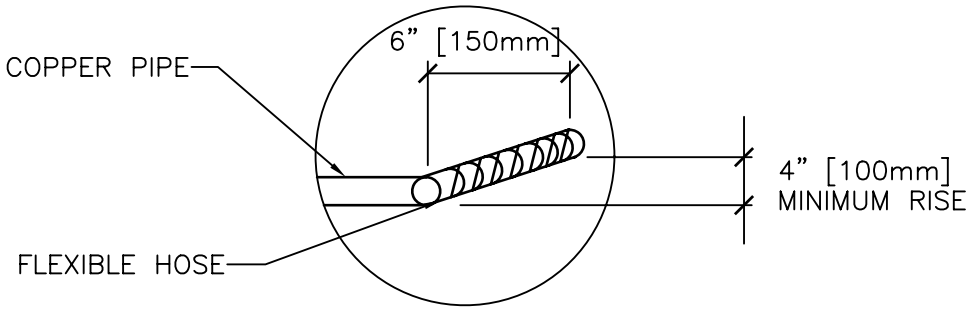
DETAIL TITLE / PIPING CROSSING A SEISMIC JOINT
DETAIL "B"

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:

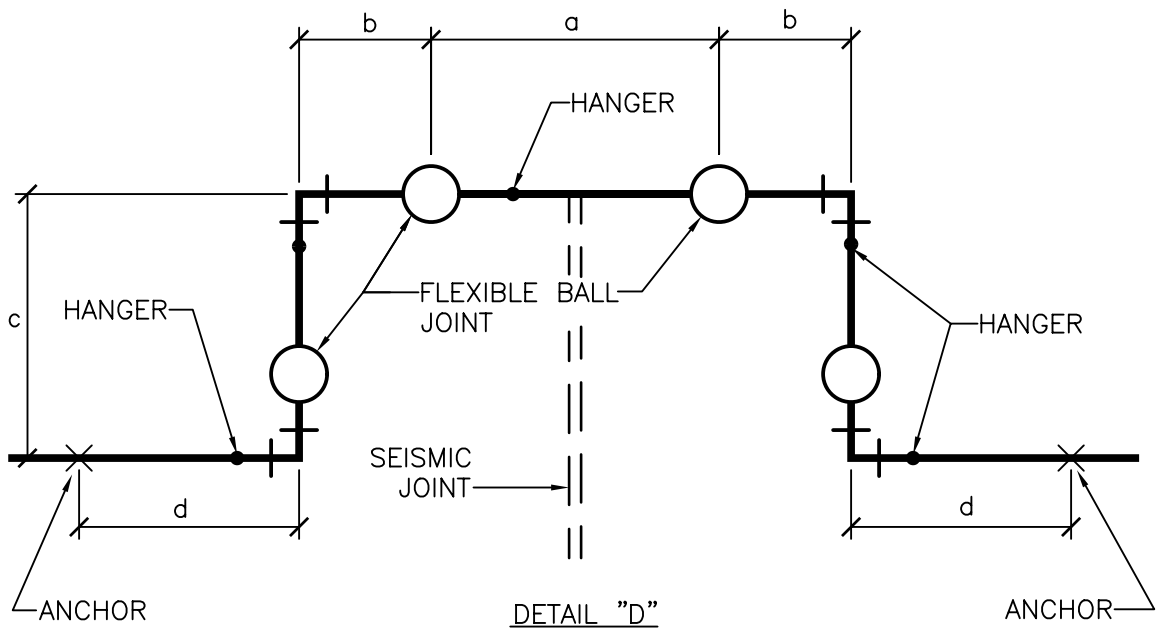
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. 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:

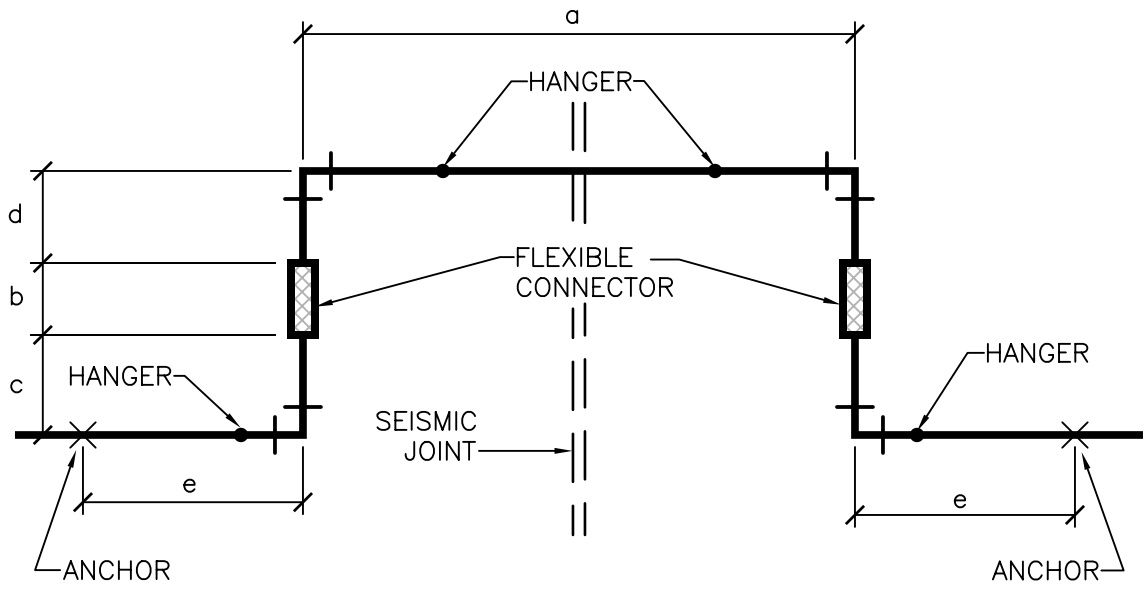
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. 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:

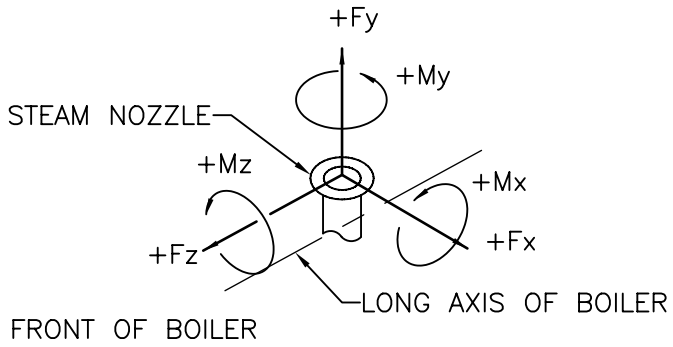
1. THIS CONFIGURATION SHOWN IN THIS DETAIL IS A SUGGESTED ARRANGEMENT, NOT MANDATED FOR USE IN AS IS CONDITION. THE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER IN CHARGE OF THE PROJECT SHALL PROVIDE SEISMIC CALCULATIONS AND MODIFY THE CONFIGURATION AS NEEDED TO MAKE THE ARRANGEMENT PROJECT–SPECIFIC. 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

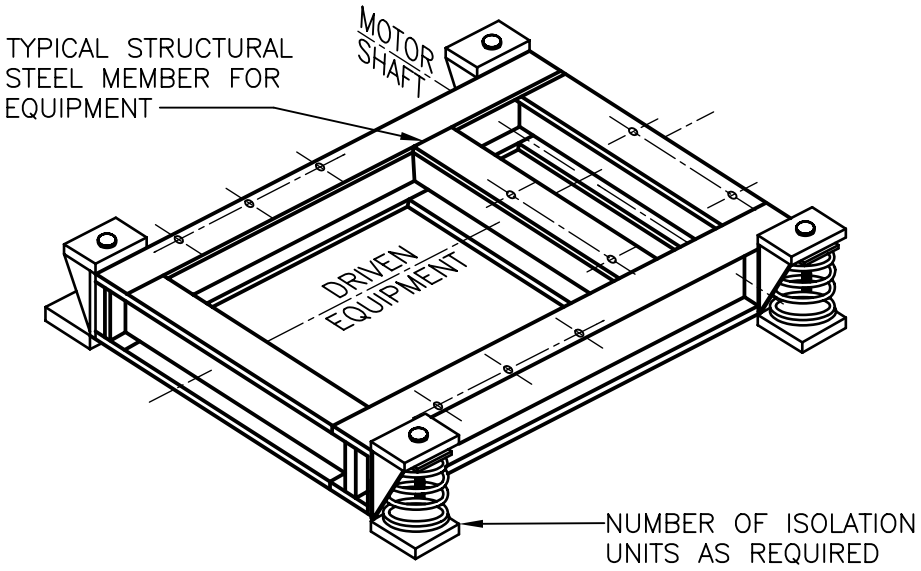
Department of Veterans Affairs

DETAIL TITLE / FORCES AND MOMENTS ON BOILER STEAM NOZZLES

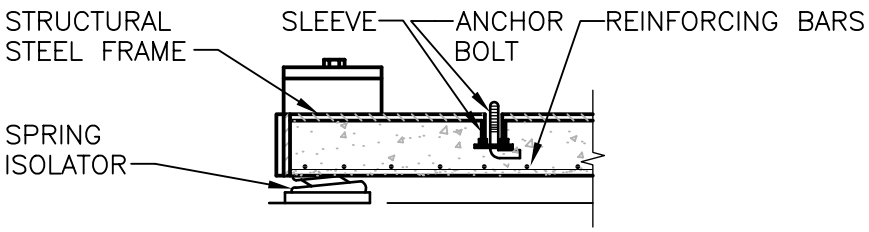
SCALE :NONE

DATE ISSUED :FEBRUARY 2008

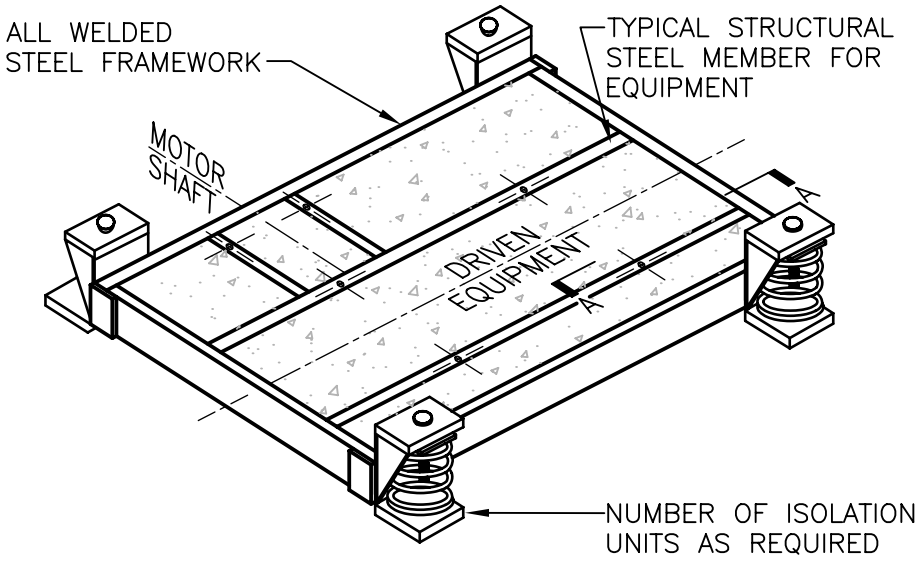
CADD DETAIL NO. : SD230511-34.DWG



TYPE"B"
WELDED STEEL BASE



SECTION A–A



TYPE "1"
CONCRETE INERTIA BASE

VIBRATION ISOLATION BASES

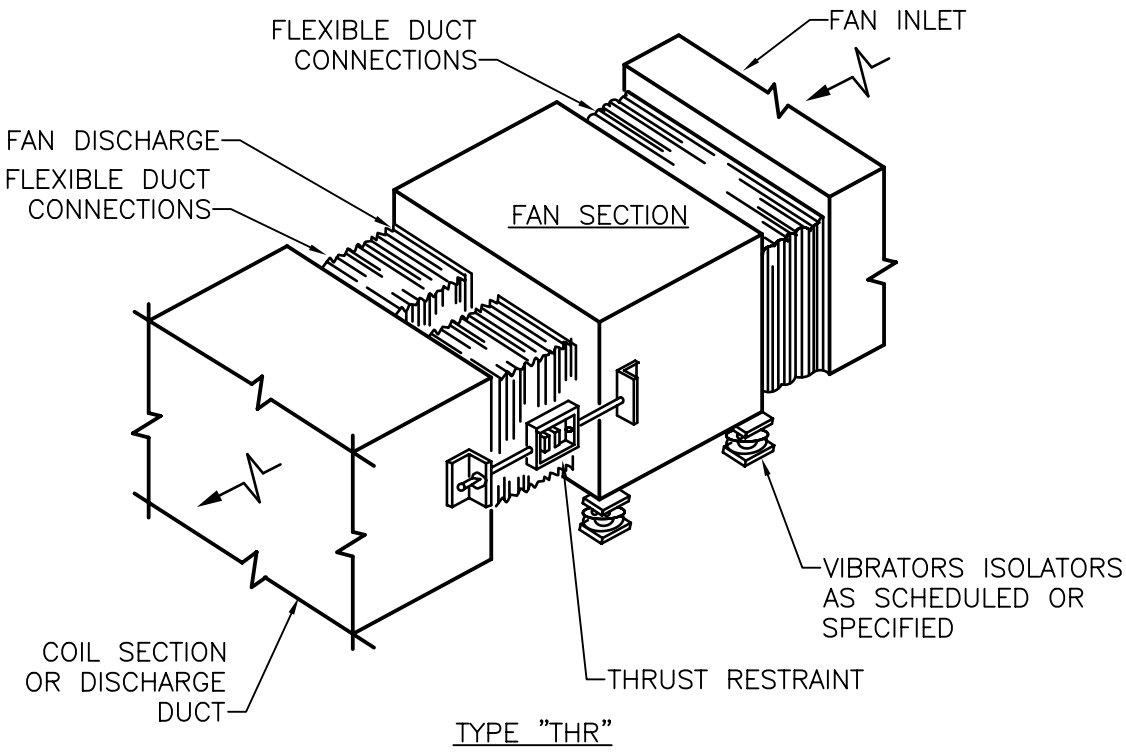
NTS

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:

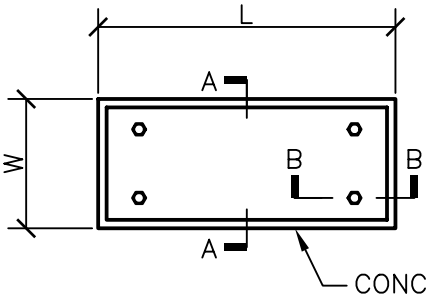
ON THE VIBRATION ISOLATION SCHEDULE OR UNDER THE TITLE OF THIS DETAIL DESIGNATE FANS REQUIRING RESTRAINT. THIS IS USUALLY SEPARATELY MOUNTED FAN SECTIONS FOR STATIC PRESSURE OVER 4" [100 mm] AND POSSIBLY FOR AXIAL FLOW FANS FOR STATIC PRESSURE OVER 4" [100 mm].

Department of Veterans Affairs

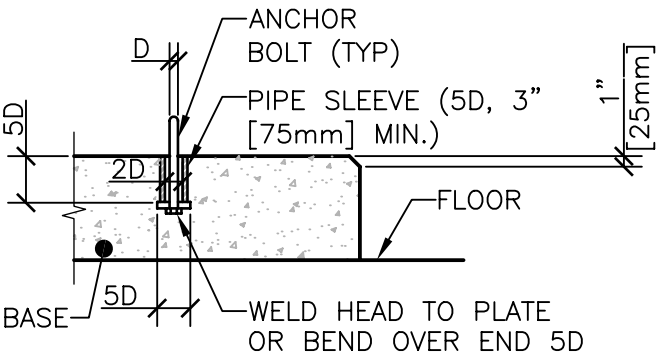
DETAIL TITLE / THRUST RESTRAINT FOR FANS

SCALE :NONE

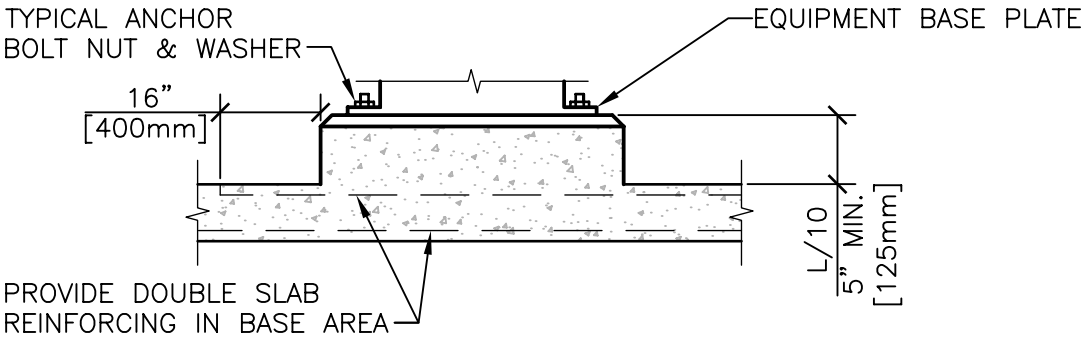
DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541-02.DWG



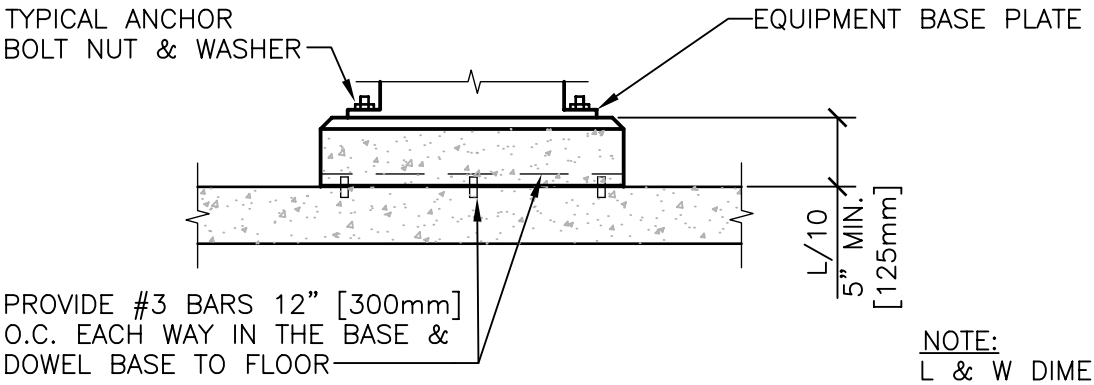
PLAN



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

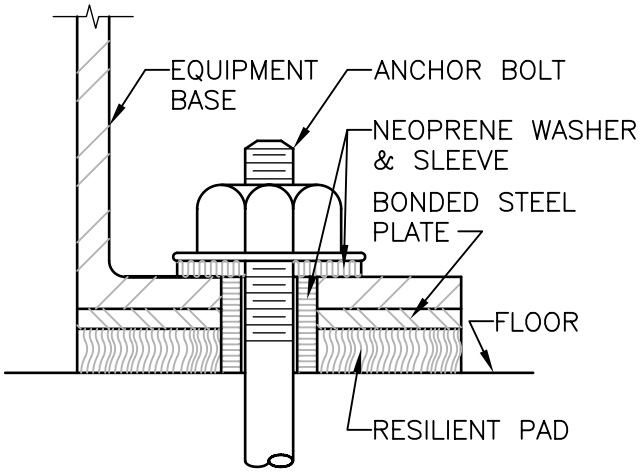
DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230541–03.DWG

Department of Veterans Affairs

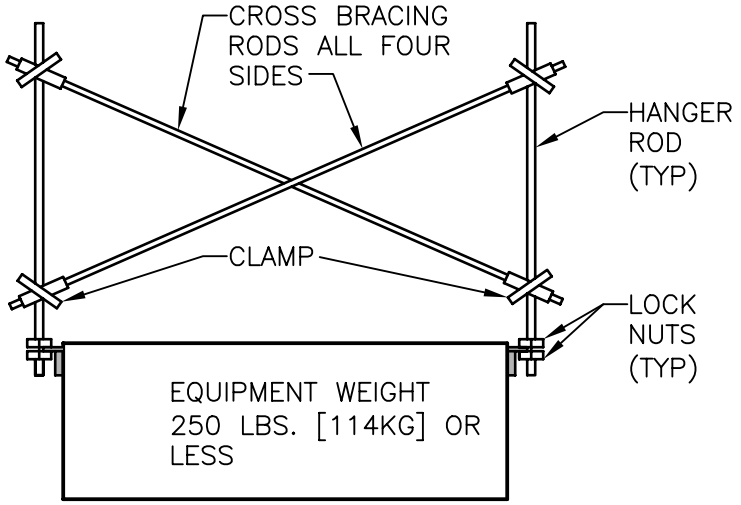
DETAIL TITLE / SEISMIC BRACING FOR LIGHT SUSPENDED EQUIPMENT/ EQUIPMENT RESTRAINED BY RESILIENT PADS (TYPE DS)

SCALE :NONE

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



FLOOR MOUNT EQUIPMENT RESTRAINED BY RESILIENT PADS (TYPE DS)

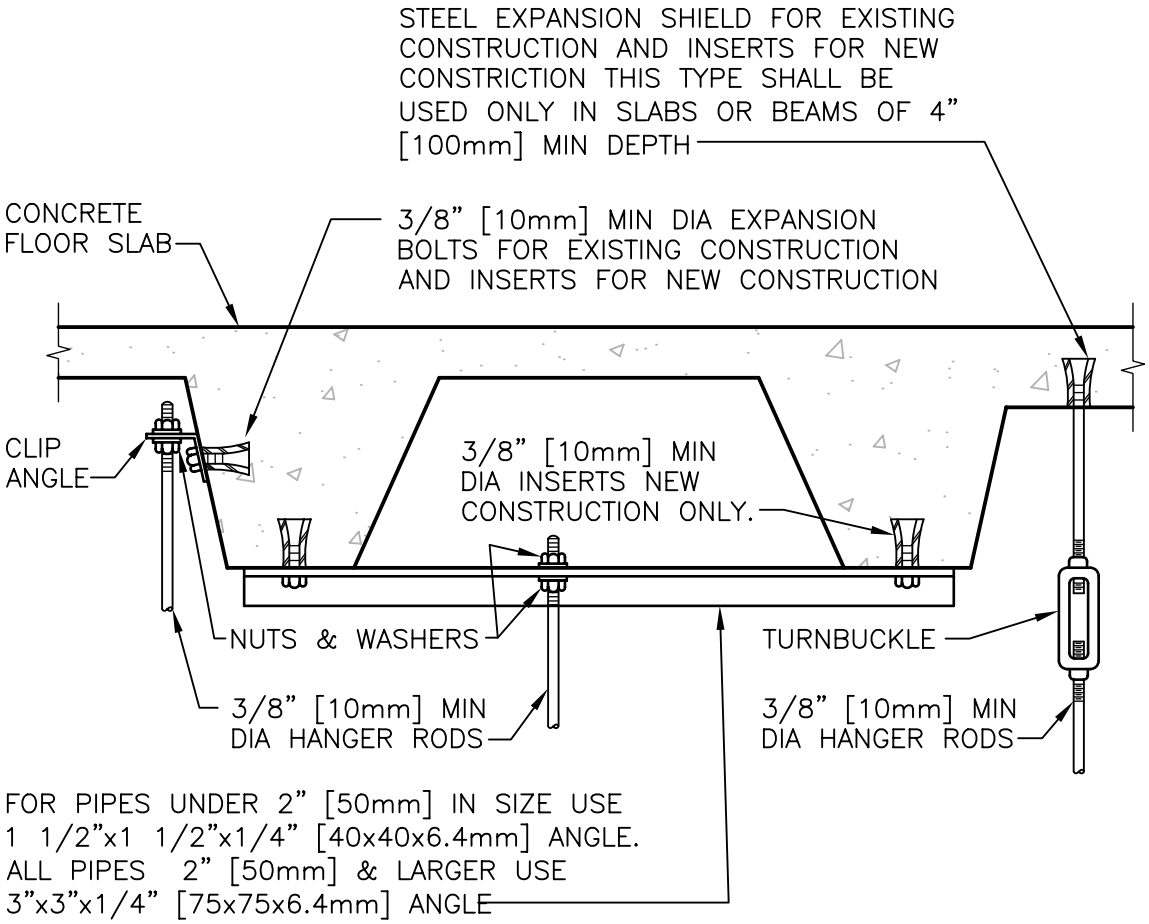


SEISMIC BRACING FOR LIGHT SUSPENDED EQUIPMENT

NOTE:
NOT REQUIRED FOR AIR TERMINAL UNITS.

SEISMIC BRACING FOR EQUIPMENT

NTS



SECURING HANGER RODS IN CONCRETE

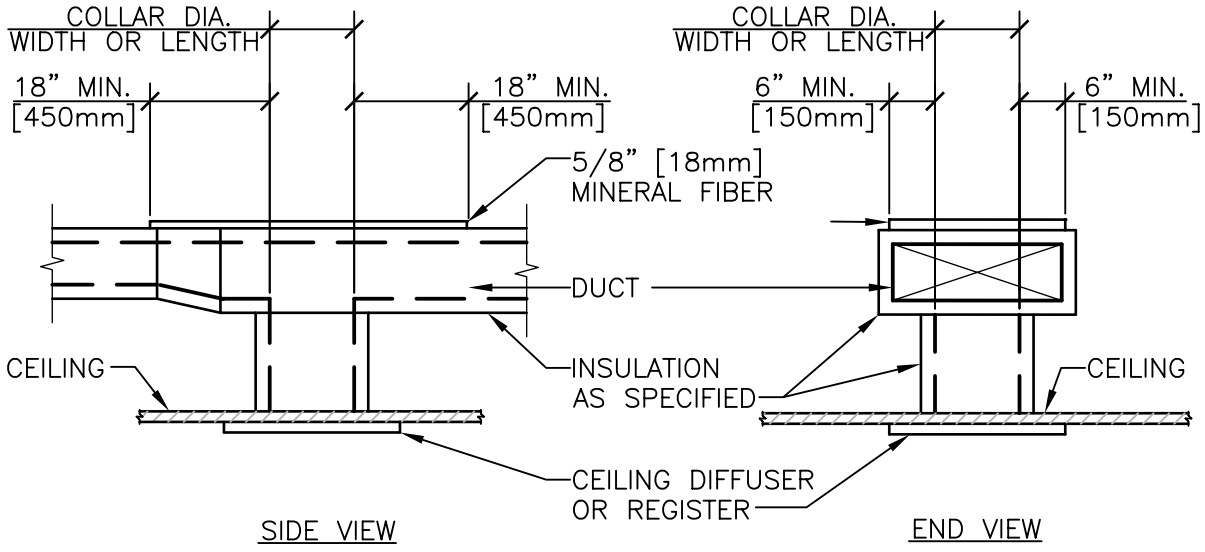
NTS

Department of Veterans Affairs

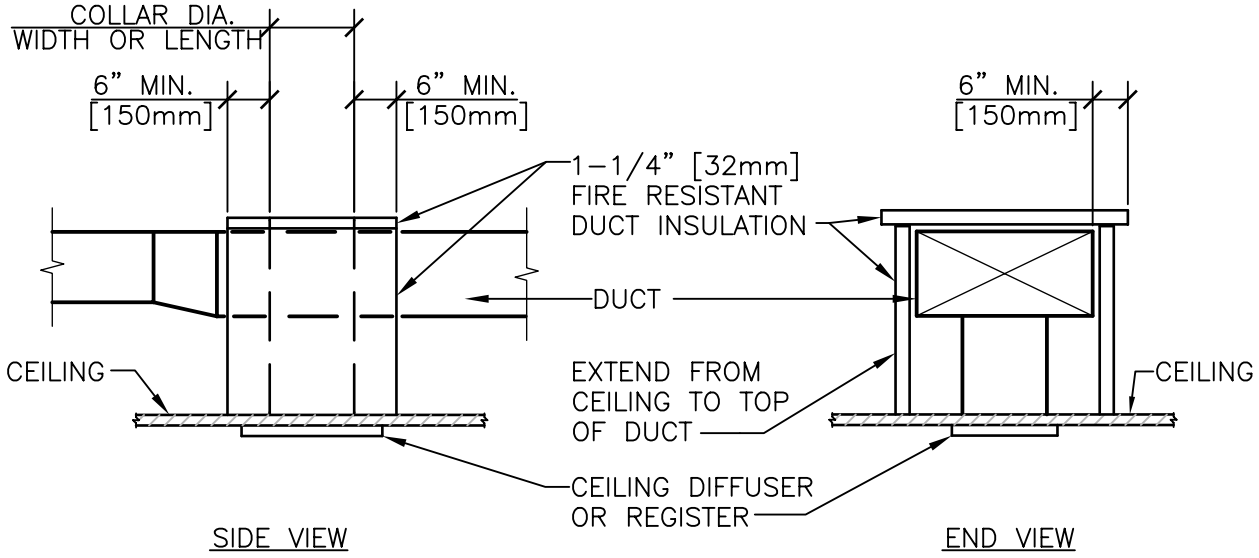
DETAIL TITLE / SECURING HANGER RODS IN CONCRETE

SCALE :NONE

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



INSULATED DUCT TYPE



NON-INSULATED DUCT TYPE

FIRE PROTECTION FOR CEILING OUTLETS

NTS

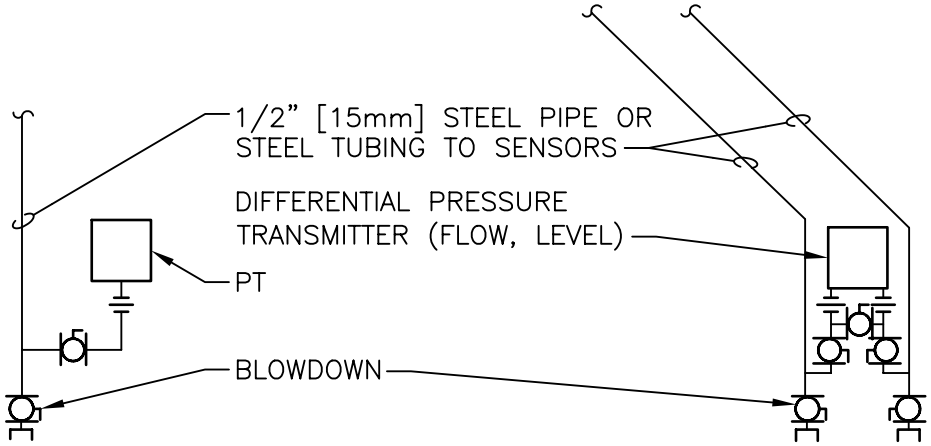
DESIGNER NOTES:
1.SHOW LOCATION ON FLOOR PLANS

Department of Veterans Affairs

DETAIL TITLE / FIRE PROTECTION FOR CEILING OUTLETS

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD230711-01.DWG



ELEVATION

NOTES:

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

PRESSURE TRANSMITTER INSTALLATION

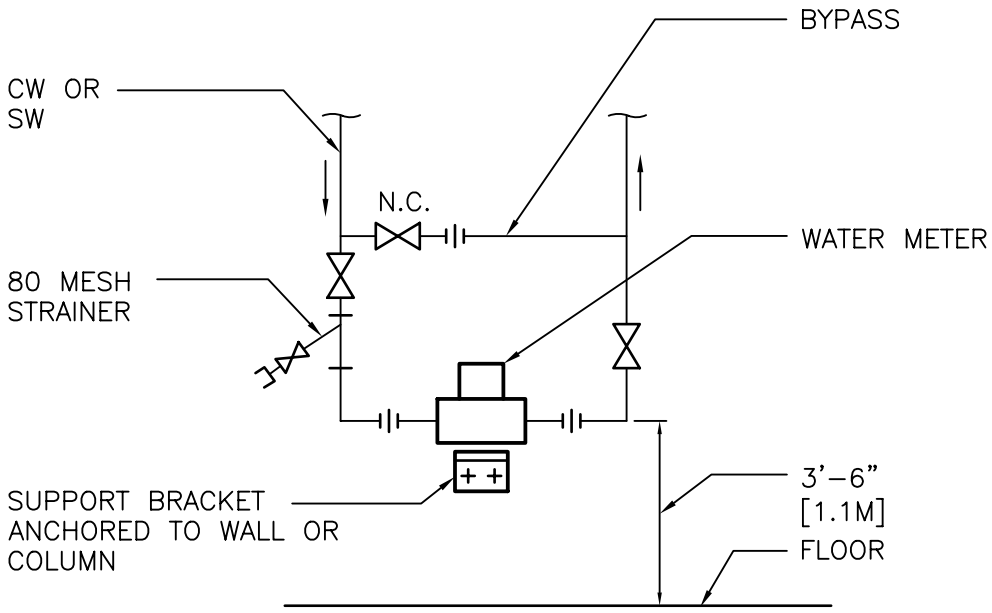
NTS

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

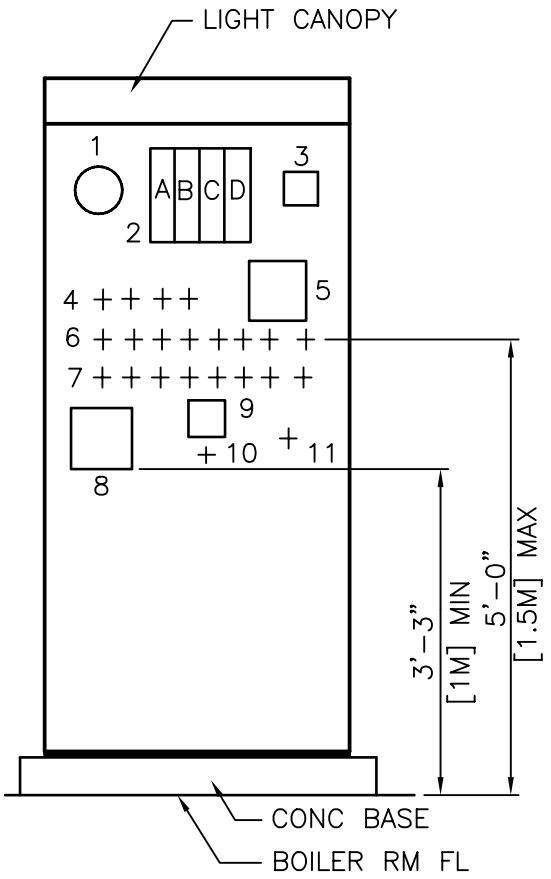
Department of Veterans Affairs

DETAIL TITLE / BURNER CONTROL PANEL FOR WATER TUBE BOILERS

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD230911-03.DWG



ELEVATION

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

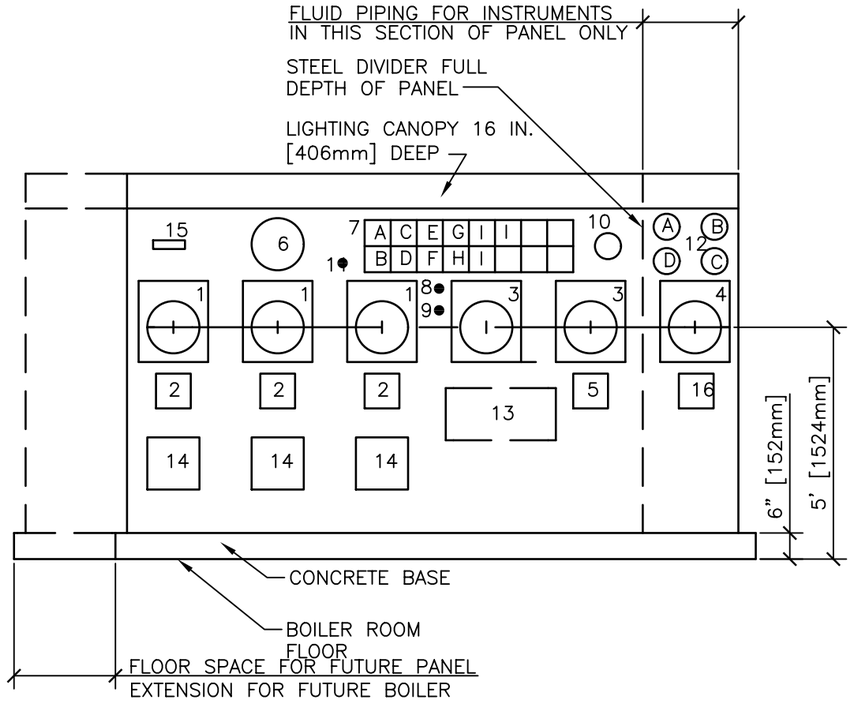
NOTES:

1. INTERIOR OF PANEL SHALL BE UTILIZED FOR MOUNTING RELAYS, BURNER CONTROL PROGRAMMER, AND OTHER DEVICES.
1. PROVIDE FRONT OR REAR ACCESS DOORS FULL HEIGHT AND WIDTH OF PANEL.
2. PANEL DIMENSIONS APPROX, 3'–0" (1 M) W x 1'–6" (0.5 M) D x 7'–6" (2.3 M) H.
3. WINDBOX AND FURNACE DRAFT GAGE SCALE RANGES RECOMMENDED BY BOILER AND BURNER MANUFACTURER.
4. SCALE RANGE OF BOILER OUTLET DRAFT GAGE MUST BE COORDINATED WITH ECONOMIZER DRAFT LOSS. IF THERE IS NO ECONOMIZER, RANGE SHOULD BE –1 IN (–25 mm) TO +1 IN (25 mm) WC.
5. 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

ENGINEERING NOTES:

1. PANEL APPROX. 12'–6"Wx2'–0"DX8'–0"H [3810x610x2438mm]. SHOW ACTUAL SIZE ON DWGS.
2. IF GRAPHIC PAPERLESS RECORDERS ARE SPECIFIED (WITH 8 CHANNELS MIN.) ITEMS 3 & 4 CAN BE COMBINED INTO ONE RECORDER.
3. SOME RECORDING & MONITORING FUNCTIONS MAY BE HANDLED BY A COMPUTER WORK STATION & THEREFORE MAY BE DELETED FROM THIS PANEL.
4. ON SOME PROJECTS, IT MAY BE DESIRABLE TO LOCATE EMERGENCY GENERATOR ANNUNCIATORS & METERS ON THIS PANEL.
5. PROVIDE SMOKE DENSITY MONITORS ONLY ON PLANTS BURNING HEATED OIL OR WHERE REQUIRED BY LOCAL CODES.
6. 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.
7. DELETE THE "ENGINEERING NOTES" FROM THE PROJECT DRAWINGS.

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

BOILER PLANT INSTRUMENTATION PANEL

NTS

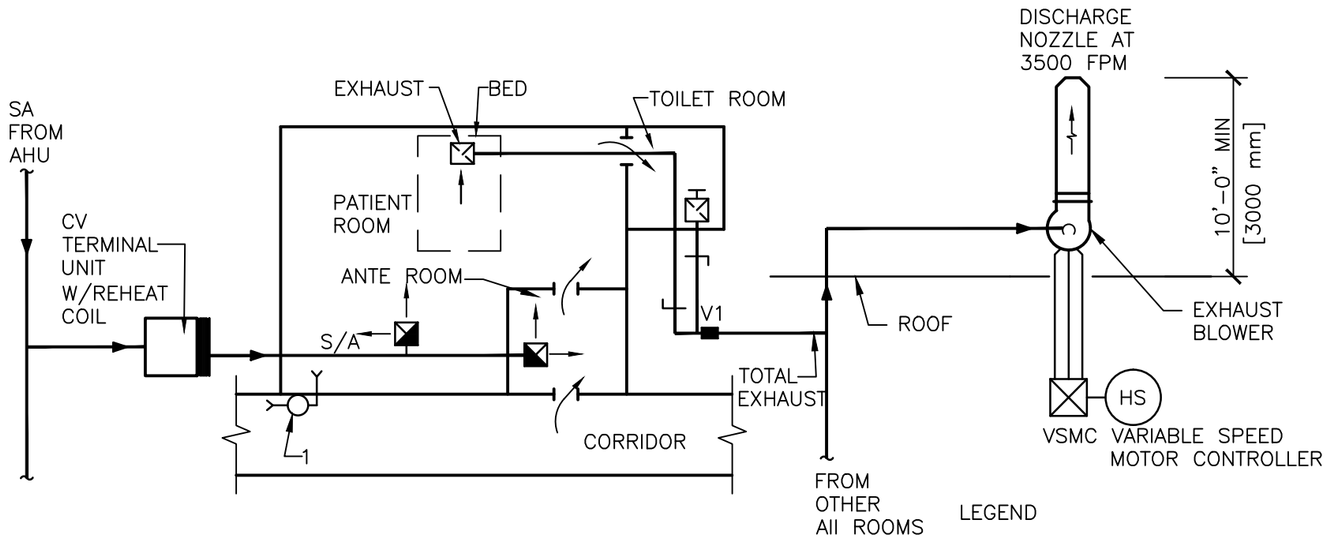
DETAIL TITLE / BOILER PLANT INSTRUMENTATION PANEL

SCALE :NONE

DATE ISSUED: DECEMBER 2008

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.

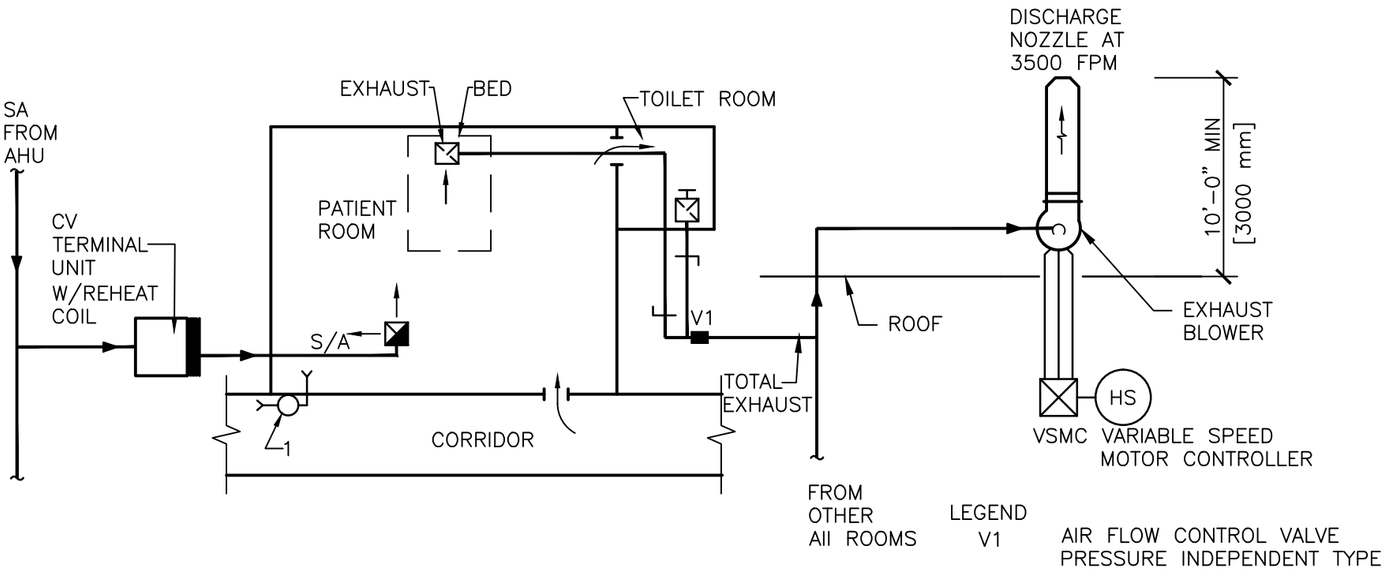
Department of Veterans Affairs

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.

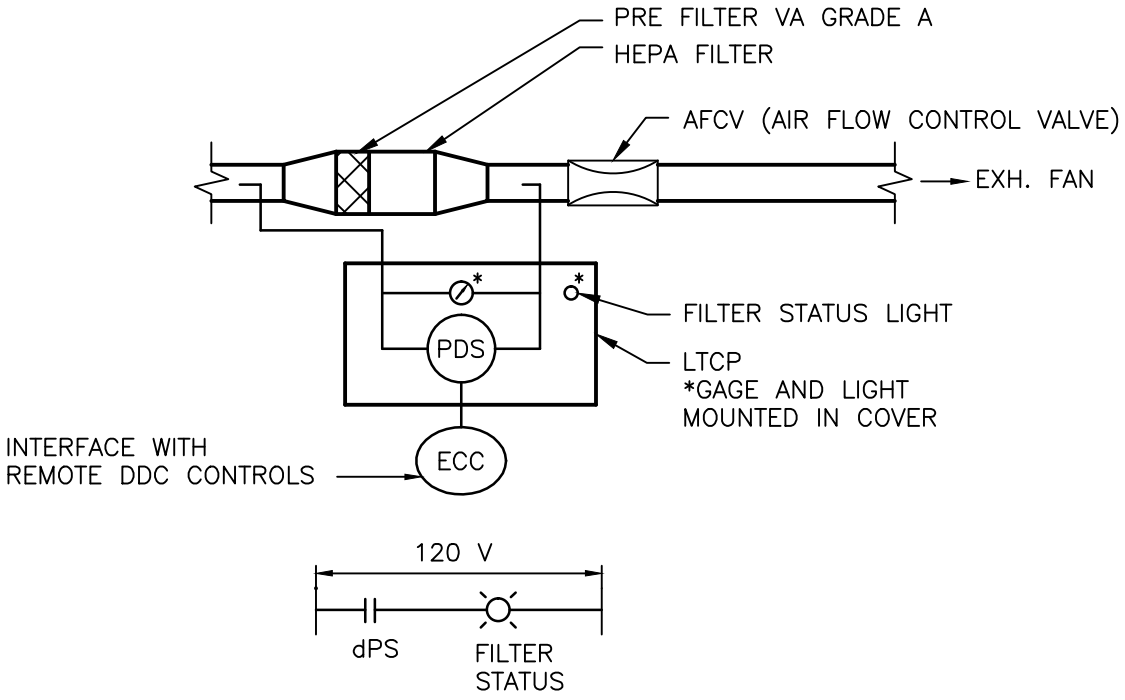
Department of Veterans Affairs

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

#

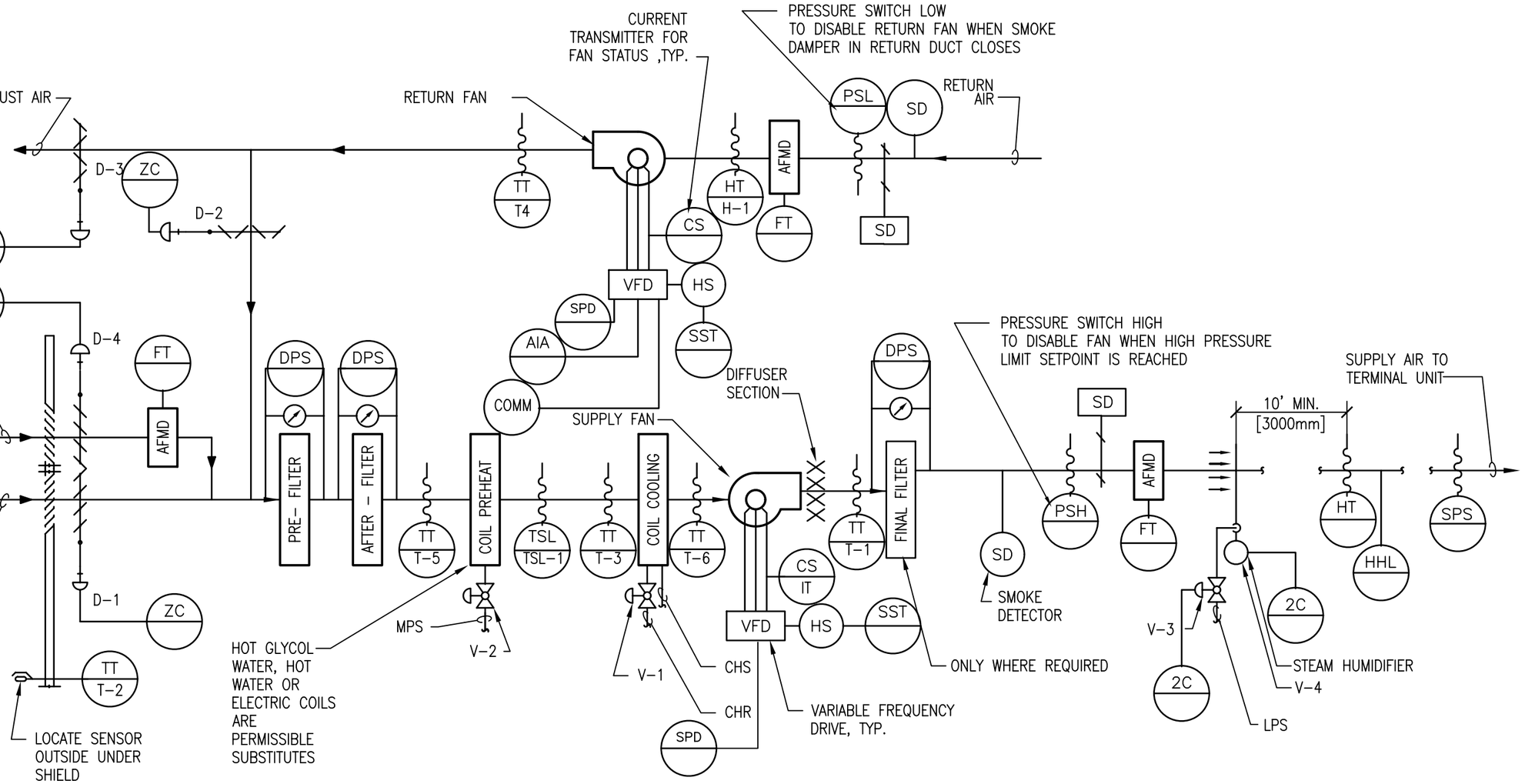
NTS

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

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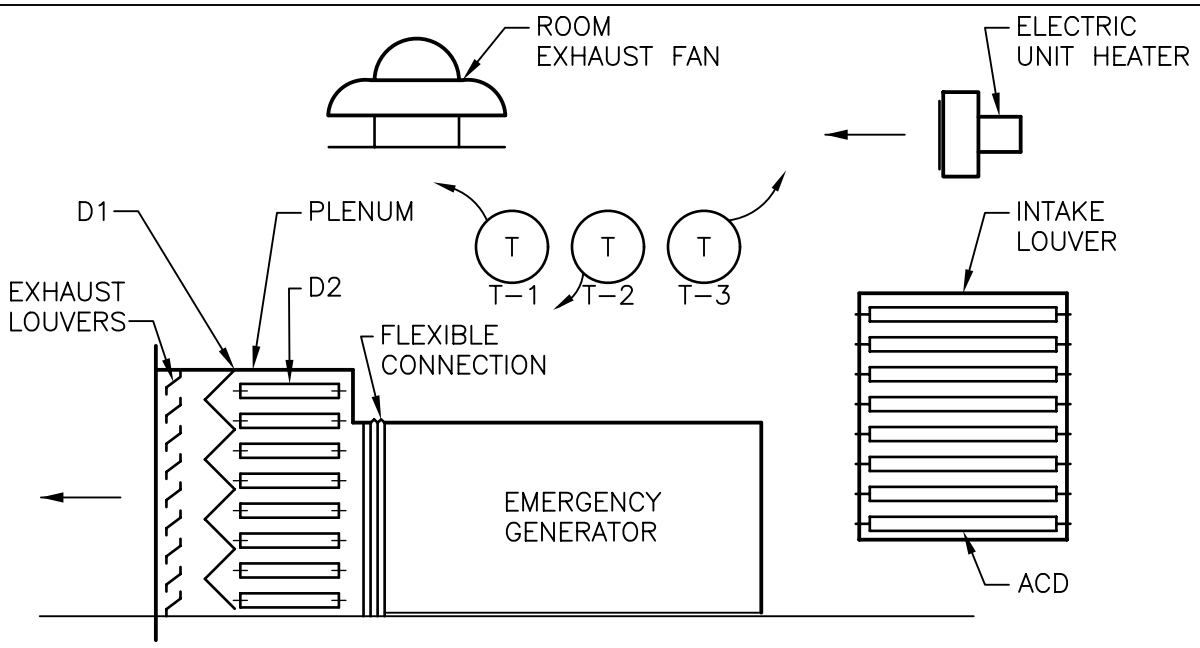
Department of Veterans Affairs



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].

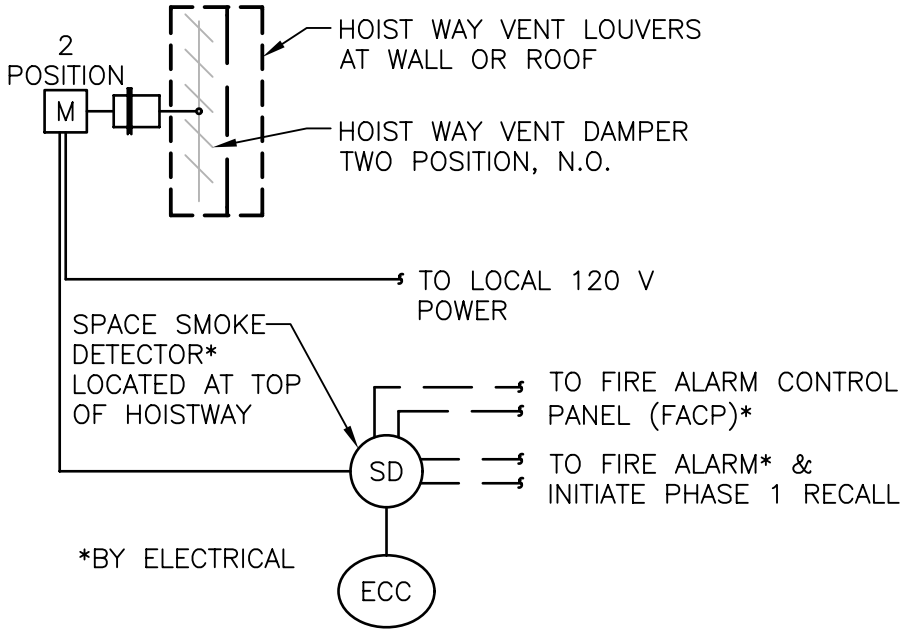
EMERGENCY GENERATOR ROOM CONTROLS

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.



NOTES:

1. THE DAMPER SHALL REMAIN CLOSED DURING NORMAL OPERATION AND OPEN UPON LOSS OF POWER FROM A SIGNAL FROM THE SMOKE DETECTOR, LOCATED AT THE TOP OF THE HOISTWAY. COORDINATE NUMBER OF CONTACTS WITH THE ELECTRICAL AND FIRE PROTECTION DESIGNS.
2. SHOW DAMPER LOCATION AND SIZE ON THE DRAWINGS.
3. PROVIDE A BINARY DDC POINT TO SOUND AN ALARM AT ECC.
4. REMOTE ALARM SHALL BE ACTIVATED WHEN THE HOISTWAY SMOKE DETECTOR DETECTS SMOKE.

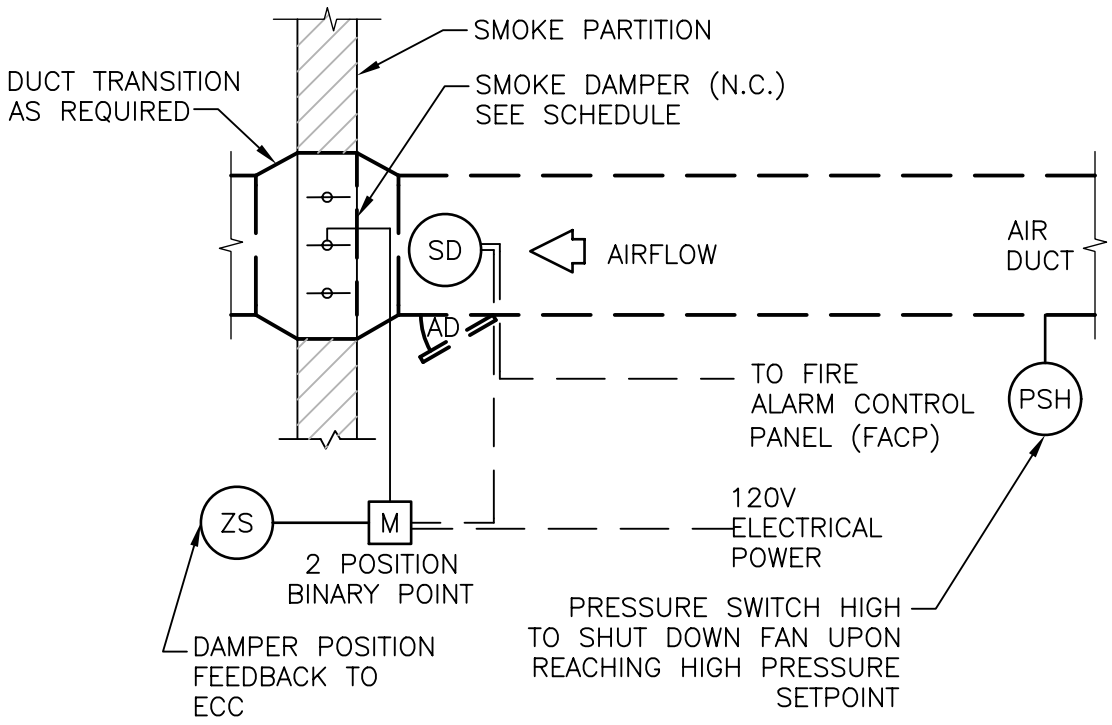
HOISTWAY VENT DAMPER (HVD) CONTROLS

#

NTS

DESIGNER'S NOTES:

1. THE AREA OF VENTS SHALL NOT BE LESS THAN 3.0% OF THE TOTAL HOISTWAY AREA OR 3 SQUARE FEET (0.28 SQUARE METERS) FOR EACH ELEVATOR CAR, WHICHEVER IS GREATER.



NOTE:
UPON DETECTION OF SMOKE BY THE SMOKE DETECTOR, THE SMOKE DAMPER SHALL CLOSE & SEND AN ALARM TO THE ECC.

SMOKE DAMPER CONTROL DIAGRAM

NTS

DESIGNER'S NOTE:
PROVIDE A DAMPER AND DETECTOR ONLY FOR PARTIALLY SPRINKLERED BUILDINGS WHEN EITHER SIDE OF SMOKE PARTITION IS NOT SPRINKLED AND PROTECTED BY QUICK RESPONSE SPRINKLER HEADS.

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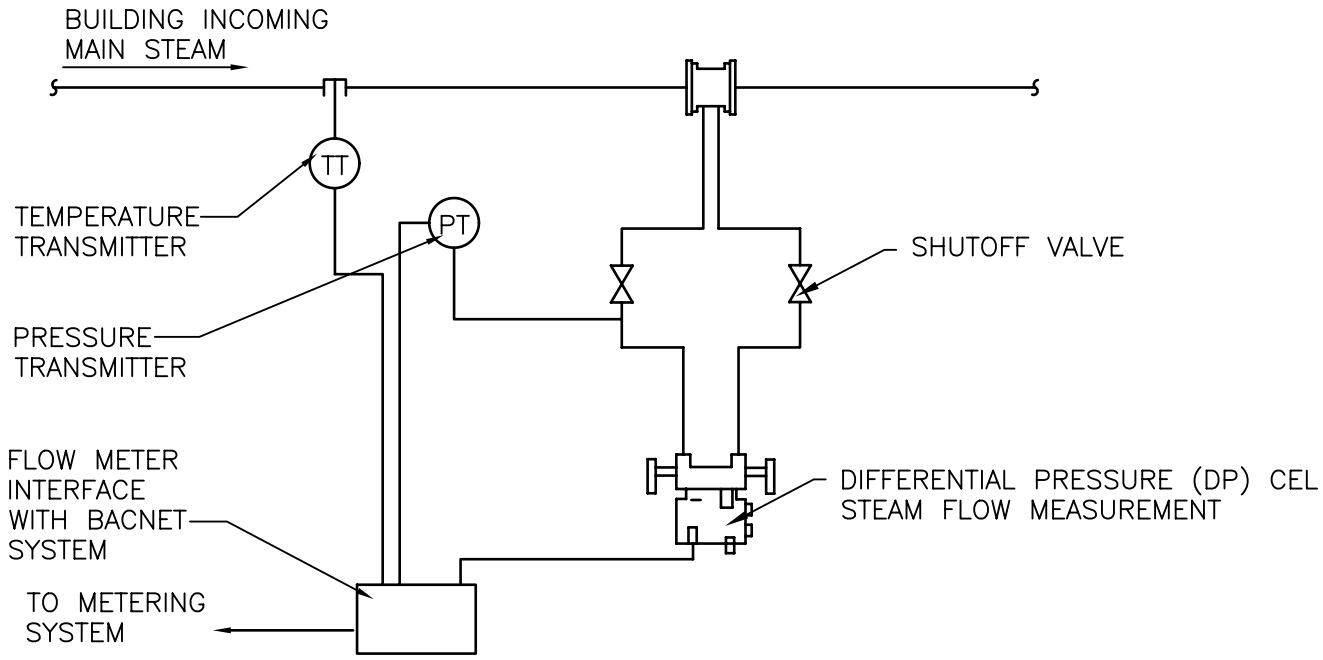
DETAIL TITLE / SMOKE DAMPER CONTROL DIAGRAM

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD230923-09.DWG



NOTE:

1. MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURES

STEAM METER DETAIL

NTS

DESIGNER'S NOTE:

1. MODIFY DETAIL AS REQUIRED TO BE PROJECT SPECIFIC FOR THE TYPE OF METER BEING USED.

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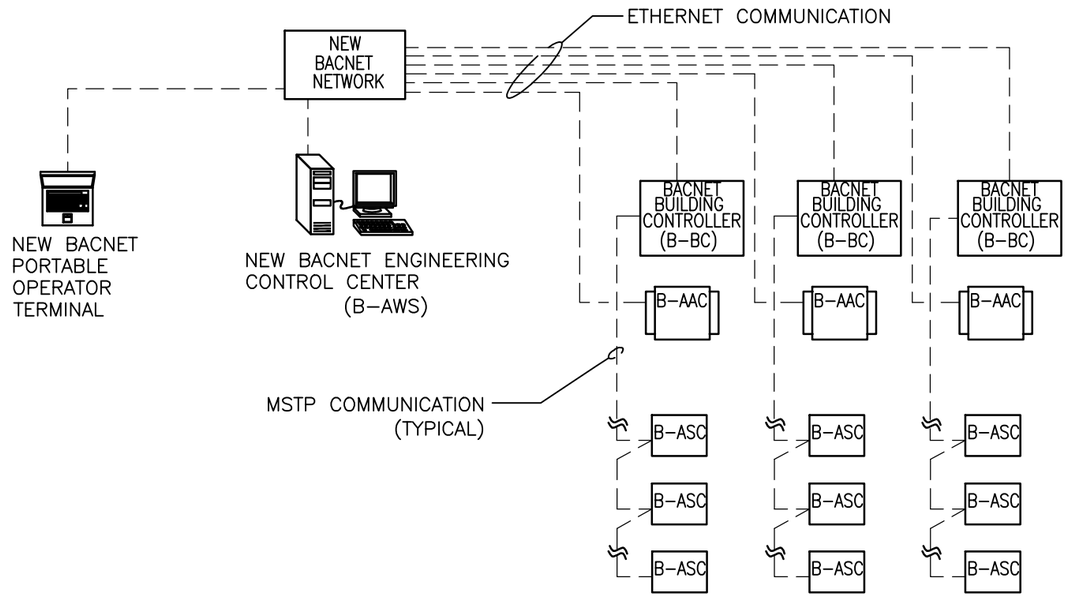
DETAIL TITLE / STEAM METER DETAIL

SCALE :NONE

DATE ISSUED: DECEMBER 2008 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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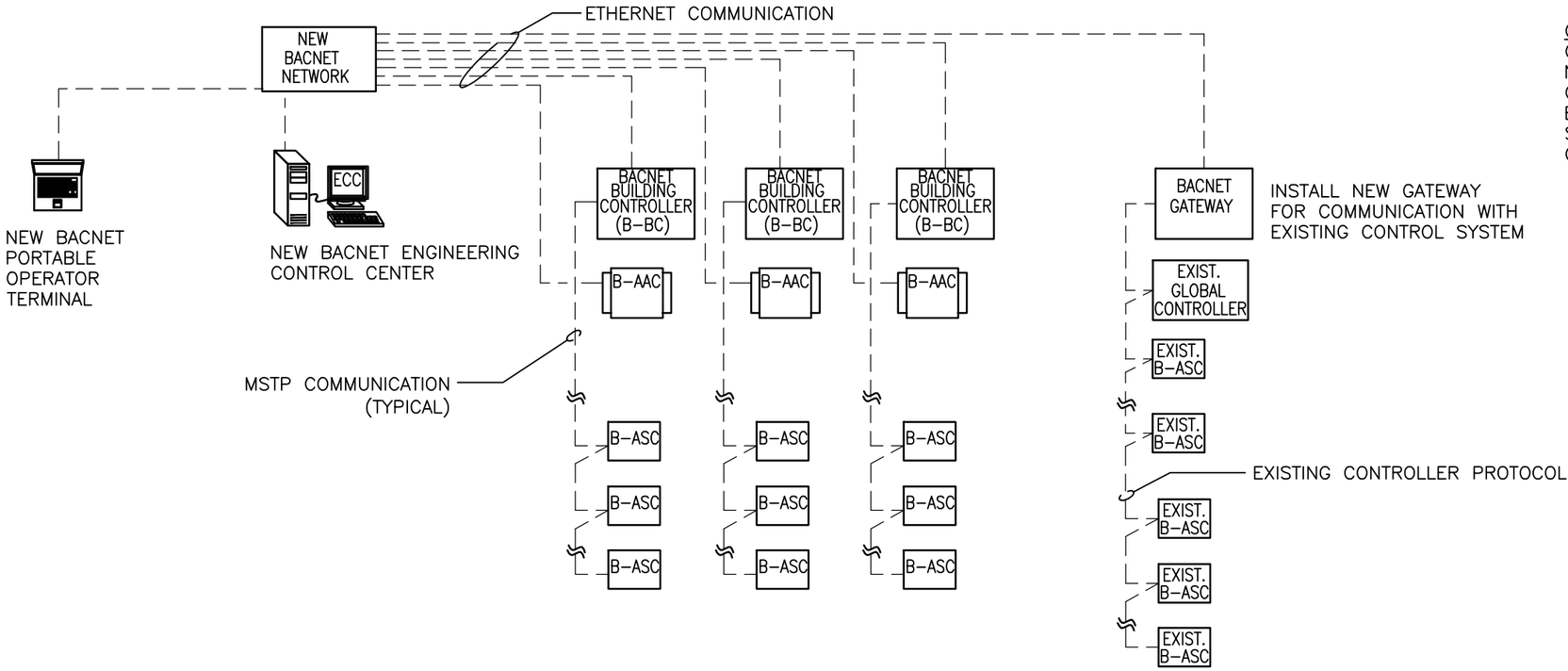

CONTROL SYSTEM CONFIGURATION
OPTION 2 –
NEW BACNET ECC, INSTALL NEW BACNET CONTROLS ON CURRENT PROJECT, PROVIDE BACNET GATEWAY FOR EXISTING CONTROL SYSTEM. INSTALL NEW BACNET COMMUNICATION NETWORK.

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

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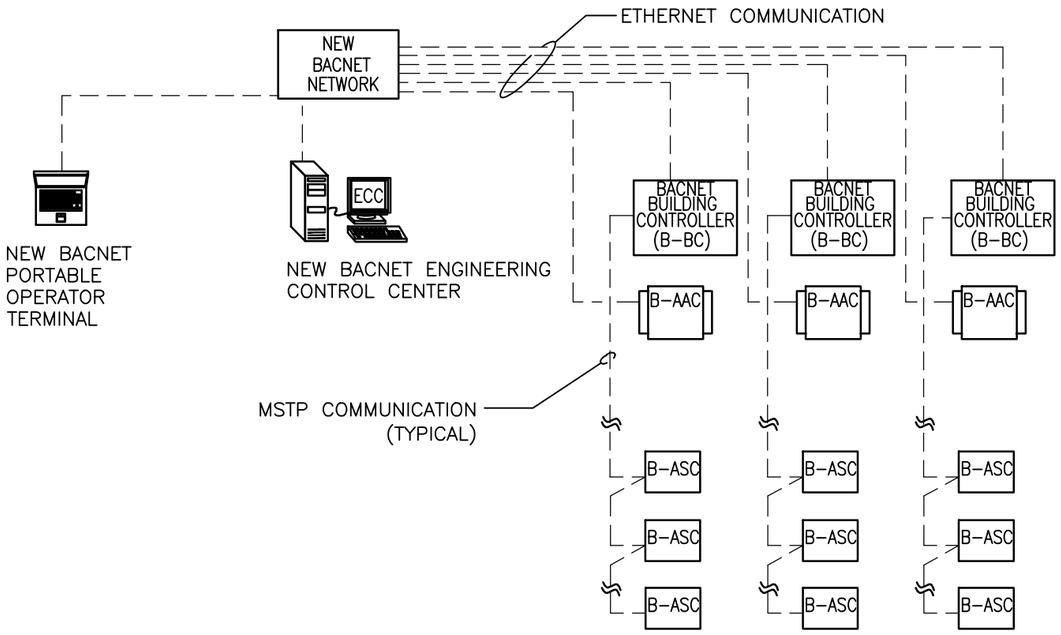
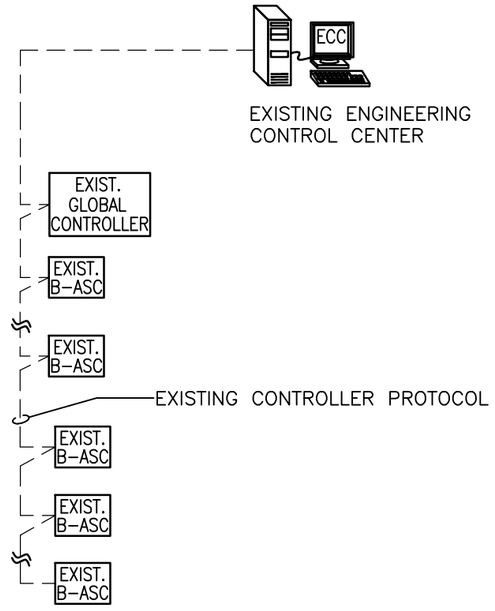




CONTROL SYSTEM CONFIGURATION
OPTION 3 –
NEW BACNET ECC, INSTALL NEW BACNET CONTROLS ON CURRENT PROJECT. INSTALL NEW COMMUNICATIONS NETWORK. EXISTING ECC AND CONTROL TO REMAIN

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

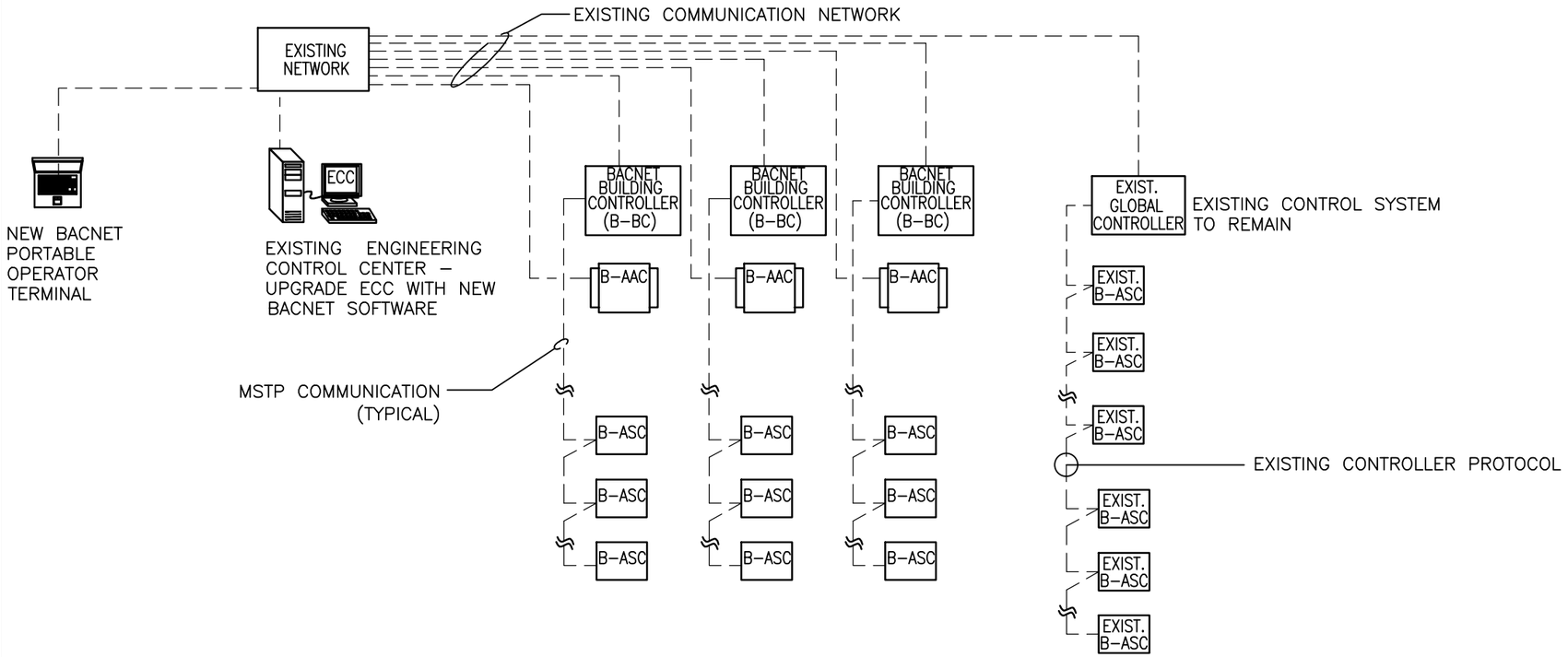
DETAIL TITLE / BACNET SYSTEM ARCHITECTURE OPTION 3

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

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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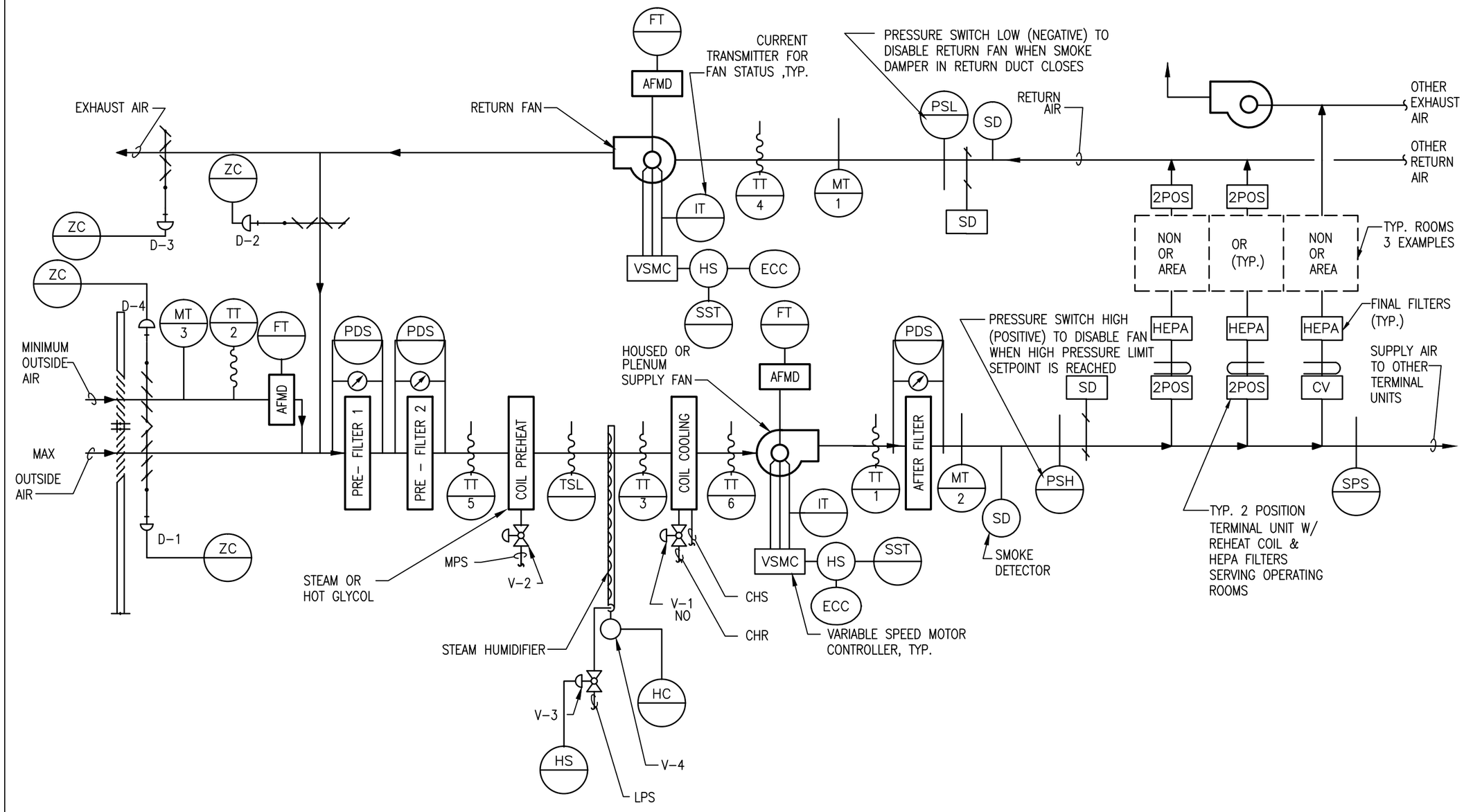

AIR HANDLING UNIT FOR SURGICAL SUITE (VAV)

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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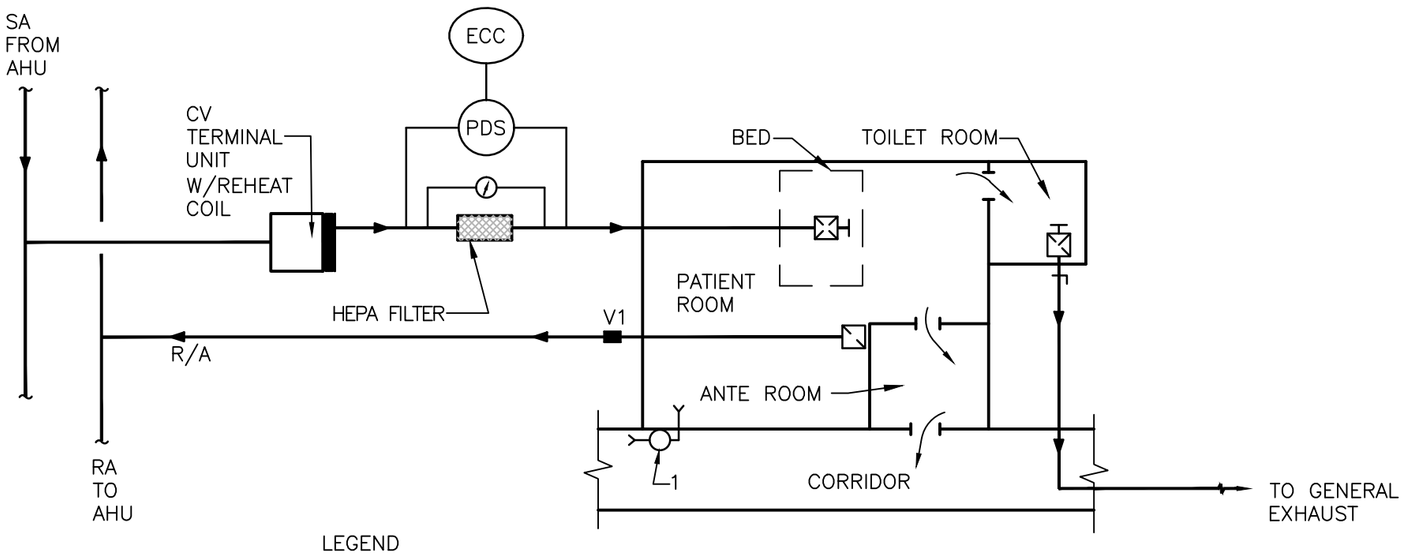
Department of Veterans Affairs



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.

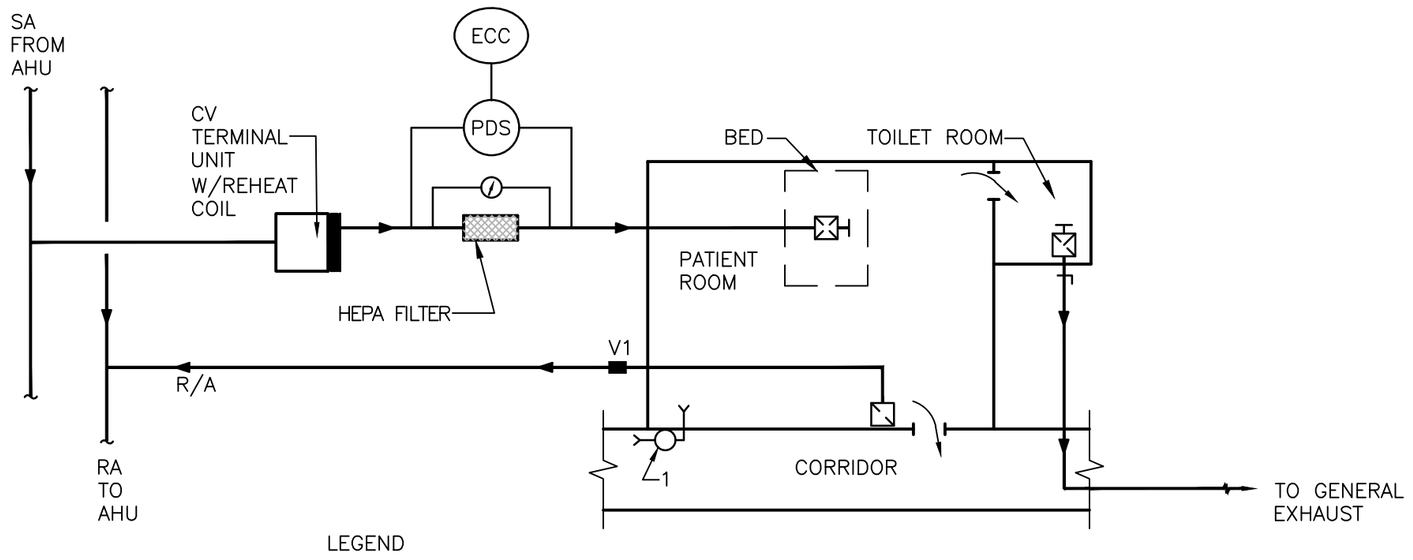
Department of Veterans Affairs

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.

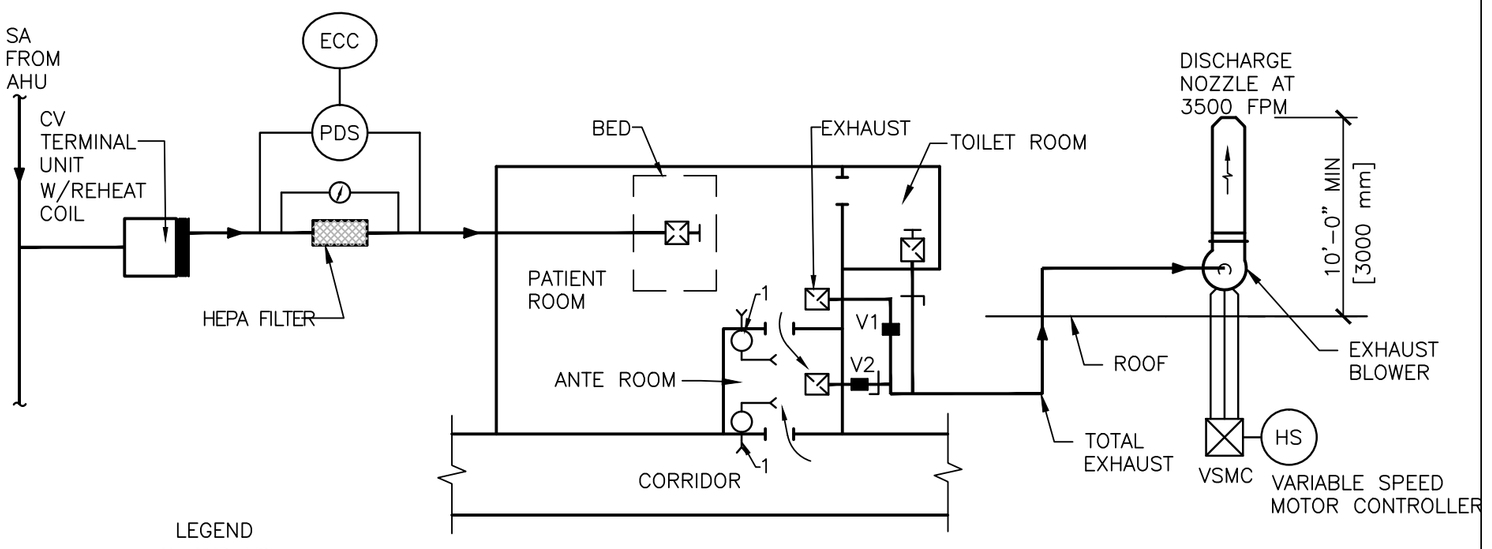
AIR SYSTEM FOR PROTECTIVE ENVIRONMENT ROOM (PE) (WITHOUT ANTEROOM)

#

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.

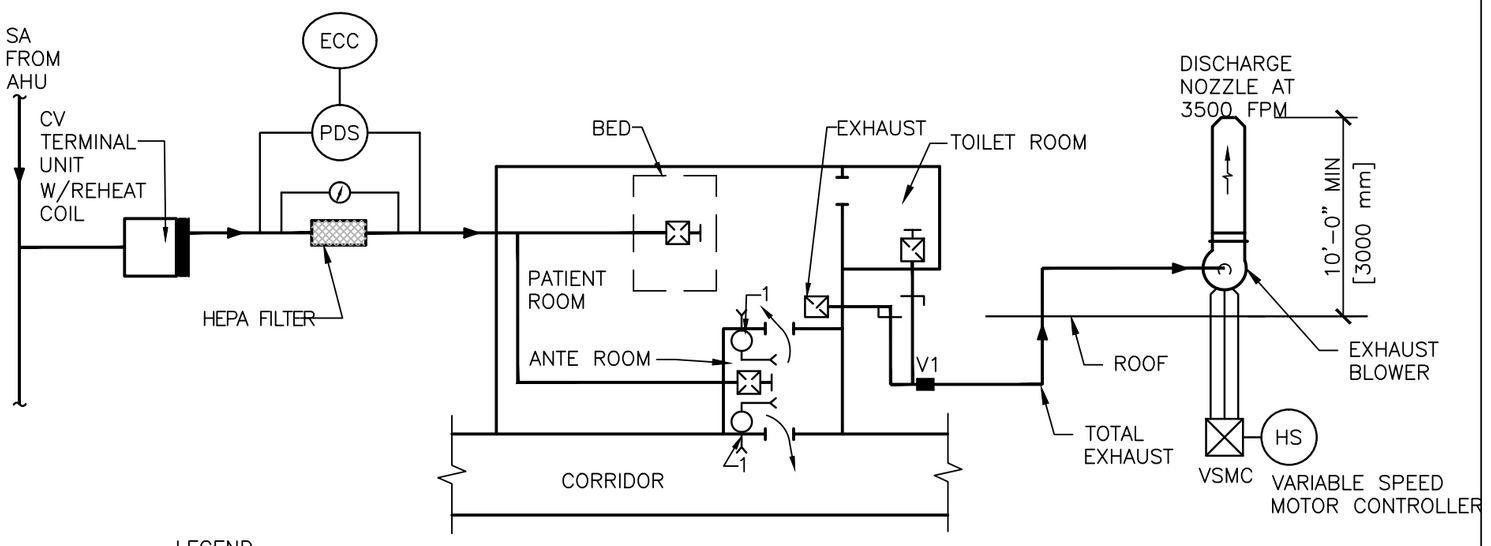
Department of Veterans Affairs

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

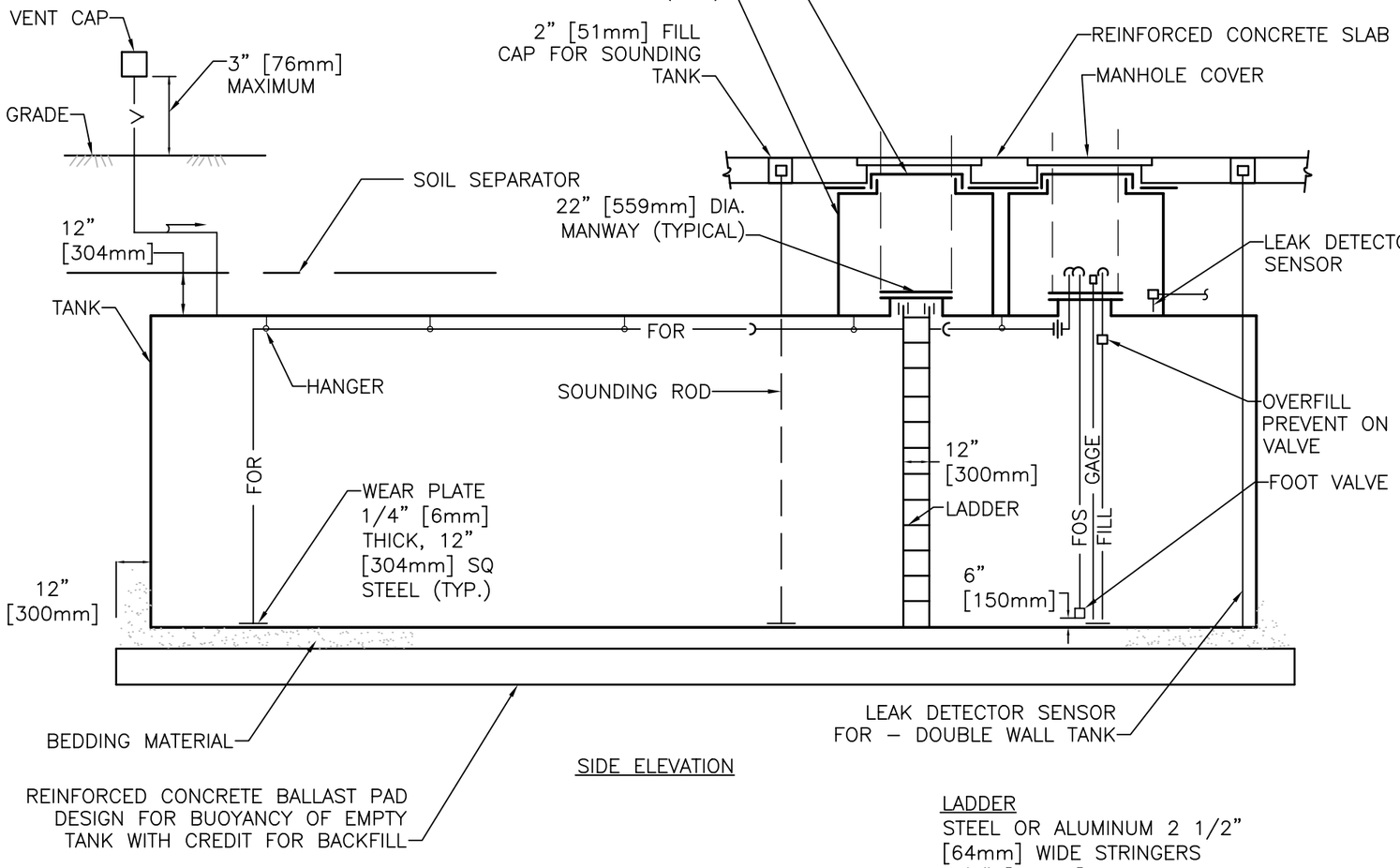
DETAIL TITLE / AIR SYSTEM FOR COMBINATION AIRBORNE INFECTION ISOLATION/ PROTECTIVE ENVIRONMENT ROOM W/POSITIVE ANTE ROOM

SCALE :NONE

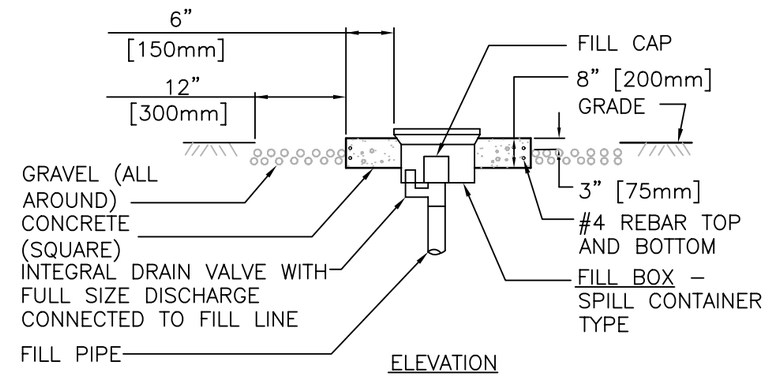
DATE ISSUED: MAY 2011

CAD DETAIL NO.: SD230923-20.DWG

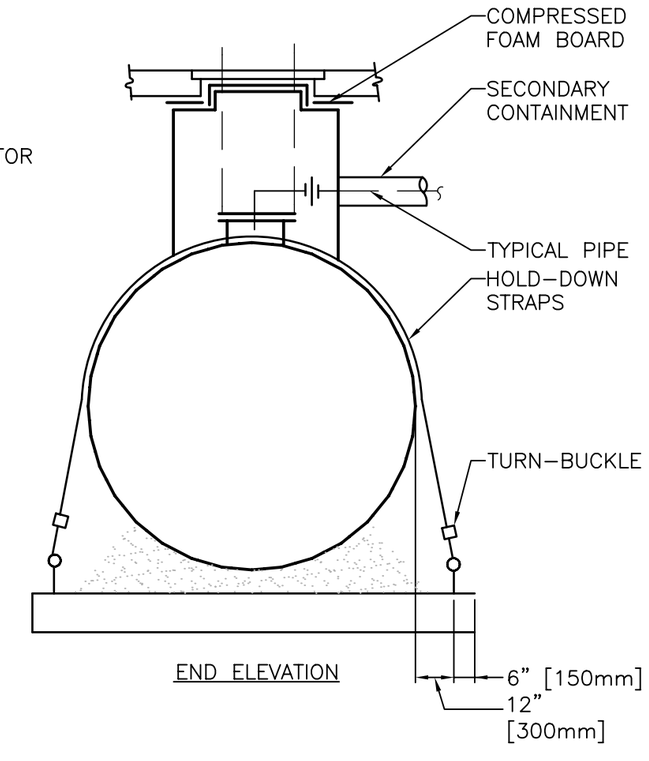
NOTE: THIS DETAIL SHOWS BASIC REQUIREMENTS ONLY AND IS NOT INTENDED FOR USE ON PROJECT DRAWINGS. THE PROJECT ENGINEER MUST PROVIDE A COMPLETE DESIGN WHICH CONFORMS TO PROJECT REQUIREMENTS.



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

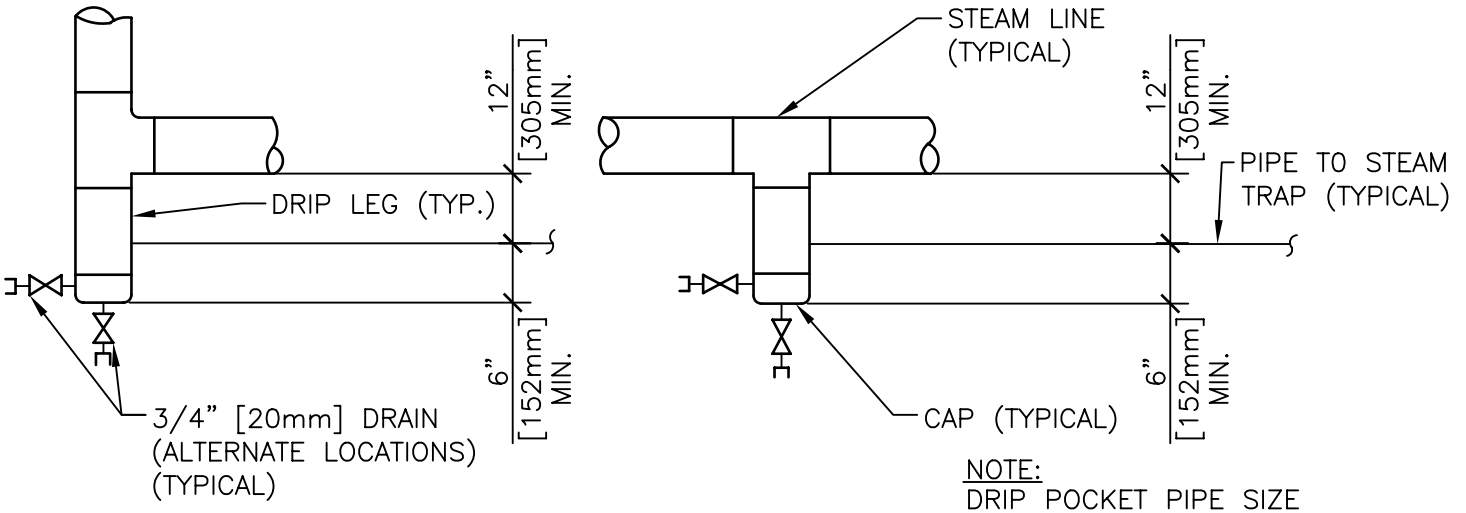
Department of Veterans Affairs

DETAIL TITLE / STEAM LINE DRIP POCKET
STEAM TRAP ASSEMBLY

SCALE :NONE

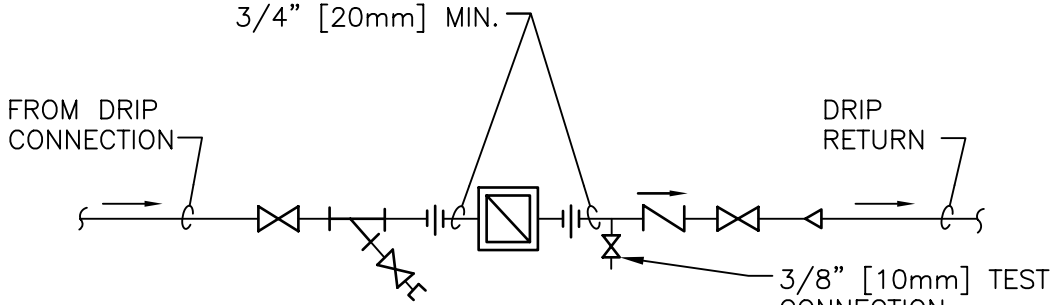
DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD232111-01.DWG



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

STEAM LINE DRIP POCKET

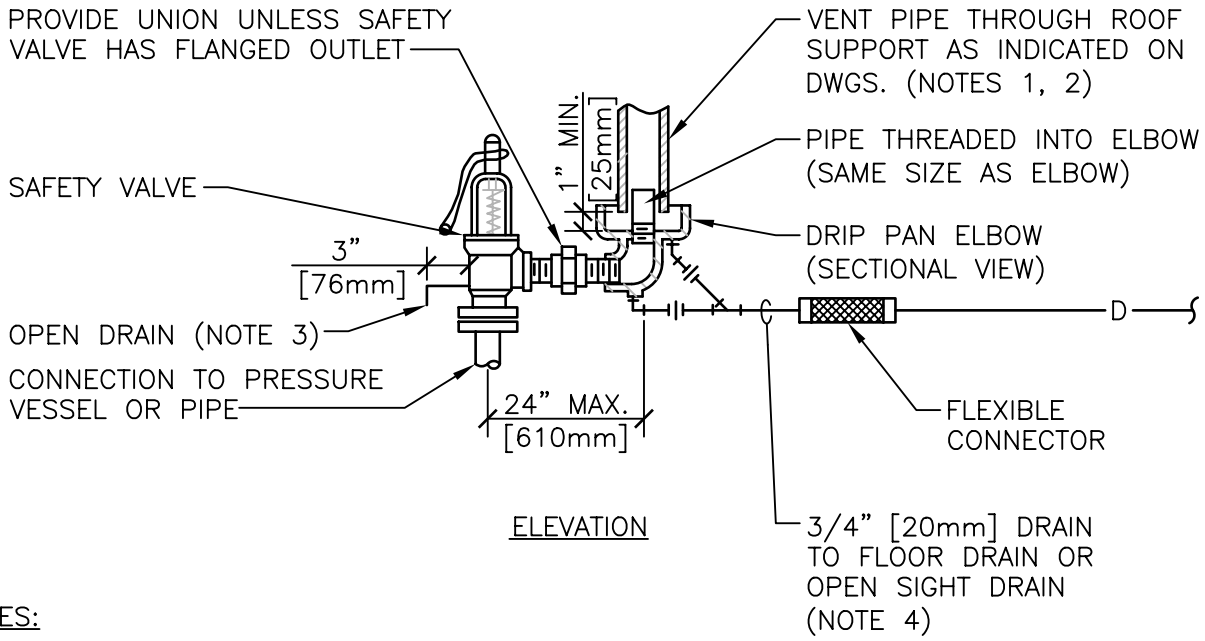


STEAM TRAP ASSEMBLY

STEAM LINE DRIP POCKET
STEAM TRAP ASSEMBLY

#

NTS



ELEVATION

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 6' [1829mm] MIN. ABOVE FINISHED ROOF.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

STEAM SAFETY VALVE

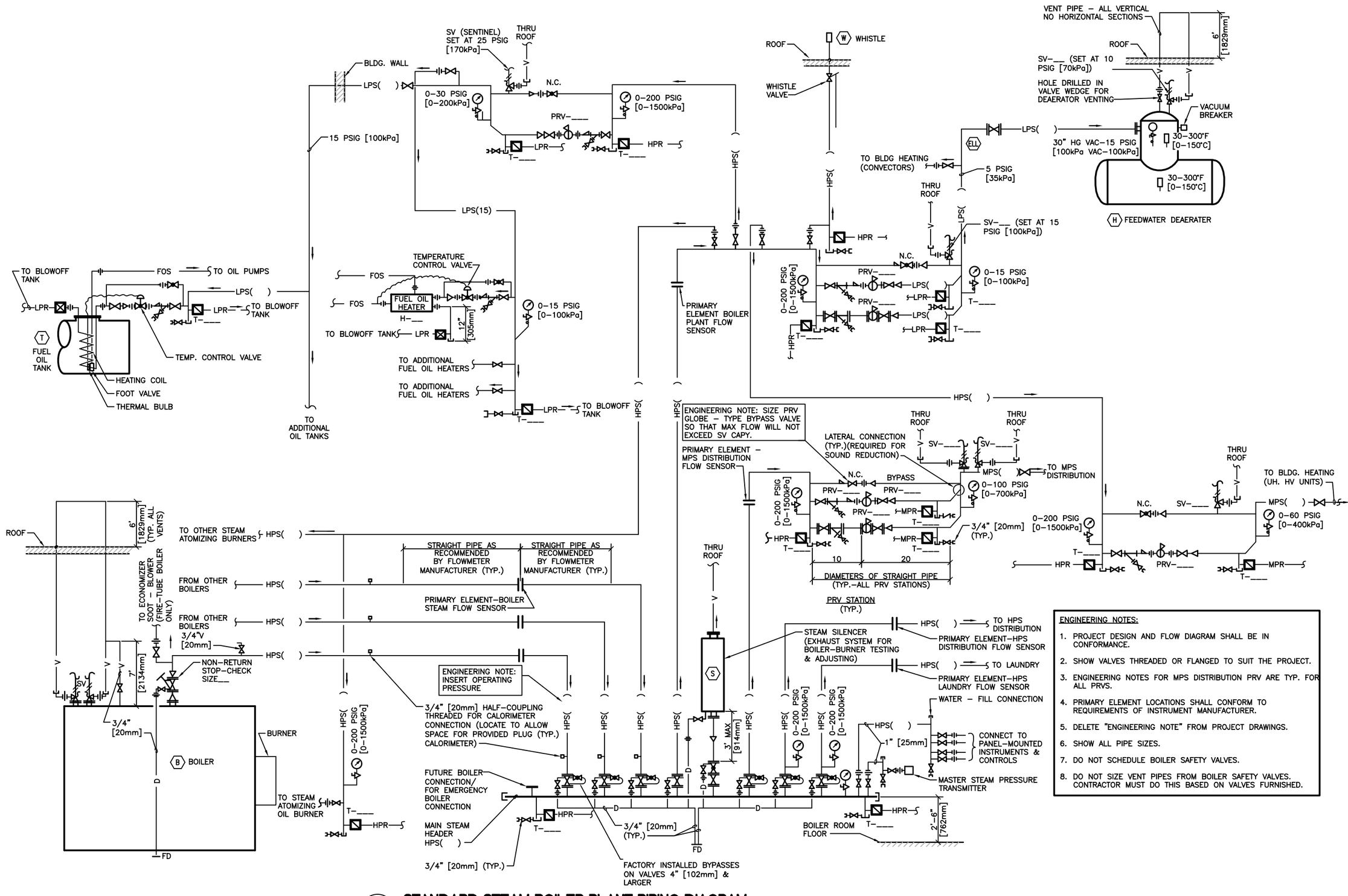
NTS

Department of Veterans Affairs

DETAIL TITLE / STEAM SAFETY VALVE

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232111-02.DWG



ENGINEERING NOTES:

1. PROJECT DESIGN AND FLOW DIAGRAM SHALL BE IN CONFORMANCE.
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 "ENGINEERING NOTE" FROM PROJECT DRAWINGS.
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.

STANDARD STEAM BOILER PLANT PIPING DIAGRAM

NTS

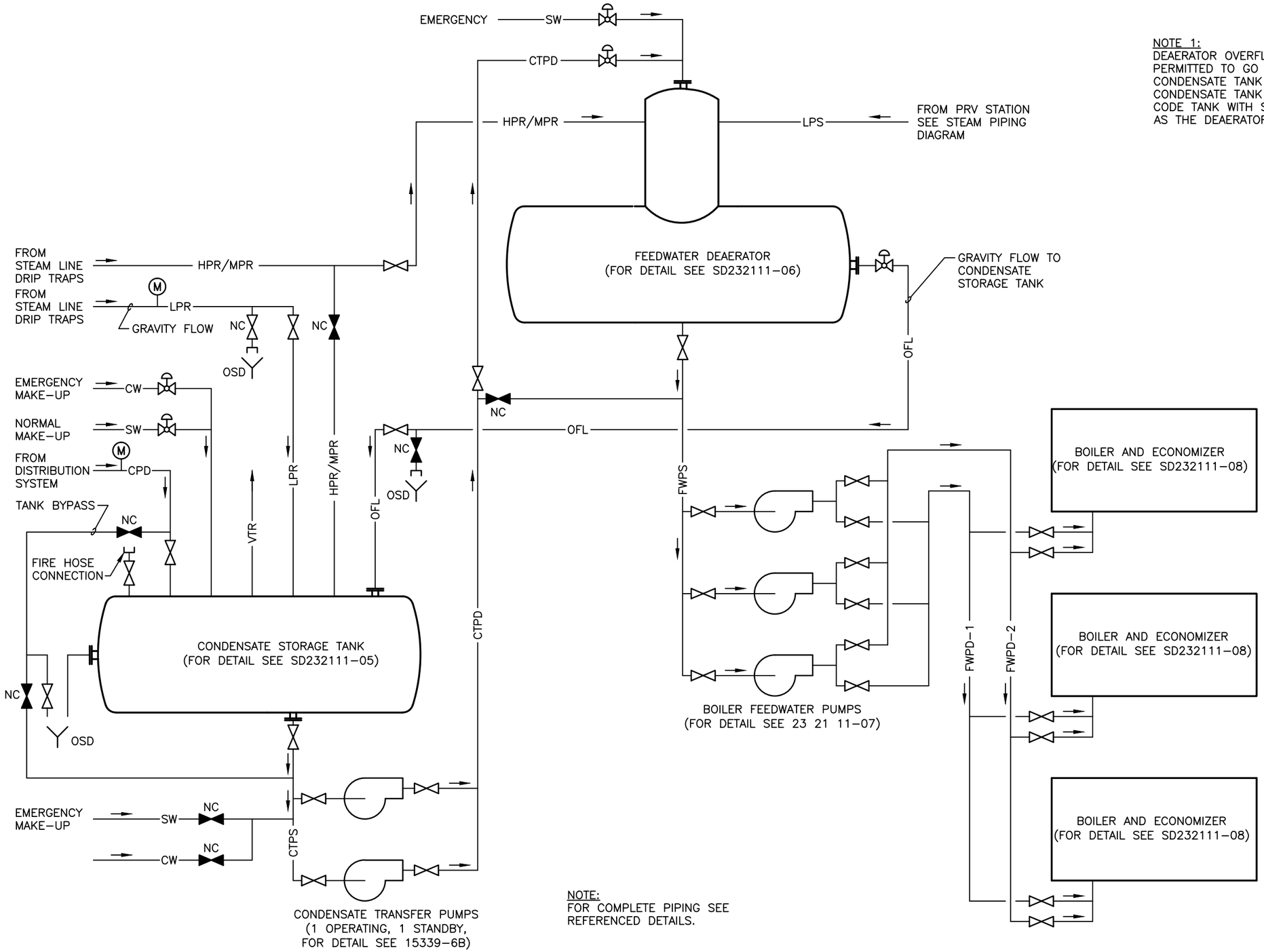
DETAIL TITLE / STANDARD STEAM BOILER PLANT PIPING DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD2321111–03.DWG

Department of Veterans Affairs



NOTE 1:
DEAERATOR OVERFLOW ONLY PERMITTED TO GO TO CONDENSATE TANK IF THE CONDENSATE TANK IS A ASME CODE TANK WITH SAME MAWP AS THE DEAERATOR.

NOTE:
FOR COMPLETE PIPING SEE REFERENCED DETAILS.

BASIC FLOW DIAGRAM – CONDENSATE AND BOILER FEEDWATER

NTS

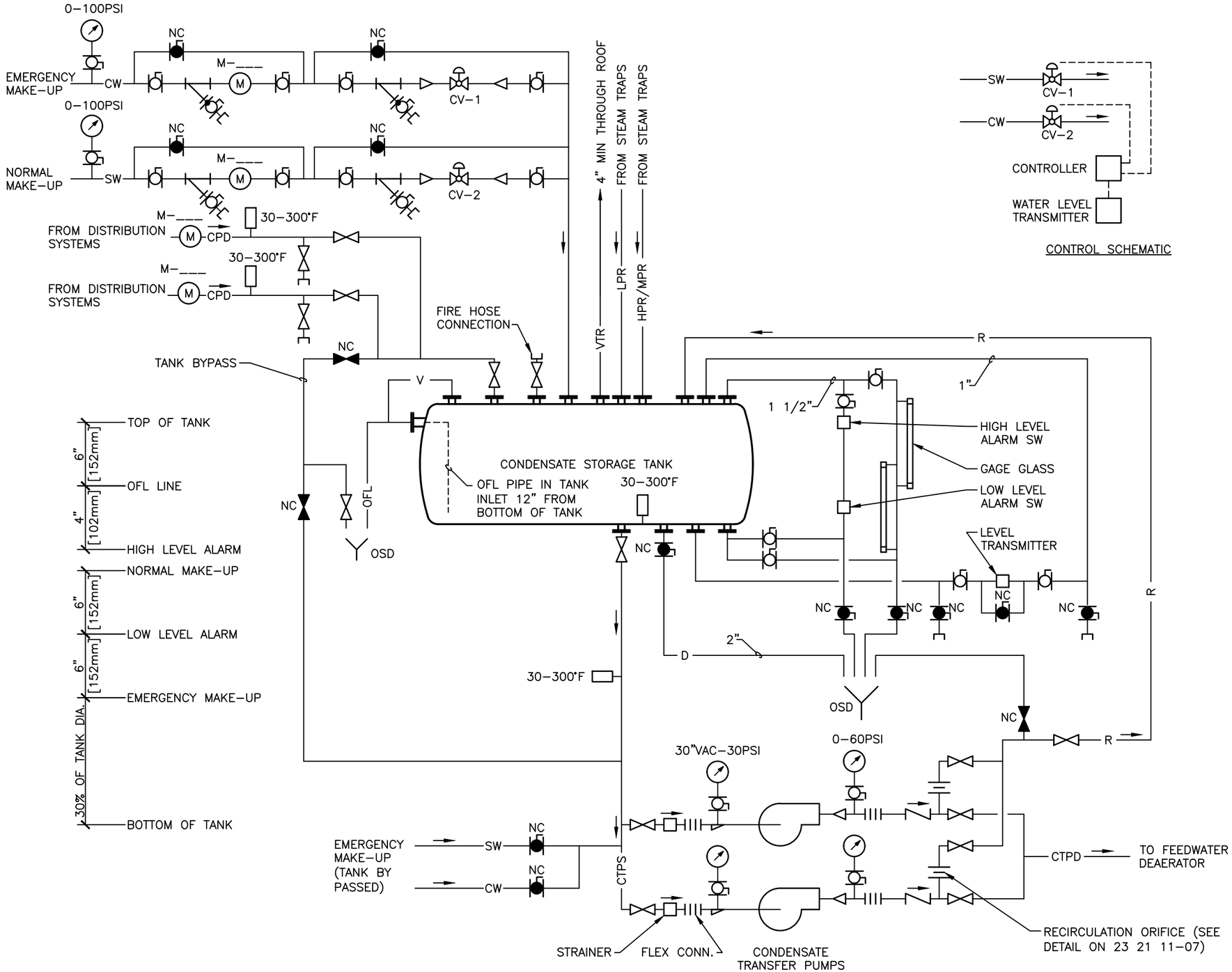
DETAIL TITLE / CONDENSATE, BOILER FEEDWATER, BLOWOFF, CHEMICAL FEED, WATER SAMPLE

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD232111–04.DWG

Department of Veterans Affairs



CONDENSATE STORAGE AND TRANSFER FLOW DIAGRAM

NTS

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

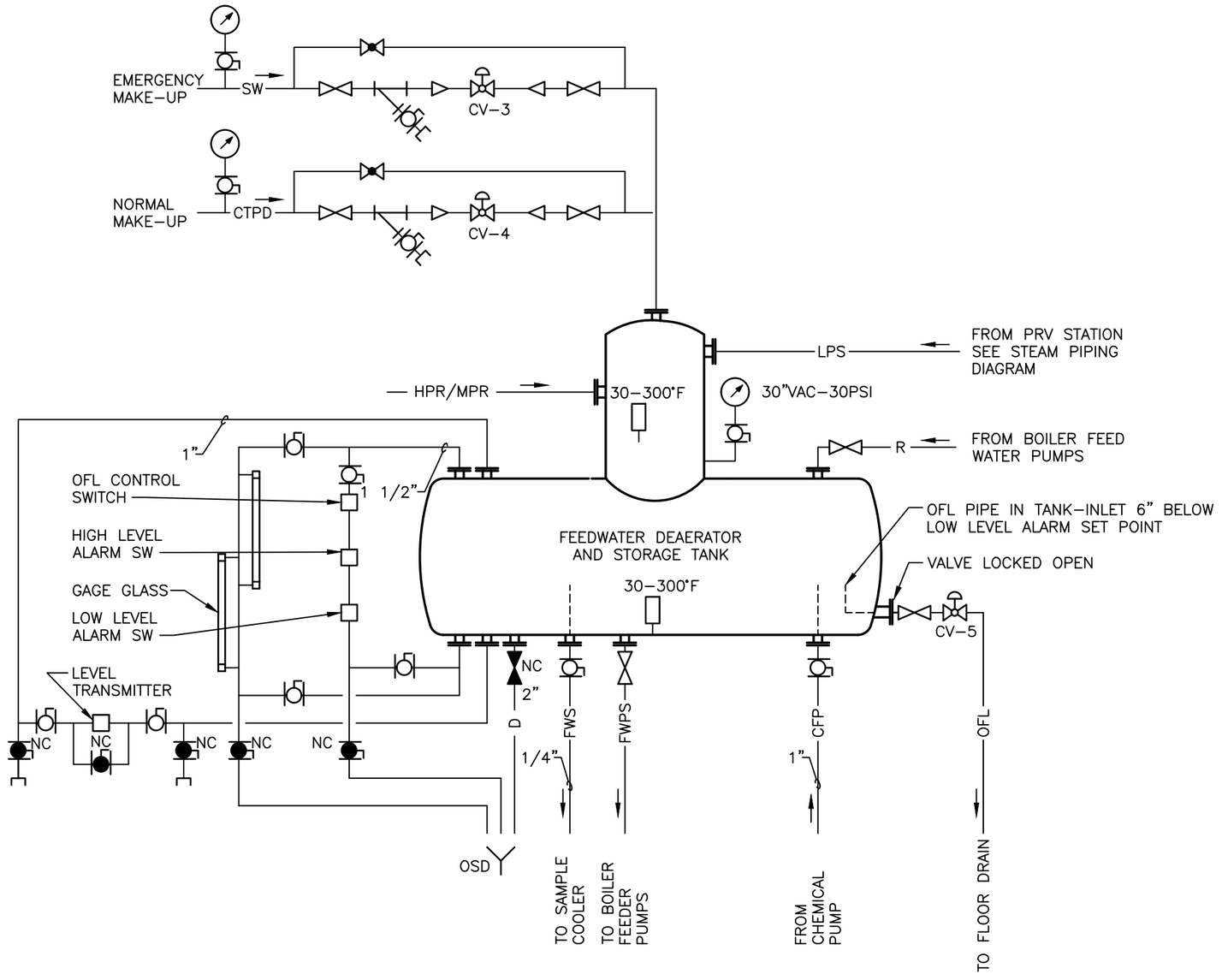
DETAIL TITLE / CONDENSATE STORAGE AND TRANSFER FLOW DIAGRAM

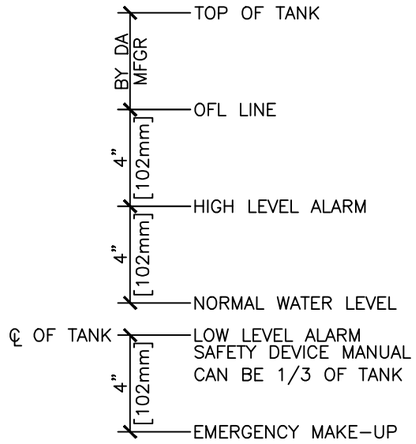
SCALE :NONE

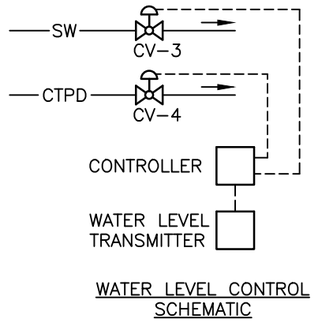
DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD232111–05.DWG

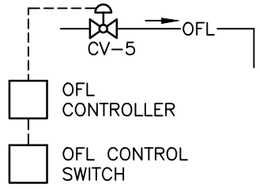
Department of Veterans Affairs







WATER LEVEL CONTROL SCHEMATIC



OVERFLOW CONTROL SCHEMATIC

FEEDWATER DEAERATOR FLOW DIAGRAM

NTS

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

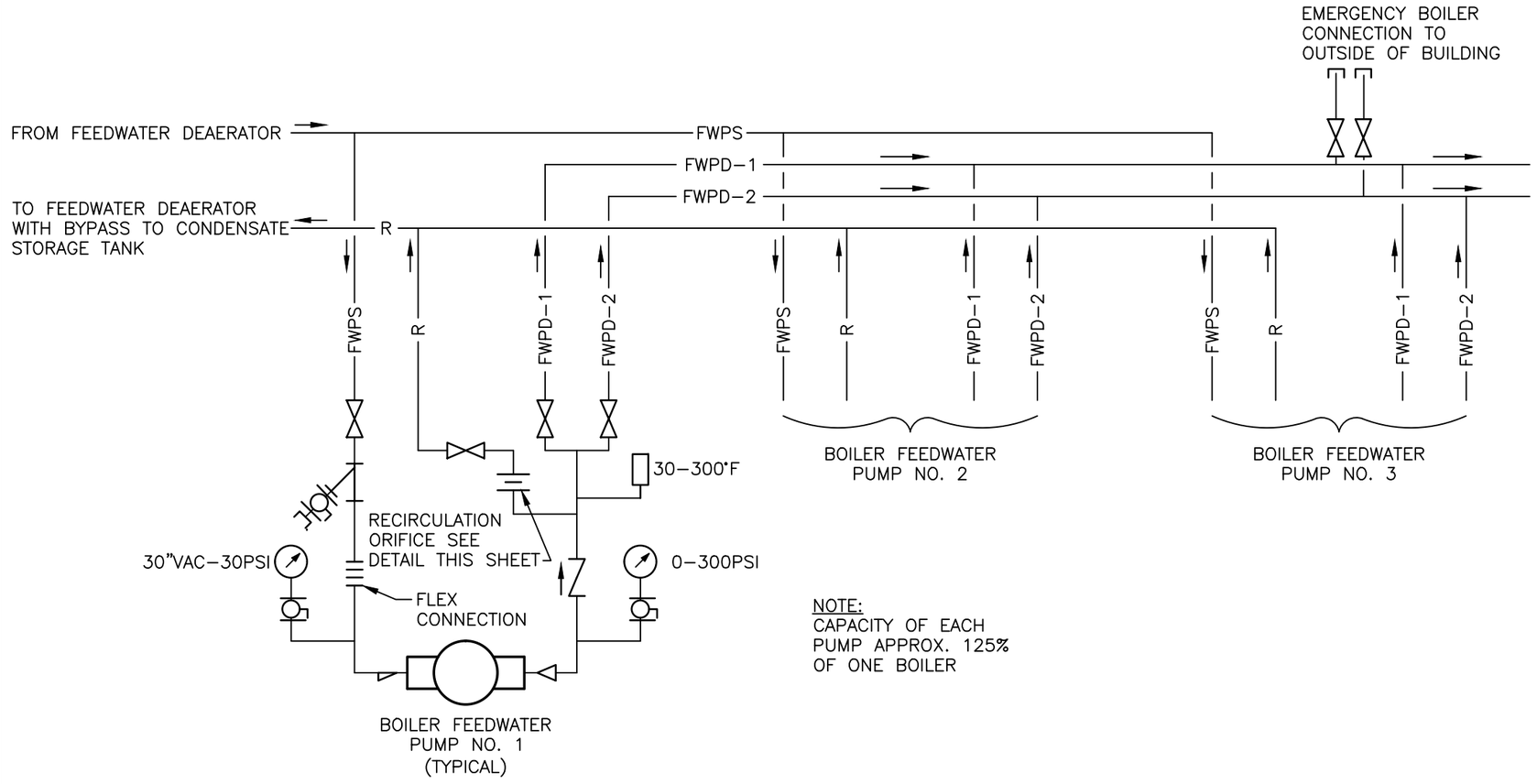
DETAIL TITLE / FEEDWATER DEAERATOR FLOW DIAGRAM

SCALE :NONE

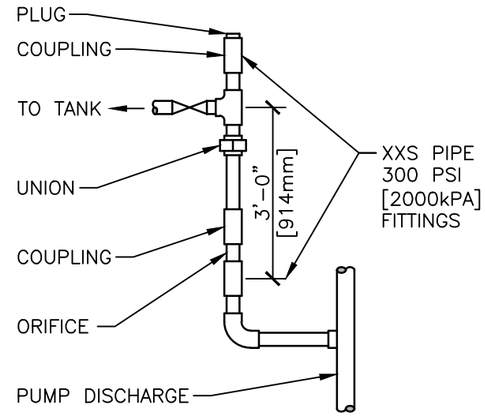
DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD232111-06.DWG

Department of Veterans Affairs



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



DETAIL – PUMP RECIRCULATION ORIFICE ASSEMBLY

BOILER FEEDWATER PUMPS FLOW DIAGRAM

NTS

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

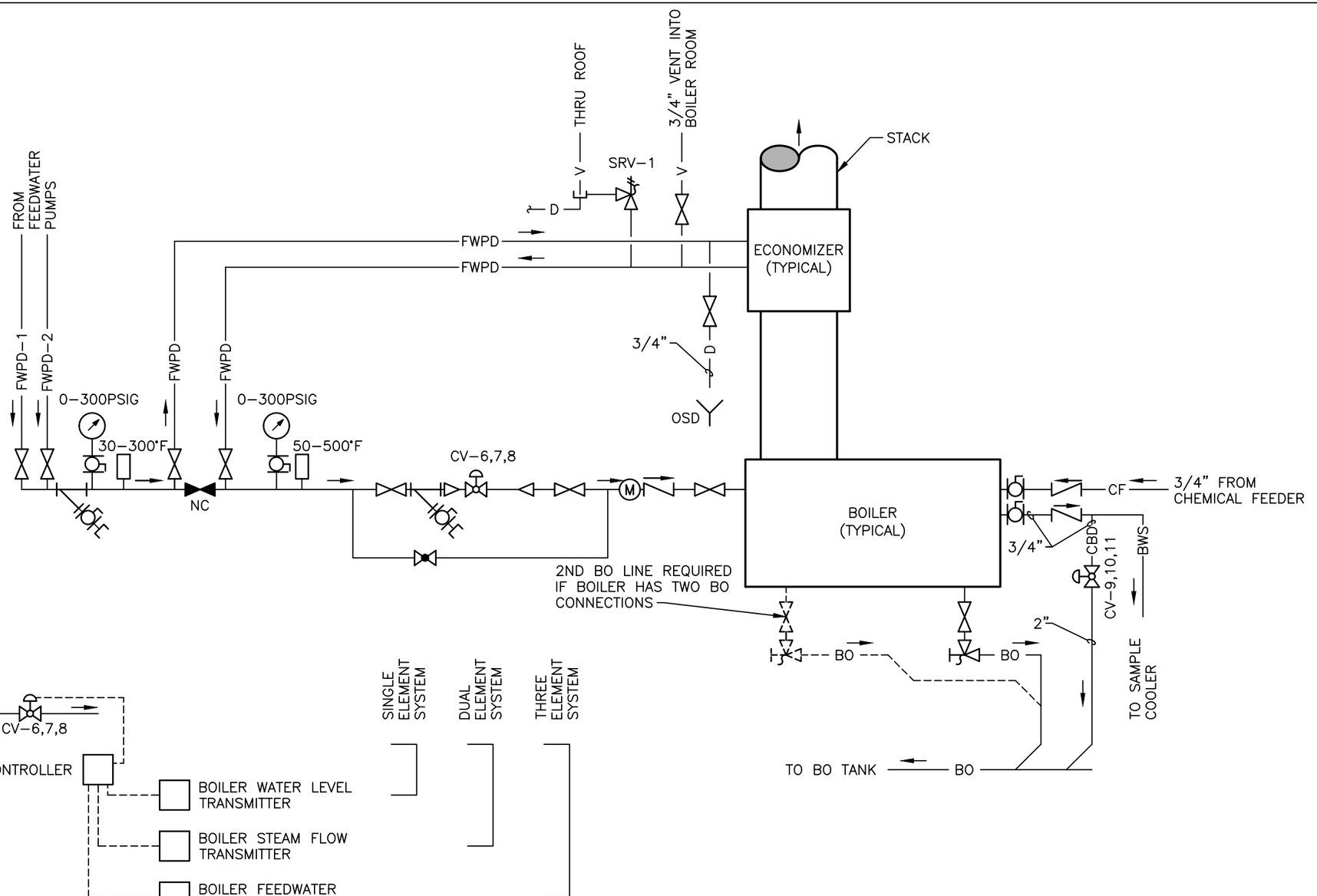
DETAIL TITLE / BOILER FEEDWATER PUMPS FLOW DIAGRAM

SCALE :NONE

DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD232111-07.DWG

Department of Veterans Affairs



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

BOILER FLOW DIAGRAM

NTS

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

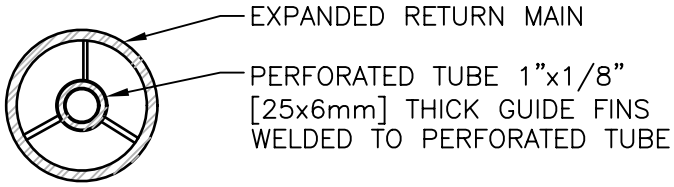
DETAIL TITLE / BOILER FLOW DIAGRAM

SCALE :NONE

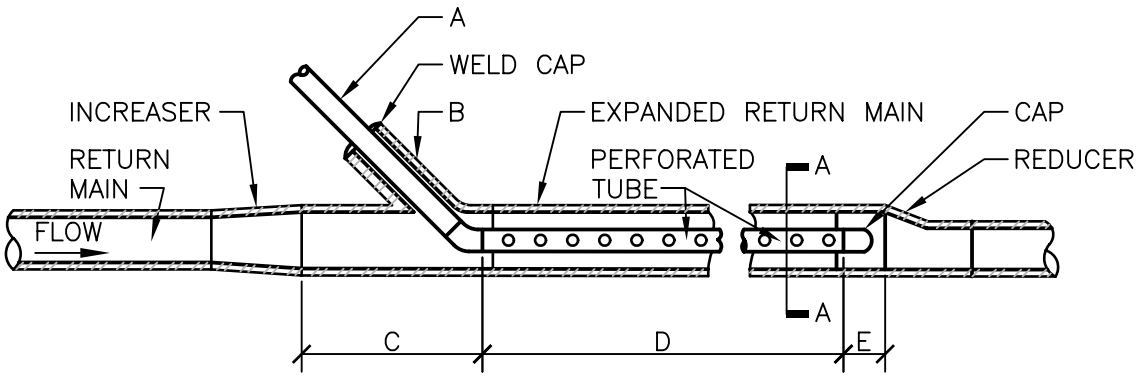
DATE ISSUED: SEPTEMBER 2010

CAD DETAIL NO.: SD232111-08.DWG

Department of Veterans Affairs



SECTION A–A



SECTION–EXPANDED RETURN MAIN

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

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

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

HIGH AND MEDIUM PRESSURE STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE RETURN LINE

#

NTS

Department of Veterans Affairs

DETAIL TITLE / HIGH AND MEDIUM PRESSURE STEAM TRAP DISCHARGE INTO PUMPED CONDENSATE RETURN LINE

SCALE :NONE

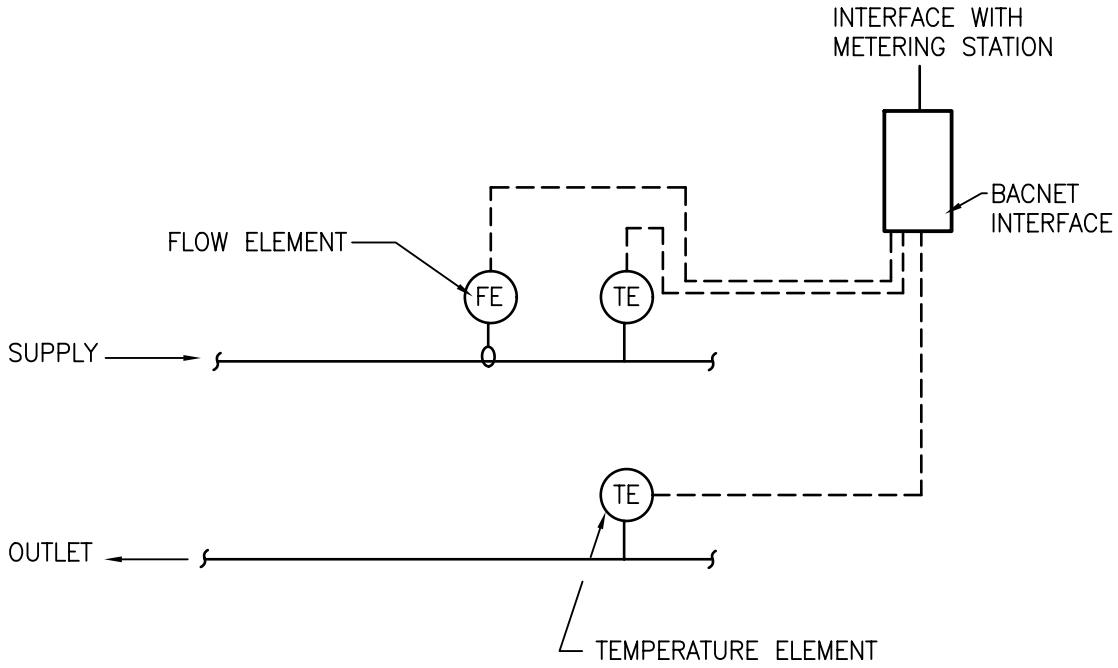
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232111–09.DWG

Department of Veterans Affairs

DETAIL TITLE / WATER FLOW MEASURING STATION

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232113-01.DWG



NOTE:

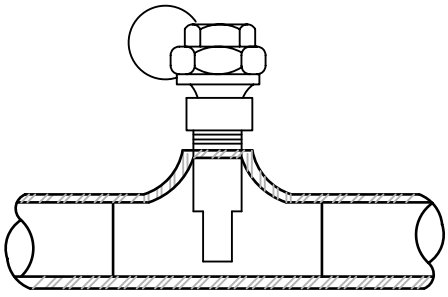
1. MAINTAIN UPSTREAM AND DOWN STREAM DISTANCES RECOMMENDED BY METER MANUFACTURES

WATER FLOW MEASURING STATION (WITH BTU METER)

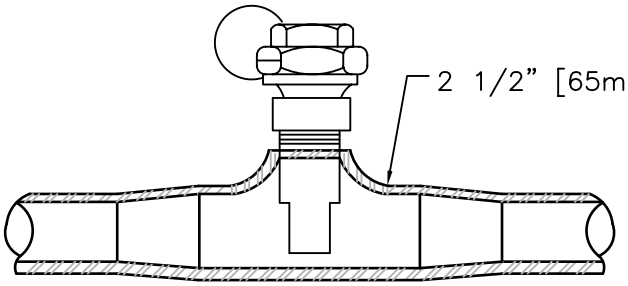
NTS

DESIGNER'S NOTE:

1. MODIFY DETAIL AS REQUIRED TO BE PROJECT SPECIFIC FOR THE TYPE OF METER BEING USED.

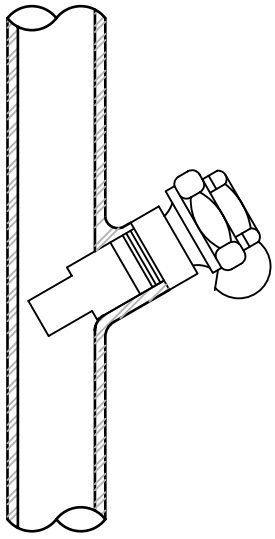


ABOVE 2" [50mm] DIA. PIPE

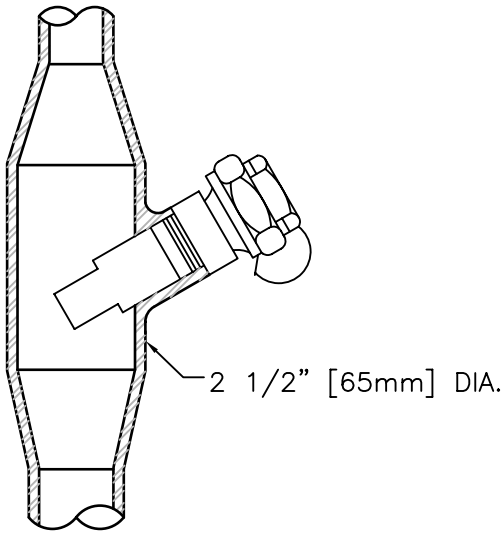


2" [50mm] DIA. & SMALLER

HORIZONTAL



ABOVE 2" [50mm] DIA. PIPE



2" [50mm] DIA. & SMALLER

VERTICAL

INSTALLATION OF THERMOMETER WELLS

NTS

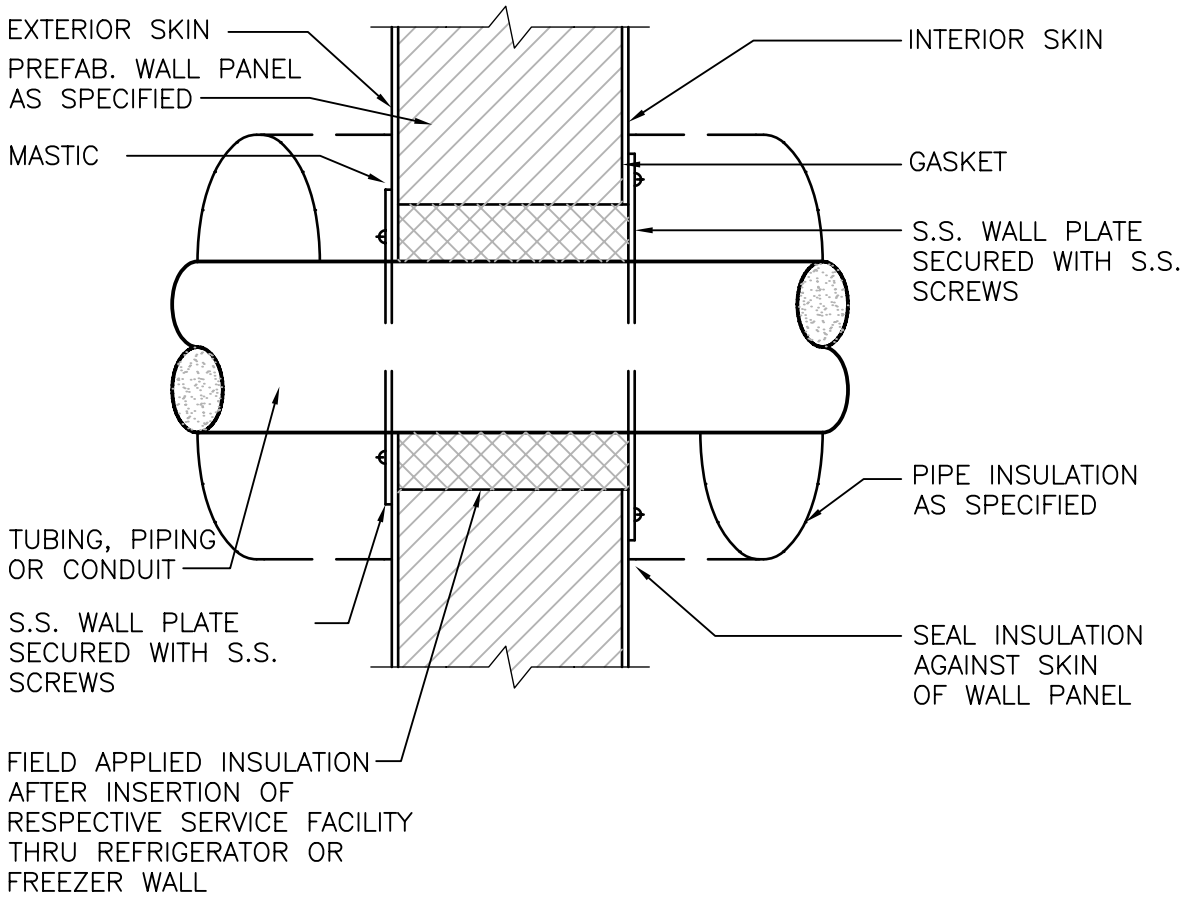
Department of Veterans Affairs

DETAIL TITLE / INSTALLATION OF THERMOMETER WELLS

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD232113-02.DWG



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

#

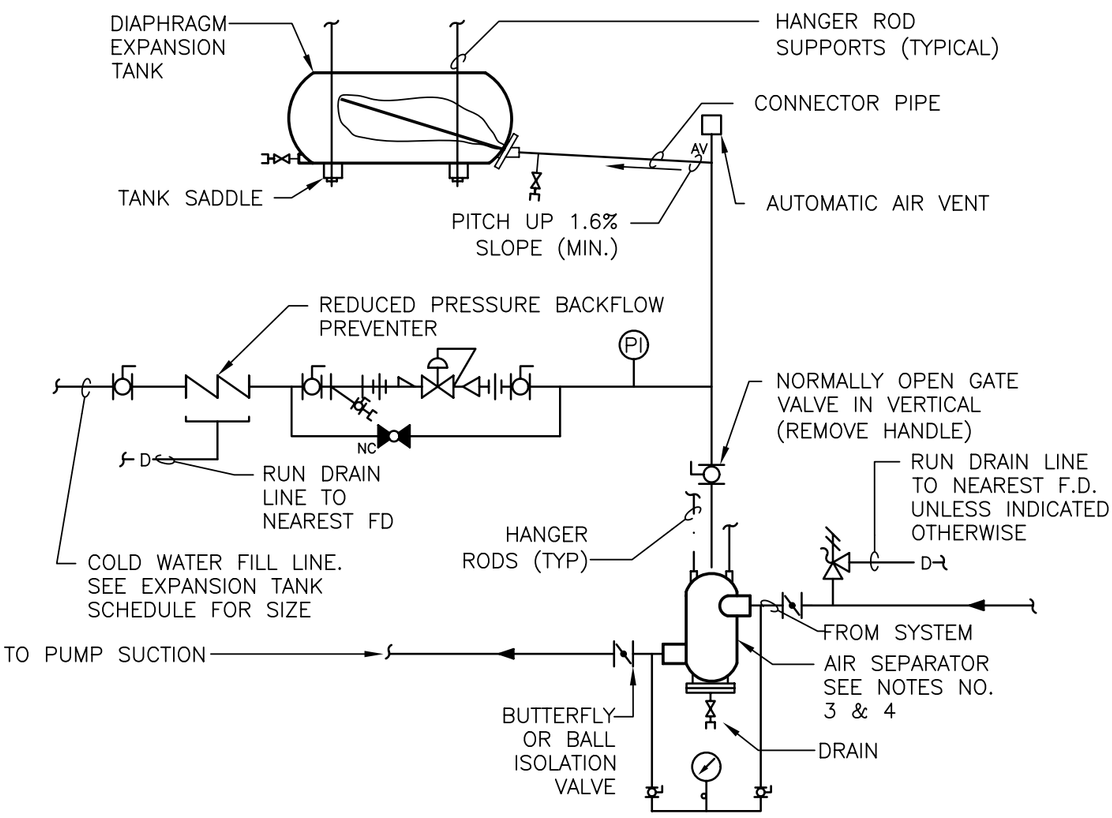
NTS

Department of Veterans Affairs

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

SCALE :NONE

DATE ISSUED :DECEMBER 2008 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 2" [50mm] 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 4 PSIG. [28kPa]

HORIZONTAL EXPANSION TANK - PIPING CONNECTIONS

#

NTS

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.

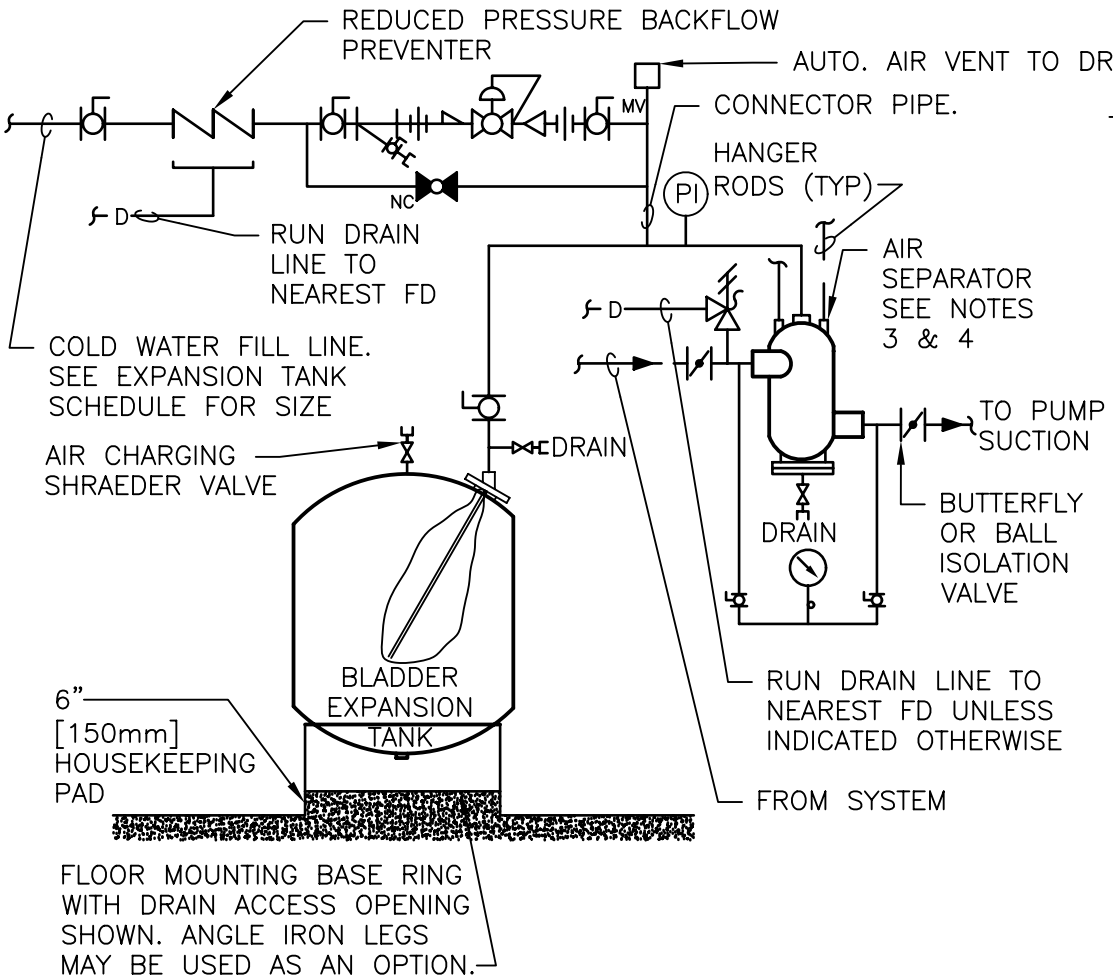
Department of Veterans Affairs

DETAIL TITLE / FLOOR MOUNTED EXPANSION TANK-PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD232113-05.DWG



NOTE:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. FOR HOT WATER SYSTEMS 2" [50mm] 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 4 PSIG [28kPa].

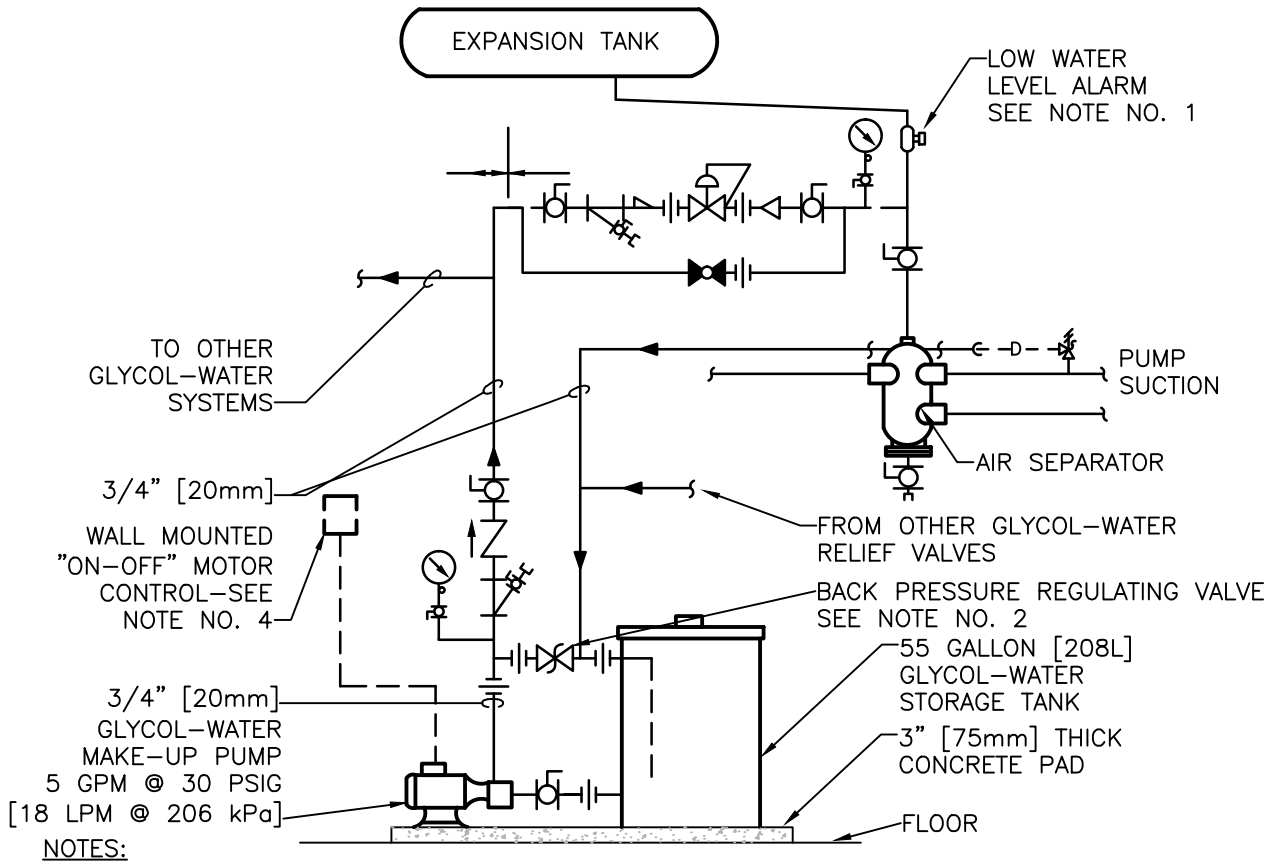
FLOOR MOUNTED EXPANSION TANK - PIPING CONNECTIONS

#

NTS

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.



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.

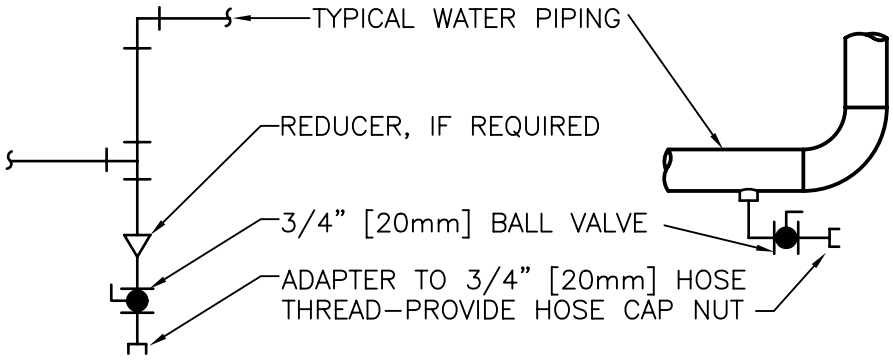
Department of Veterans Affairs

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

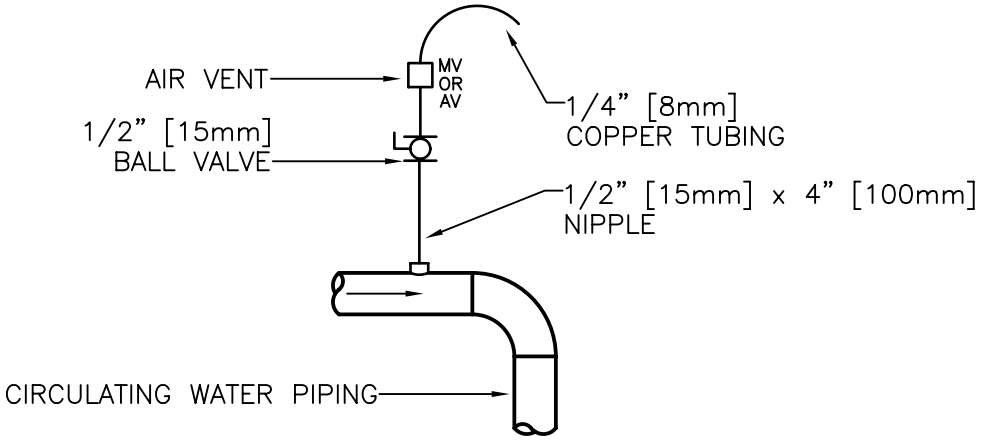
ELEVATION
WELDED PIPING

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)

#

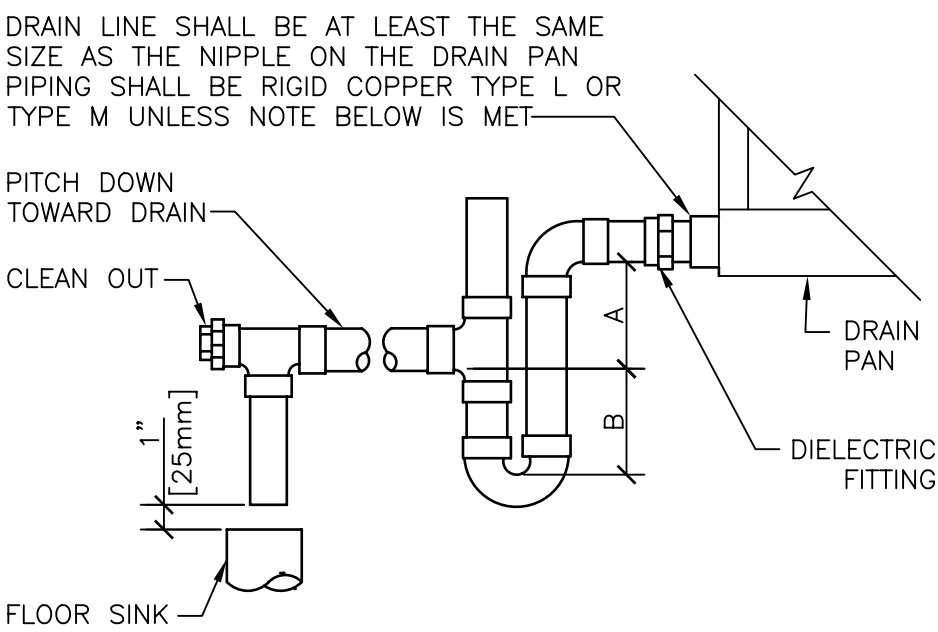
NTS

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

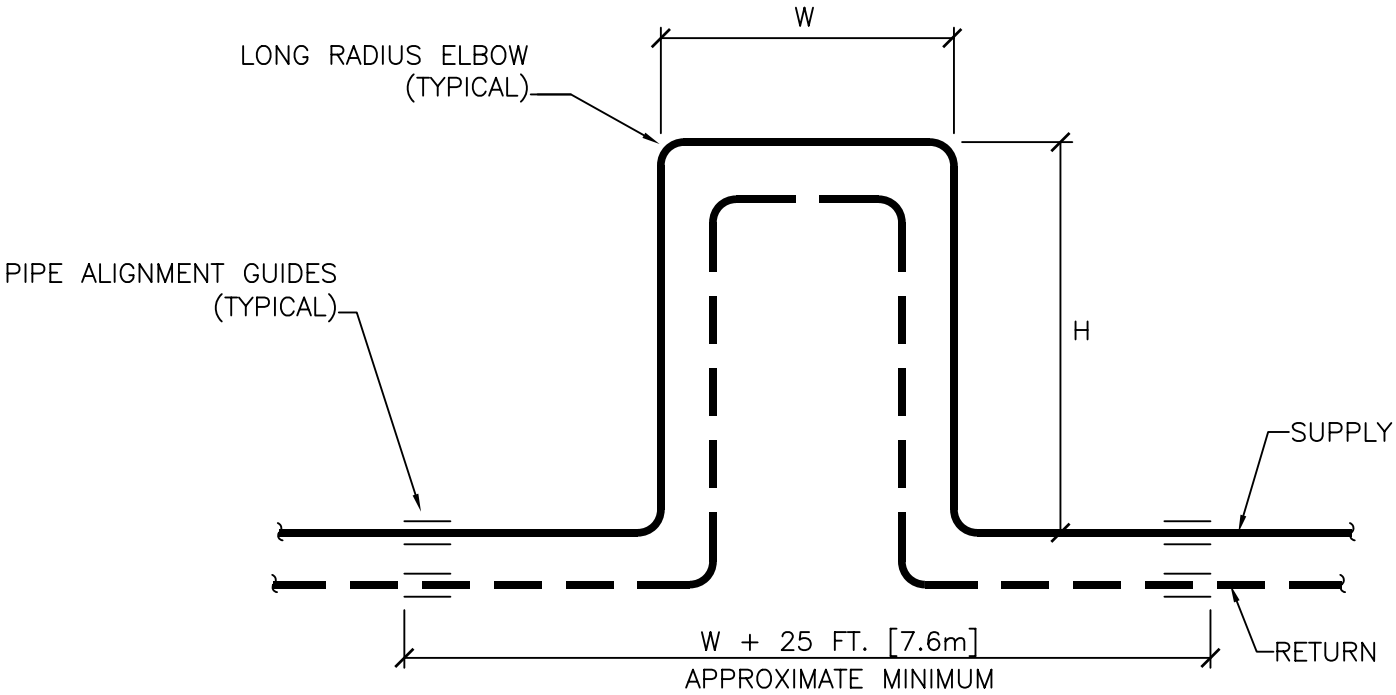
NTS

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

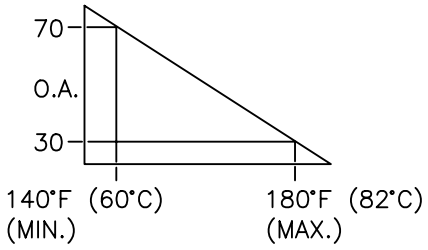
CADD DETAIL NO. : SD232113–09.DWG

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.



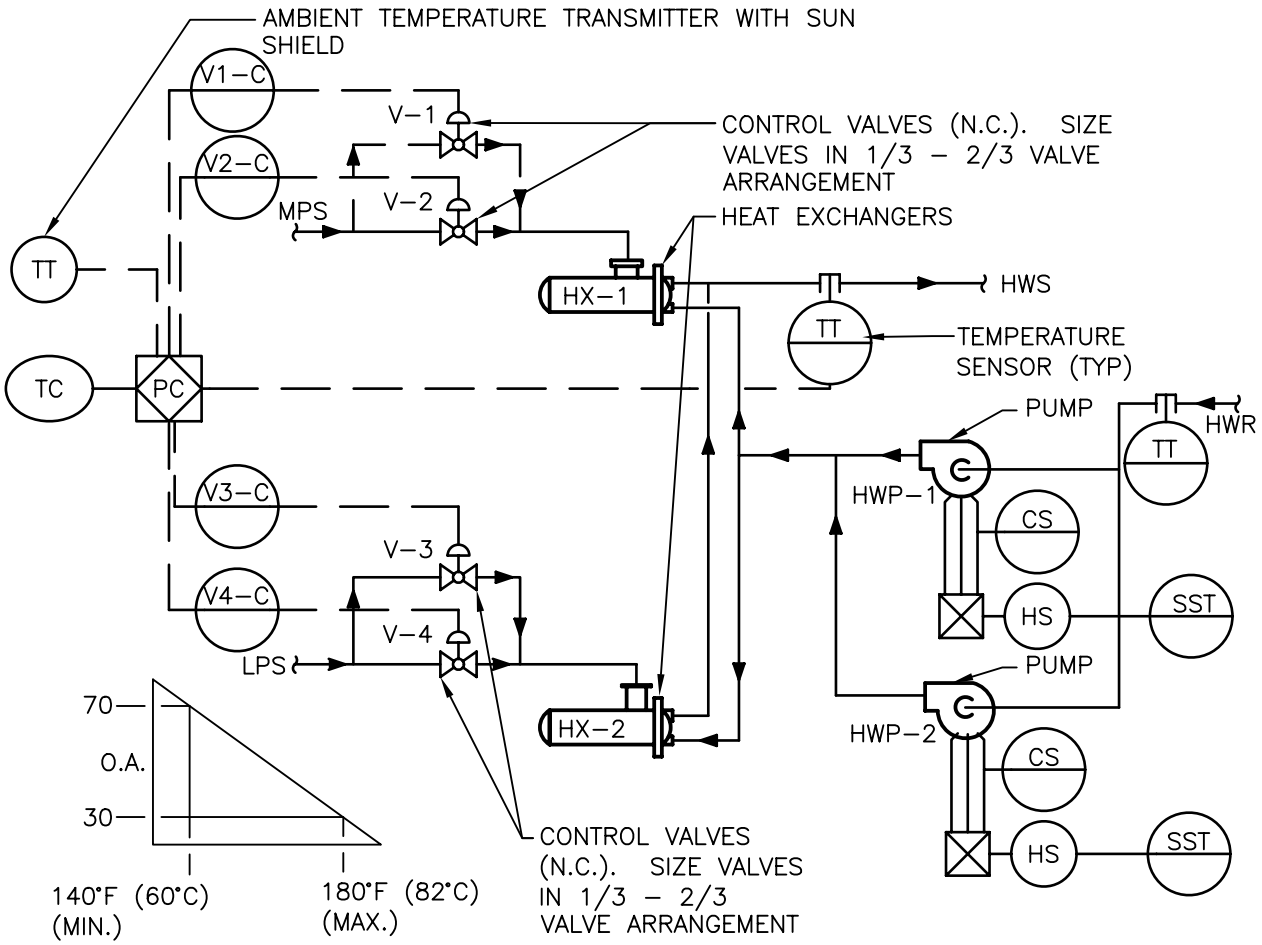
TYP OSA RESET SCHEDULE

VALVE SEQUENCE:

1. V1 ⅓ CAPACITY) MODULATING FULLY OPEN TO MAINTAIN SET POINT

2 .V2 ⅔ CAPACITY) MODULATE FULLY OPEN TO MAINTAIN SET POINT.

3. BOTH V1 & V2 MODULATE TOGETHER TO MAINTAIN SET POINT.



DUAL HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

#

NTS

Department of Veterans Affairs

DETAIL TITLE / DUAL HEAT EXCHANGER CONTROLS (HEATING SYSTEM)

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD232113-10.DWG

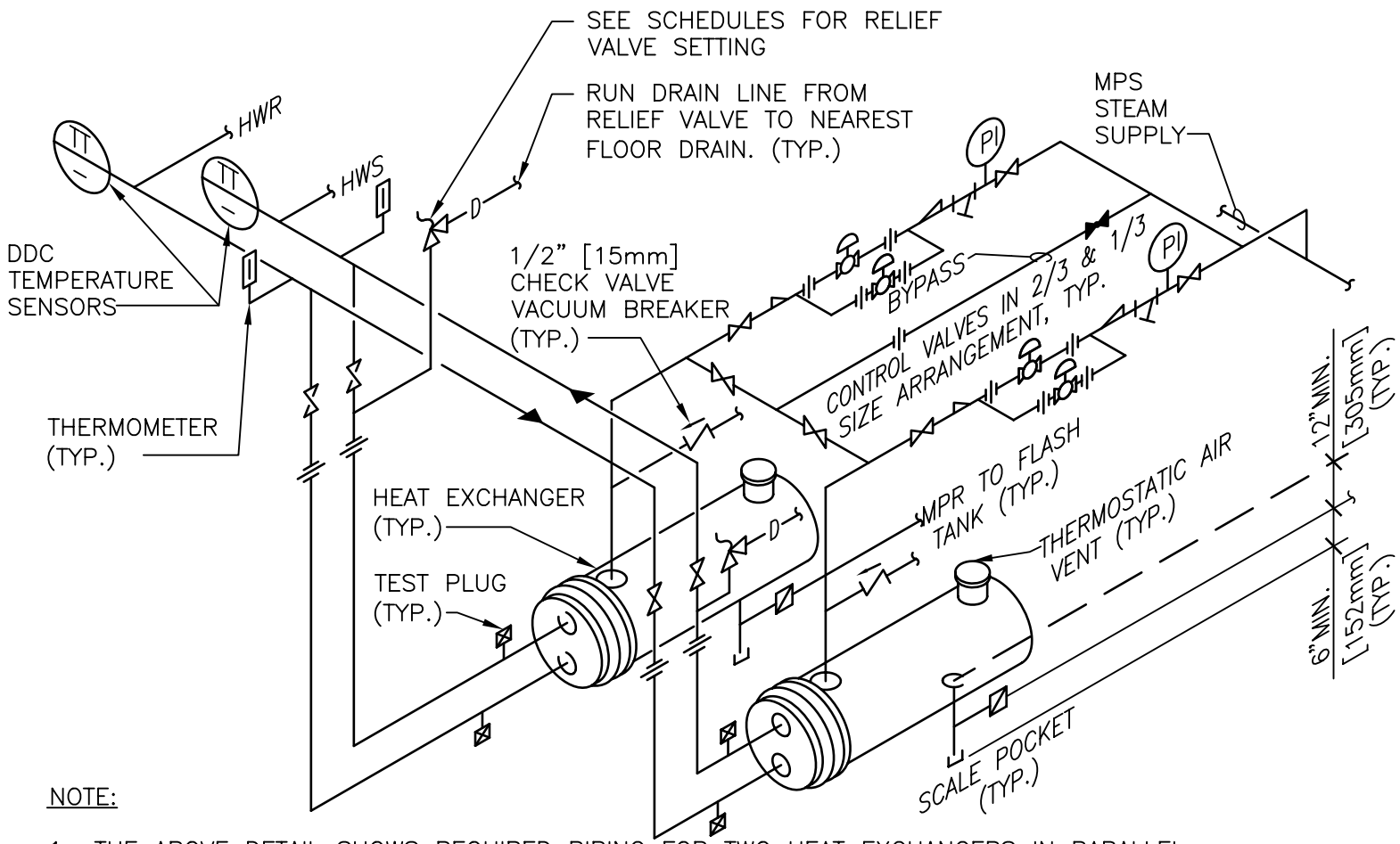
Department of Veterans Affairs

DETAIL TITLE / HEAT EXCHANGER - STEAM TO HOT WATER

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD232113-11.DWG

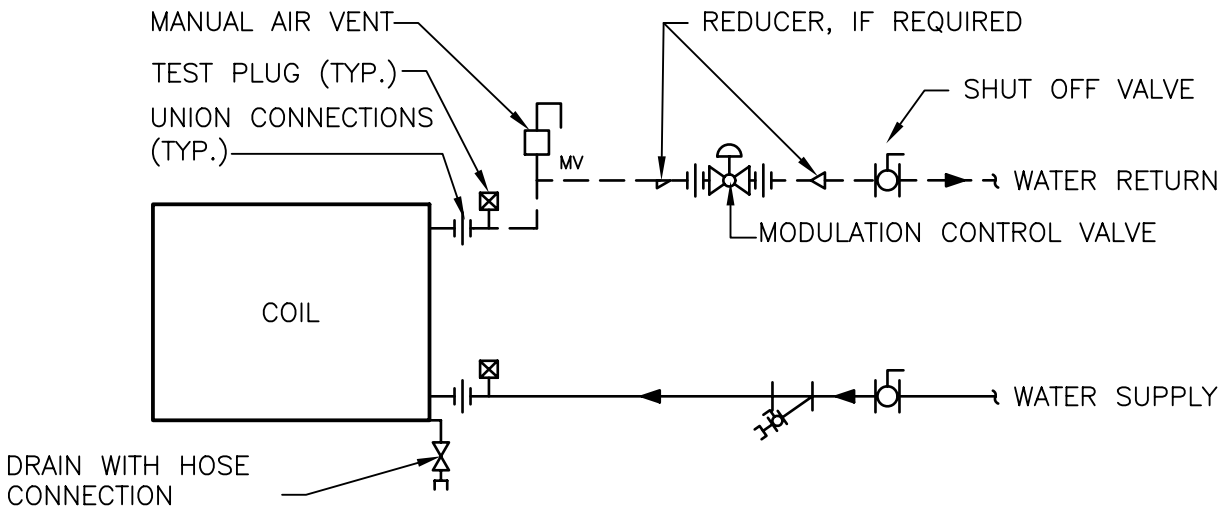


NOTE:

1. THE ABOVE DETAIL SHOWS REQUIRED PIPING FOR TWO HEAT EXCHANGERS IN PARALLEL.
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:

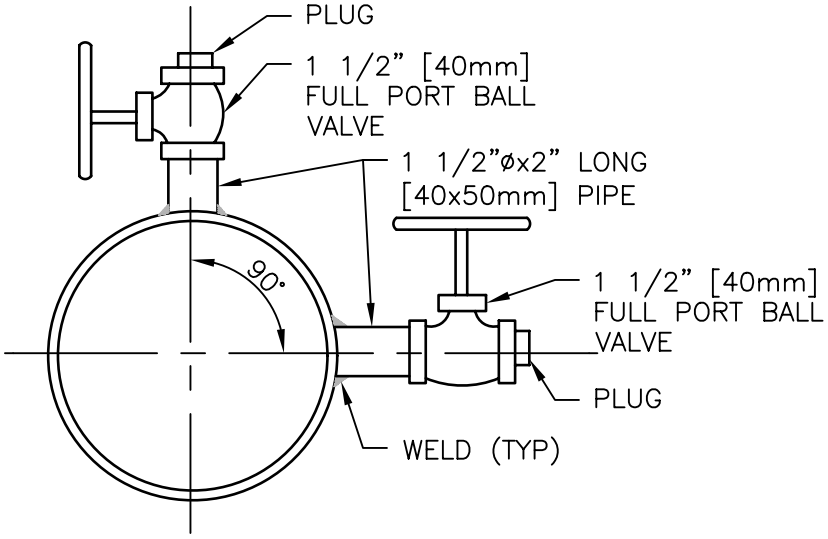
1. THIS DETAIL IS APPLICABLE TO: 2-PIPE FAN COIL UNITS (CHILLED OR HOT WATER)
   - VAV/CV AIR TERMINAL UNITS (REHEAT COIL)
   - DUCT-MOUNTED REHEAT COIL
   - CABINET UNIT HEATERS

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.

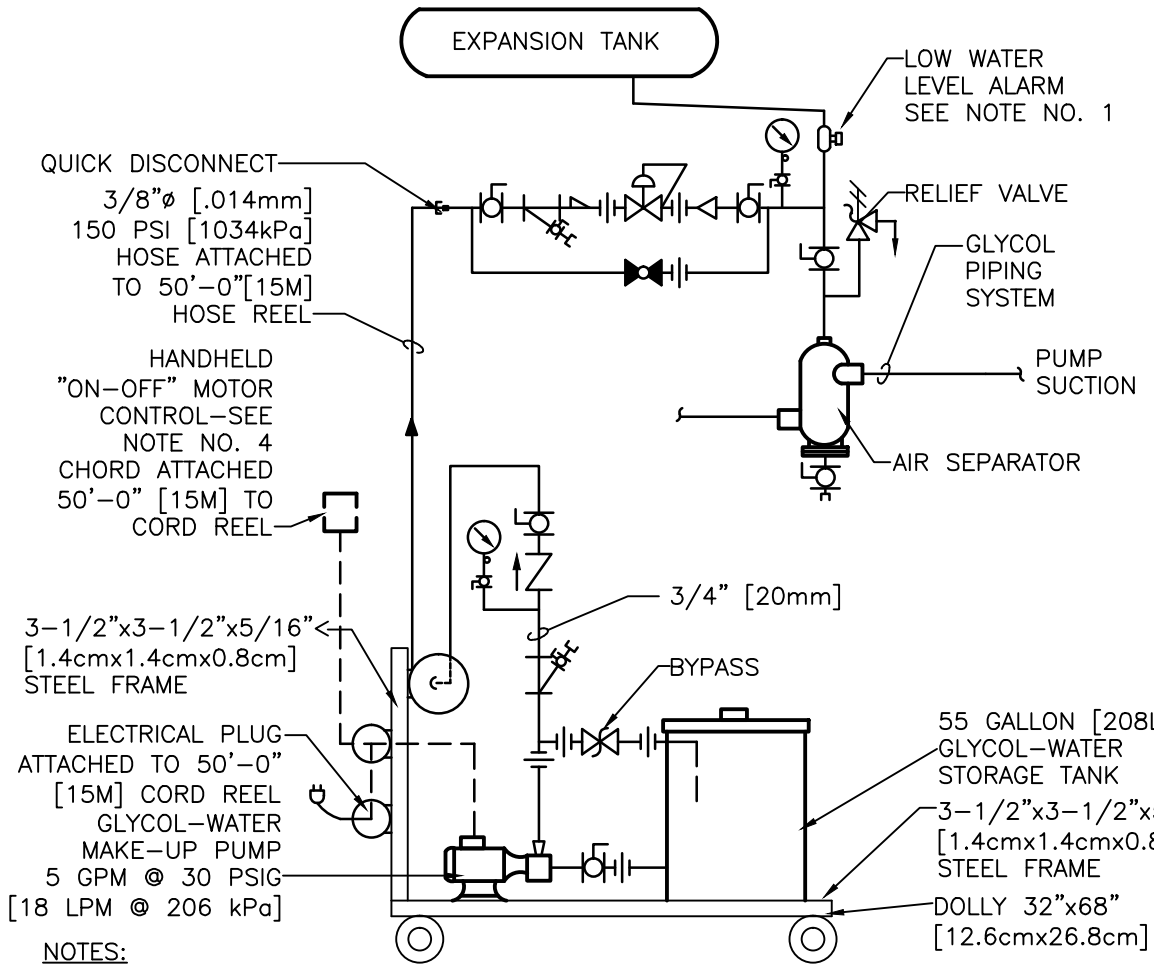
   EITHER TOP OR SIDE LOCATION. BOTH ARE NOT REQUIRED AT SAME LOCATION.

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.

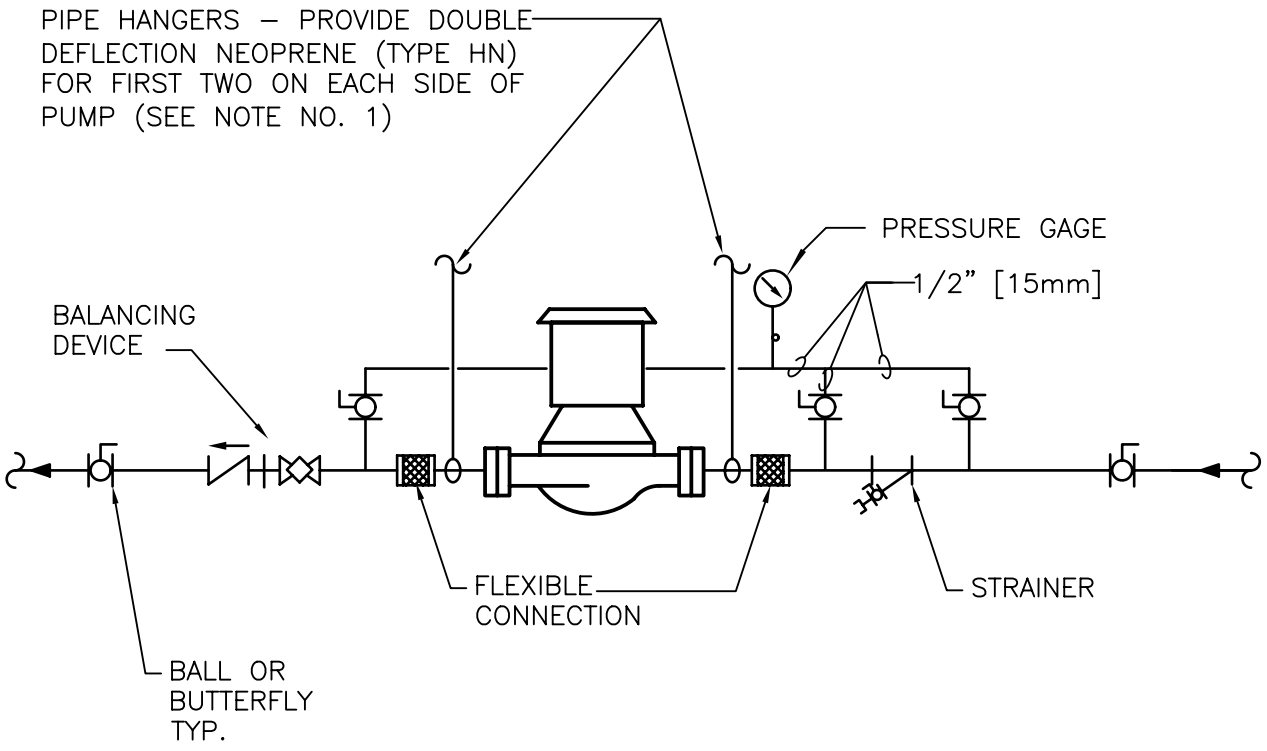
Department of Veterans Affairs

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:

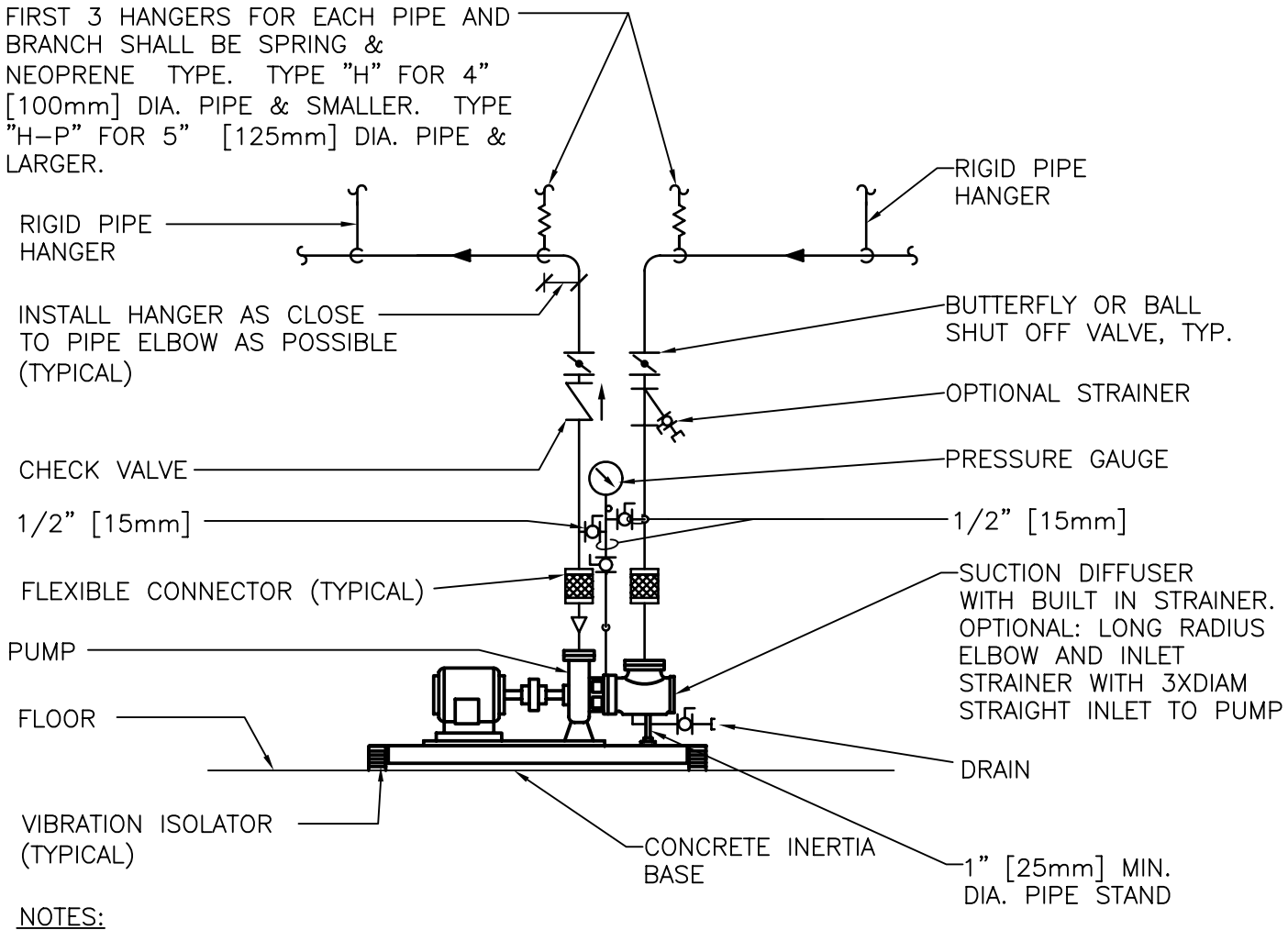
1. CHECK VALVE IS OPTIONAL FOR SINGLE PUMP, EXCEPT FOR COOLING TOWER PUMP.
2. ELIMINATE BALANCING DEVICE WHEN PUMP CONTROLLED BY VARIABLE SPEED DRIVE.

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

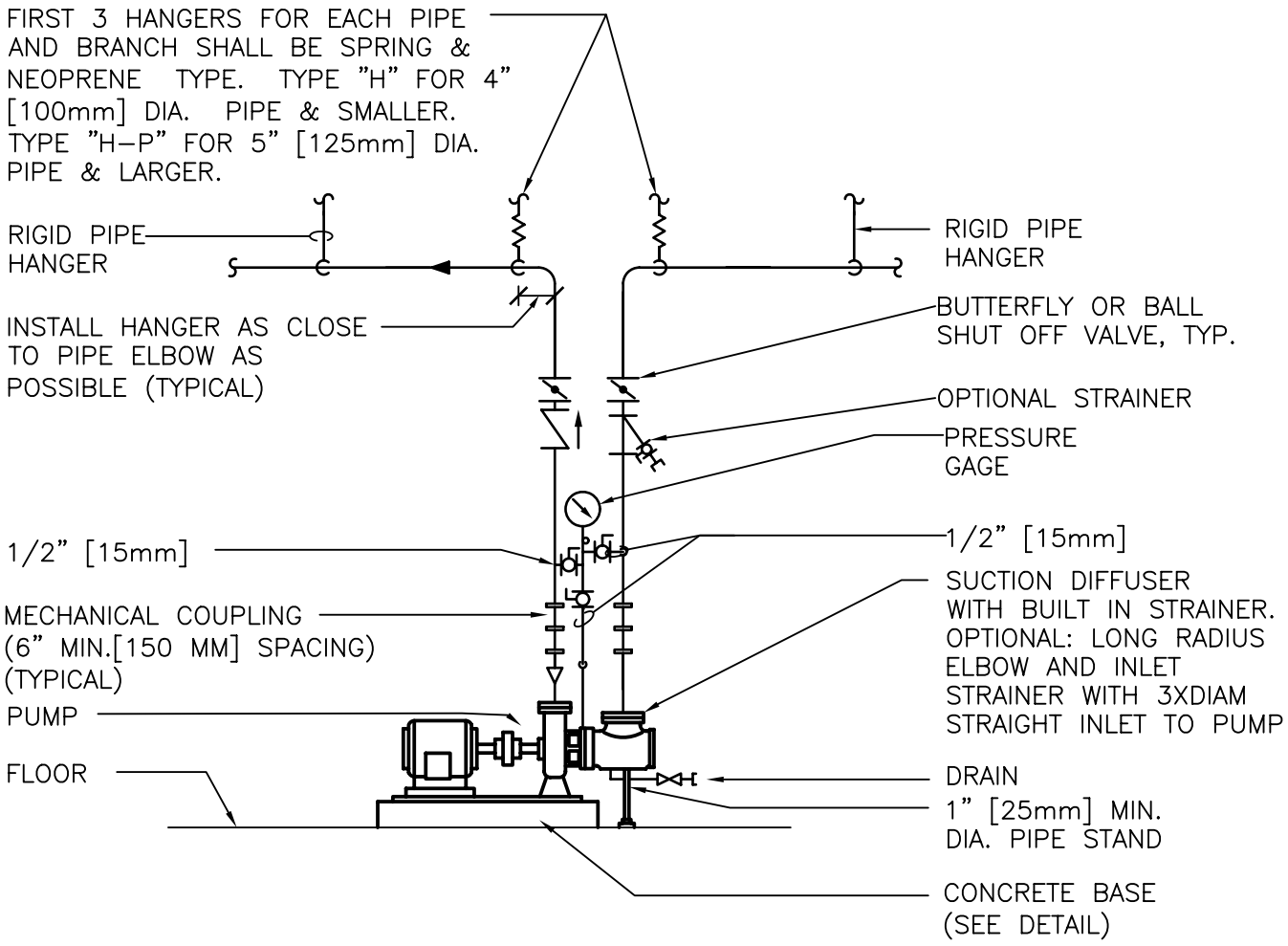
DESIGNER'S NOTE:
CHECK VALVE IS OPTIONAL FOR SINGLE PUMP, EXCEPT FOR COOLING TOWER PUMP.

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.

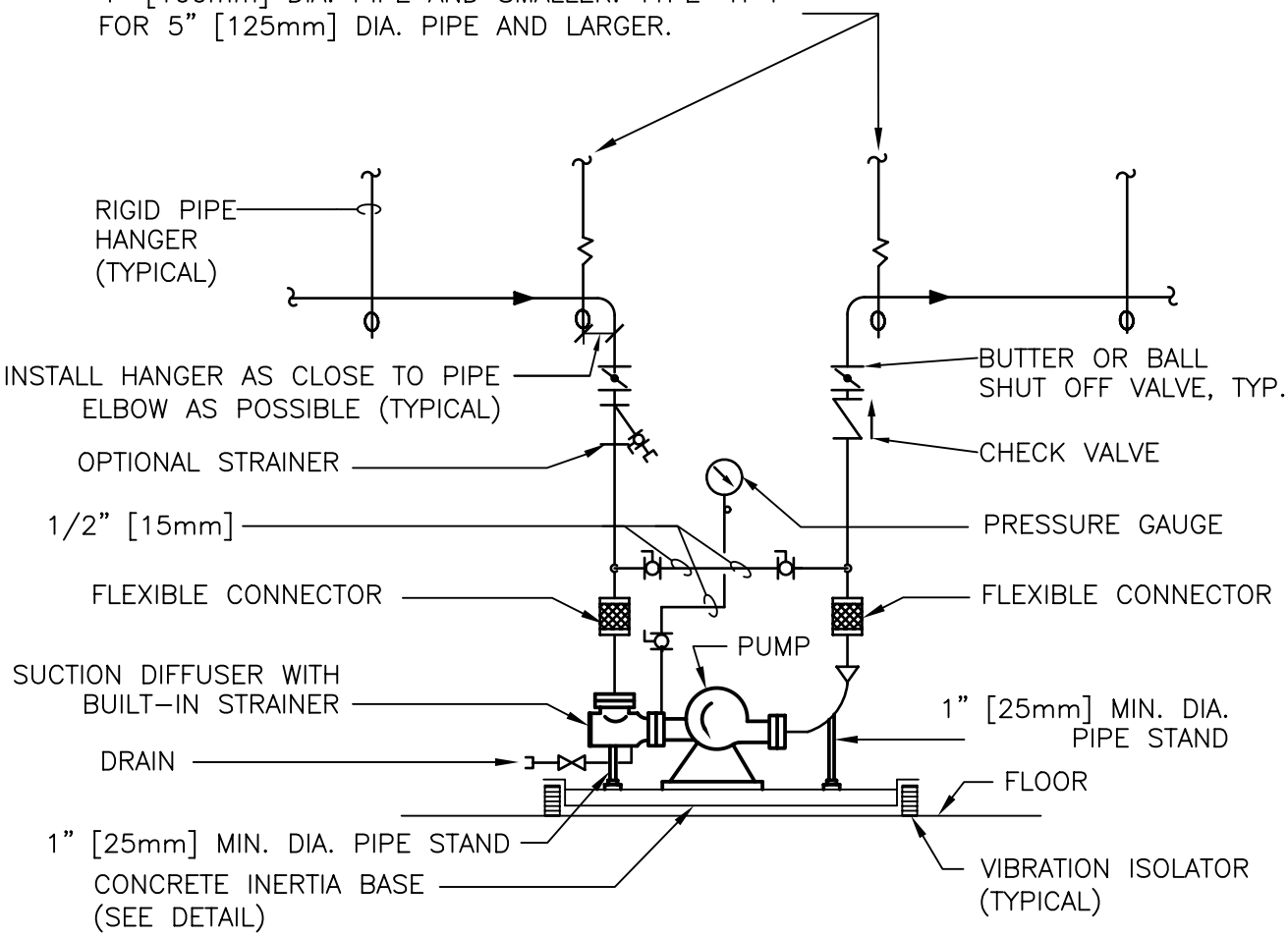
2. COUPLINGS SHALL NOT BE USED ON HOT WATER SYSTEMS.

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



NOTE:
SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION.

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

DOUBLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH FLEXIBLE CONNECTORS

#

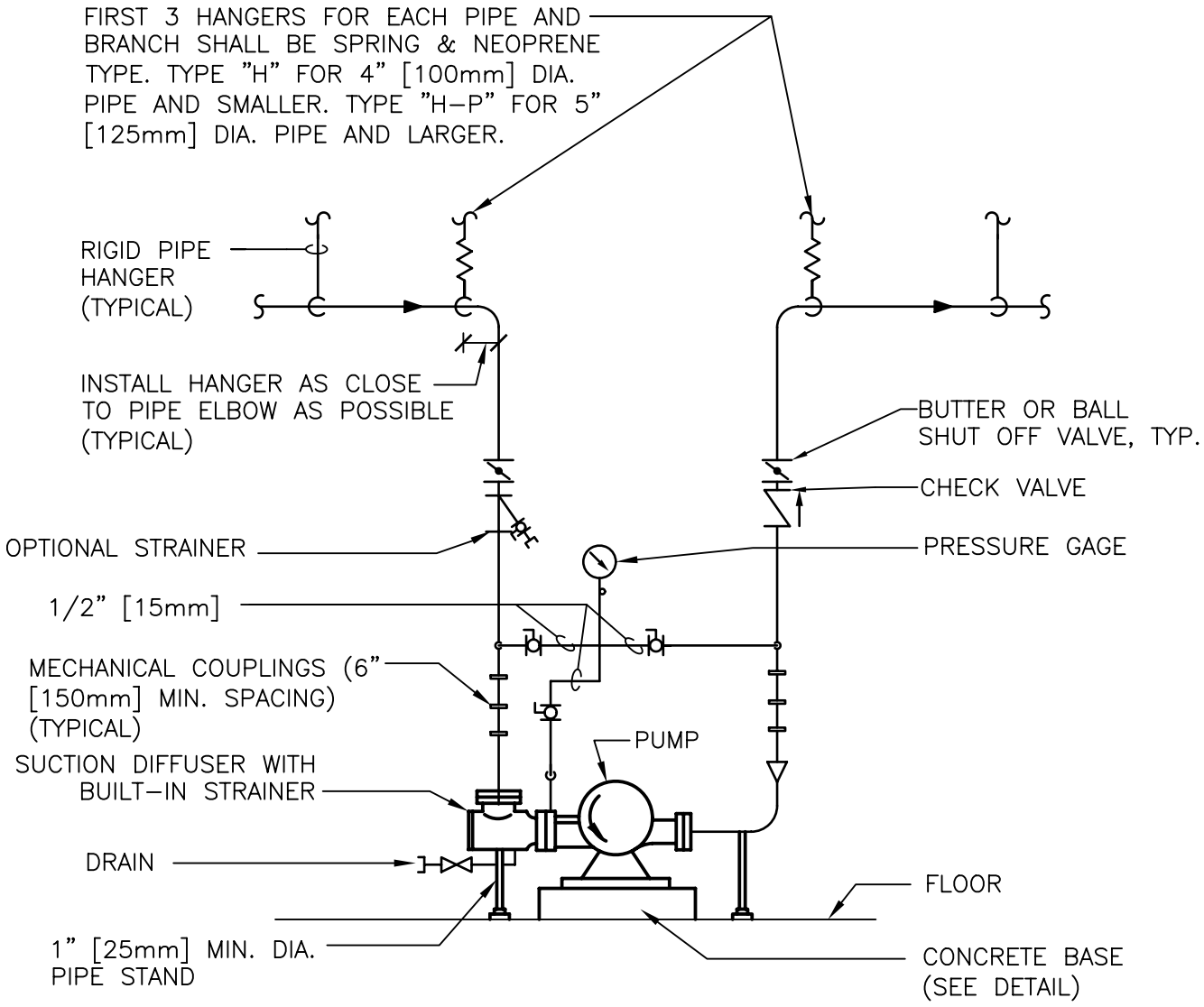
NTS

Department of Veterans Affairs

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

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-04.DWG



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

DOUBLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH MECHANICAL COUPLINGS

#

NTS

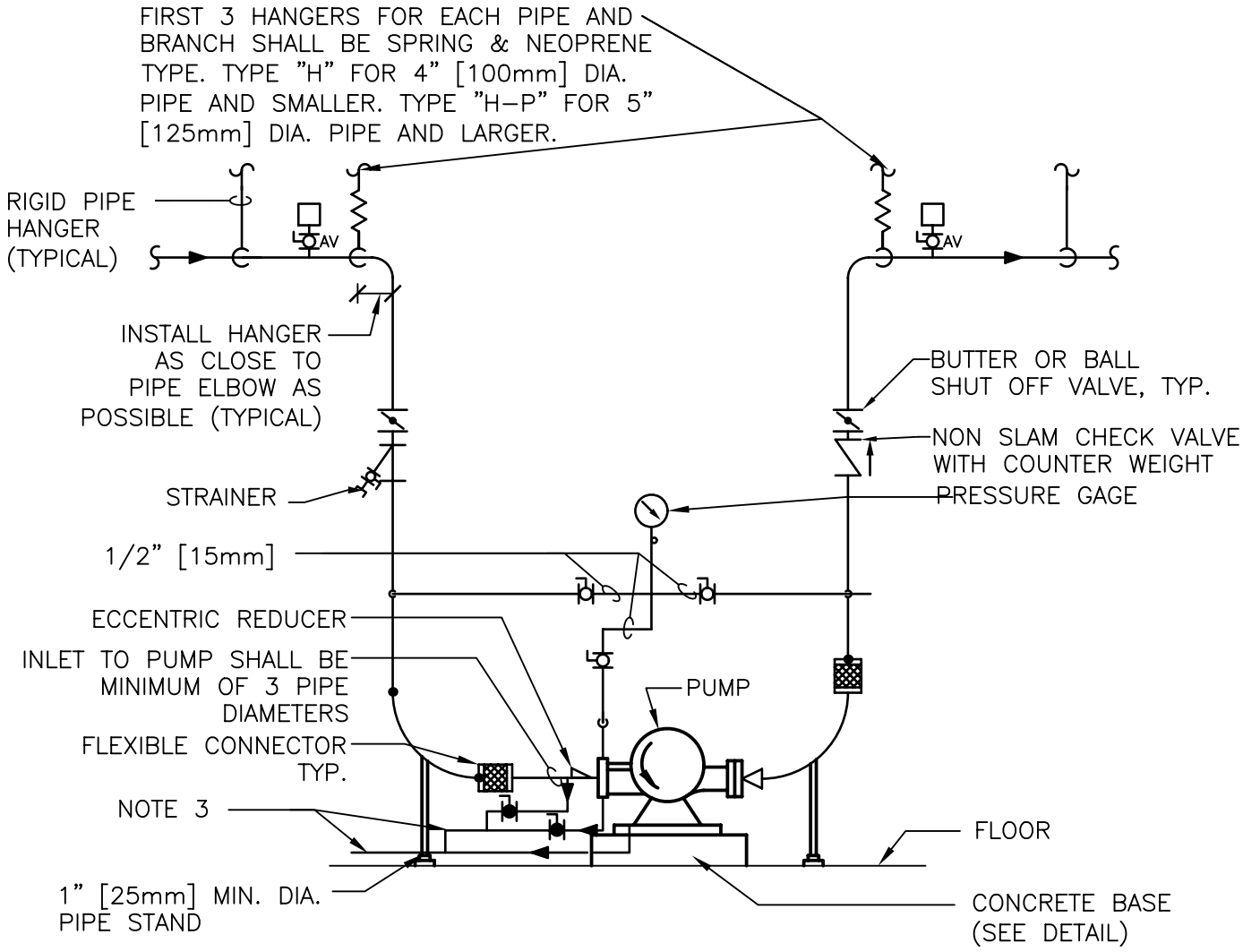
DESIGNER'S NOTE:
1. CHECK VALVE IS OPTIONAL FOR SINGLE PUMP EXCEPT FOR COOLING TOWER PUMP. USE THIS DETAIL ONLY FOR PUMPS IN A MECHANICAL BUILDING WHERE POSSIBLE VIBRATION WILL NOT BE OBJECTIONABLE AND WHERE APPROVED BY VA.
2. COUPLINGS SHALL NOT BE USED IN HOT WATER APPLICATIONS.

Department of Veterans Affairs

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

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-05.DWG



1. Y TYPE STRAINER BLOWDOWN HEIGHT SHALL ACCOMMODATE 55 GALLON DRUM.

2. PUMP INSTALLATION IS DIAGRAMMATIC AND INTENDED TO SHOW THE MAJOR COMPONENTS REQUIRED FOR INSTALLATION. THE INSTALLED PIPING CONFIGURATION SHALL BE BASED ON THE ACTUAL PUMP PROVIDED. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL A COORDINATION DRAWING SHOWING PUMP, PIPING, AND ACCESSORIES AS REQUIRED BY THIS INSTALLATION DETAIL.

3. ALL PAD, PUMP, AND PIPING DRAINS SHALL BE HARD PIPED TO NEAREST FLOOR DRAIN, TYPICAL.

HORIZONTAL SPLIT CASE PUMP - FLEXIBLE CONNECTORS

#

NTS

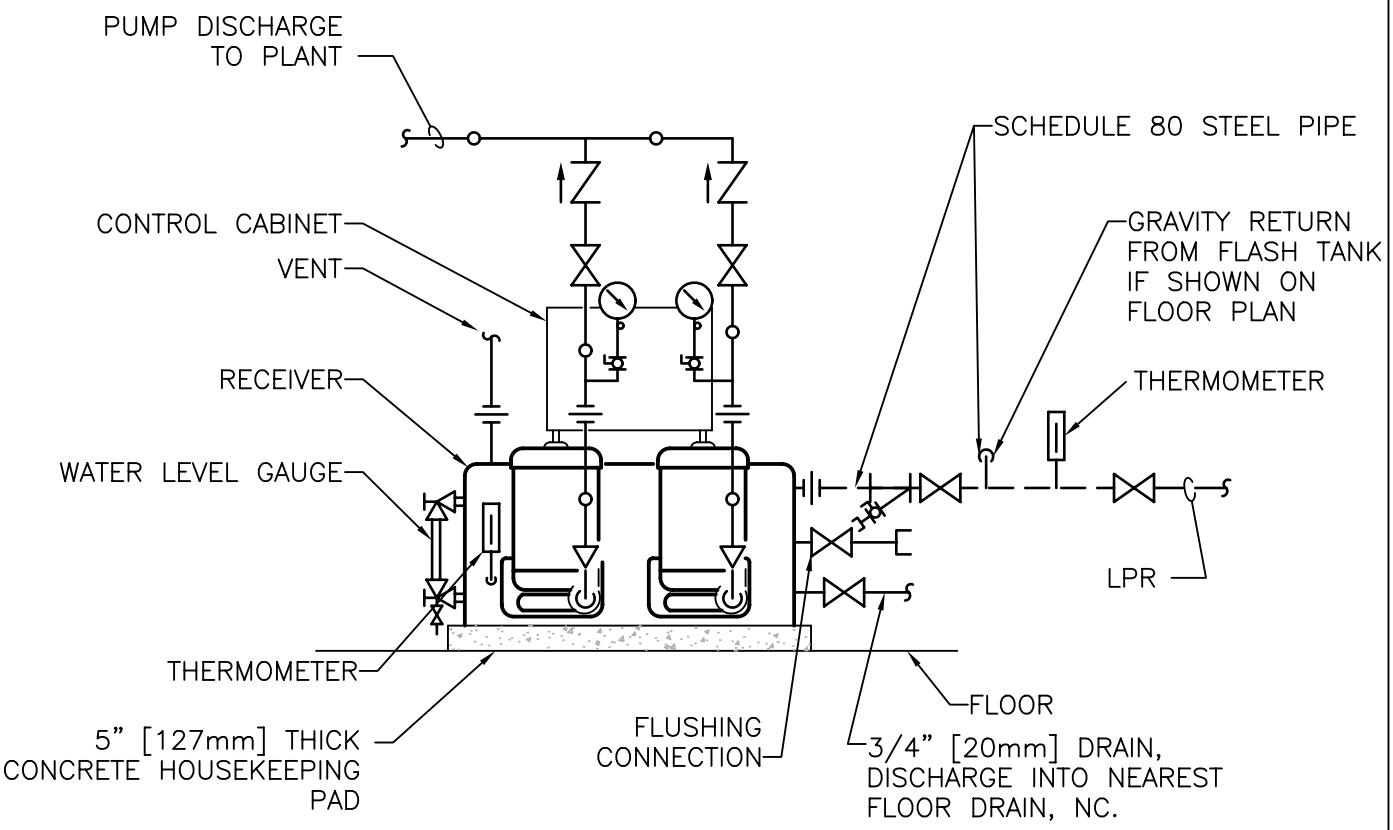
DESIGNER'S NOTE:
CHECK VALVE IS OPTIONAL FOR SINGLE PUMP EXCEPT FOR COOLING TOWER PUMP. USE THIS DETAIL ONLY FOR PUMPS IN A MECHANICAL BUILDING WHERE POSSIBLE VIBRATION WILL NOT BE OBJECTIONABLE OR WHERE APPROVED BY VA.

Department of Veterans Affairs

DETAIL TITLE / HORIZONTAL SPLIT CASE PUMP - FLEXIBLE CONNECTORS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232123-06.DWG



CONDENSATE PUMPS - PIPING CONNECTIONS

NTS

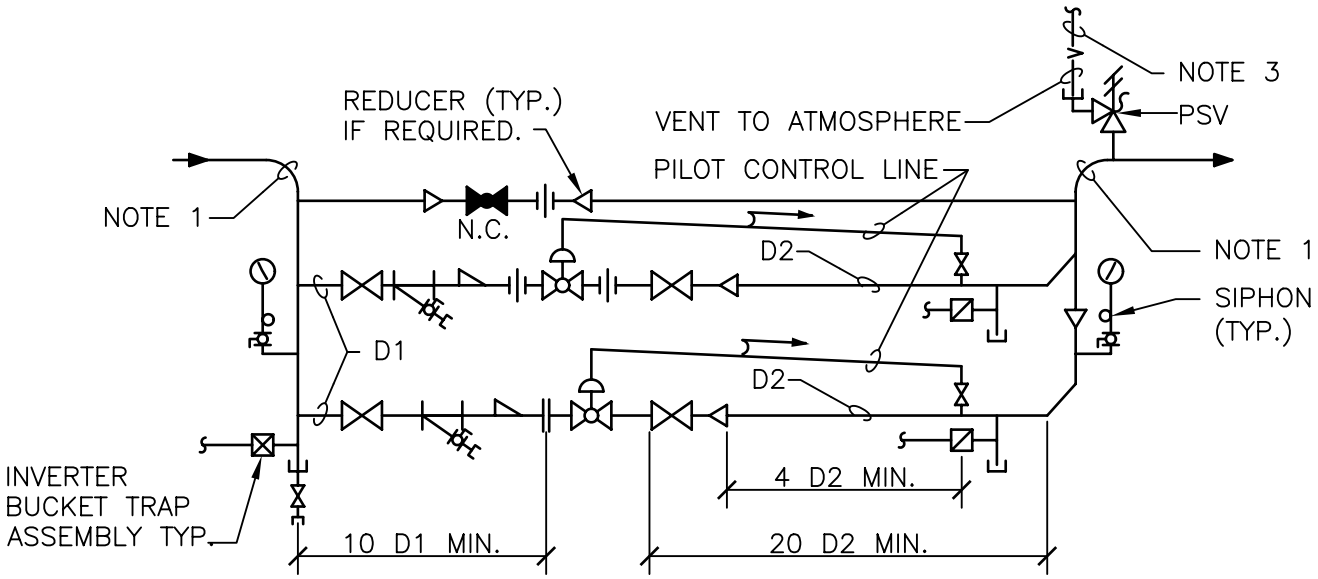
Department of Veterans Affairs

DETAIL TITLE / CONDENSATE PUMPS – PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD232123-07.DWG



NOTE:

1. SEE FLOOR PLANS FOR PIPE SIZES.
2. SEE EQUIPMENT SCHEDULES FOR VALVE DATA AND PIPE SIZES D1 AND D2. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.
3. MAKE BYPASS VALVE DISCHARGE PIPE THE SAME SIZE AS D2 FOR THE LARGEST PRV.
4. PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.

1 STEAM PRESSURE REDUCING STATION DOUBLE VALVE (1/3 AND 2/3)

NTS

DESIGNER'S NOTES:

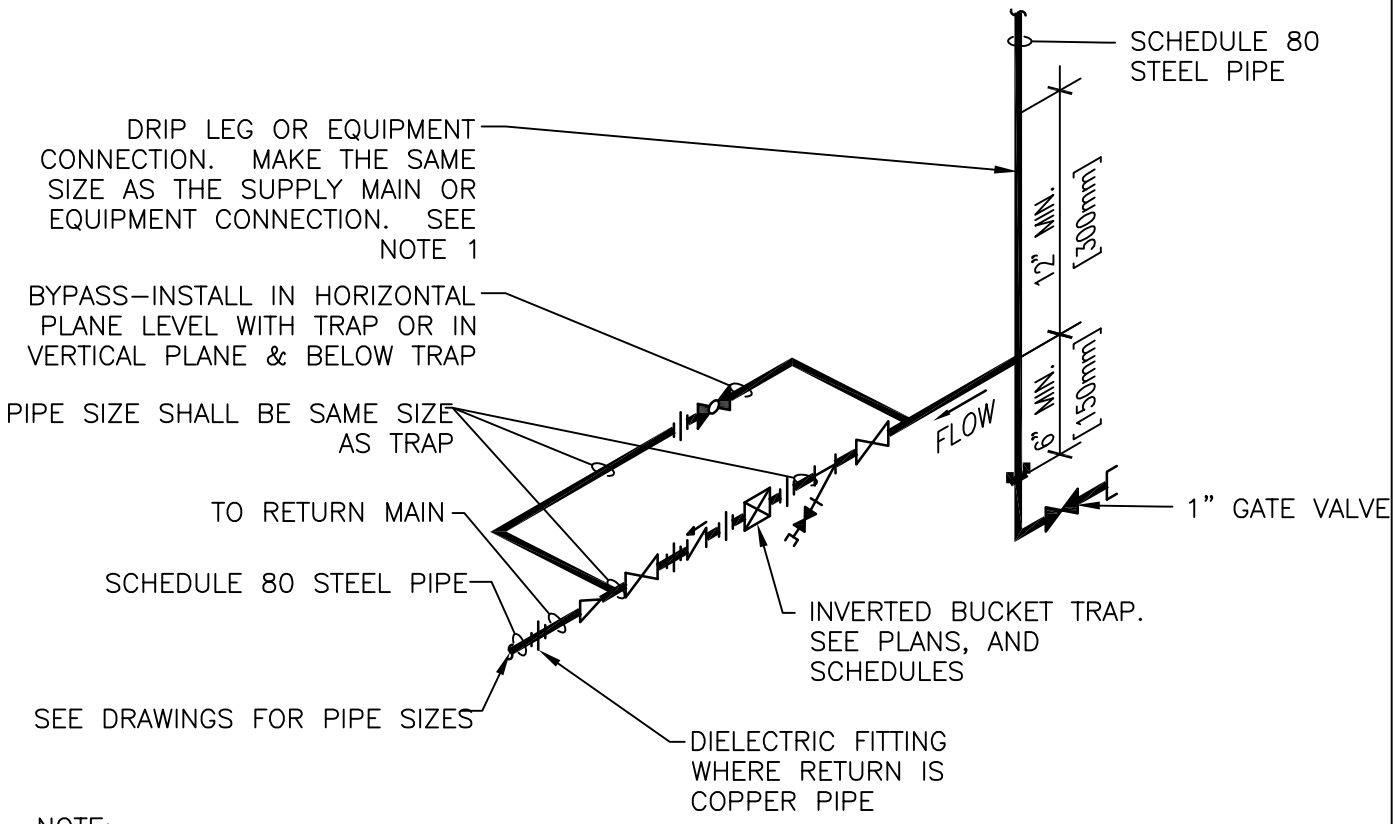
1. DESIGNATE LOWER VALVE A AND UPPER VALVE B (1–PRV1A, 1–PRV1B). USE SYSTEM PRESSURE FOR 1–PRV1A AND SET PRESSURE 2 PSIG [13.8kPa] HIGHER
2. USE DUAL VALVE PRESSURE REDUCING STATION WHEN THE MINIMUM LOAD IS 10% OR LESS THAN PEAK LOAD.
3. SAFETY VALVES SHALL BE SIZED SO AS TO RELIEVE AT PRESSURES OF 5–10 PSIG [35–70kPa] IN EXCESS OF DELIVERED PRESSURES OF PRV'S AND TO HAVE A CAPACITY EQUAL TO THE MAXIMUM CAPACITY OF PRV IT IS TO RELIEVE. VENT PIPE SHALL BE NO LESS THAN ONE PIPE SIZE LARGER THAN SAFETY VALVE DISCHARGE AND SHALL FURTHER BE SIZED SO THAT FRICTIONAL RESISTANCE OR VENT DOES NOT EXCEED VELOCITY PRESSURE AT SAFETY VALVE OUTLET. VENTS FROM SAFETY VALVES SHALL RUN THE SHORTEST AND MOST DIRECT ROUTE TO OUTDOOR THRU THE ROOF. WHERE VENTS RUN IN FINISHED SPACE THEY SHALL BE FURRED IN TO MATCH ADJACENT BUILDING CONSTRUCTION; IN UNFINISHED SPACE, PIPE TO BE COVERED ONLY. SAFETY VALVES SHALL BE LOCATED AS SHOWN ON THE FLOOR PLANS.

Department of Veterans Affairs

DETAIL TITLE / STEAM PRESSURE REDUCING STATION DOUBLE VALVE (1/3 AND 2/3)

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213–01.DWG



NOTE:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

2. PROVIDE BYPASS PIPING.

INVERTED BUCKET STEAM TRAP ASSEMBLY

#

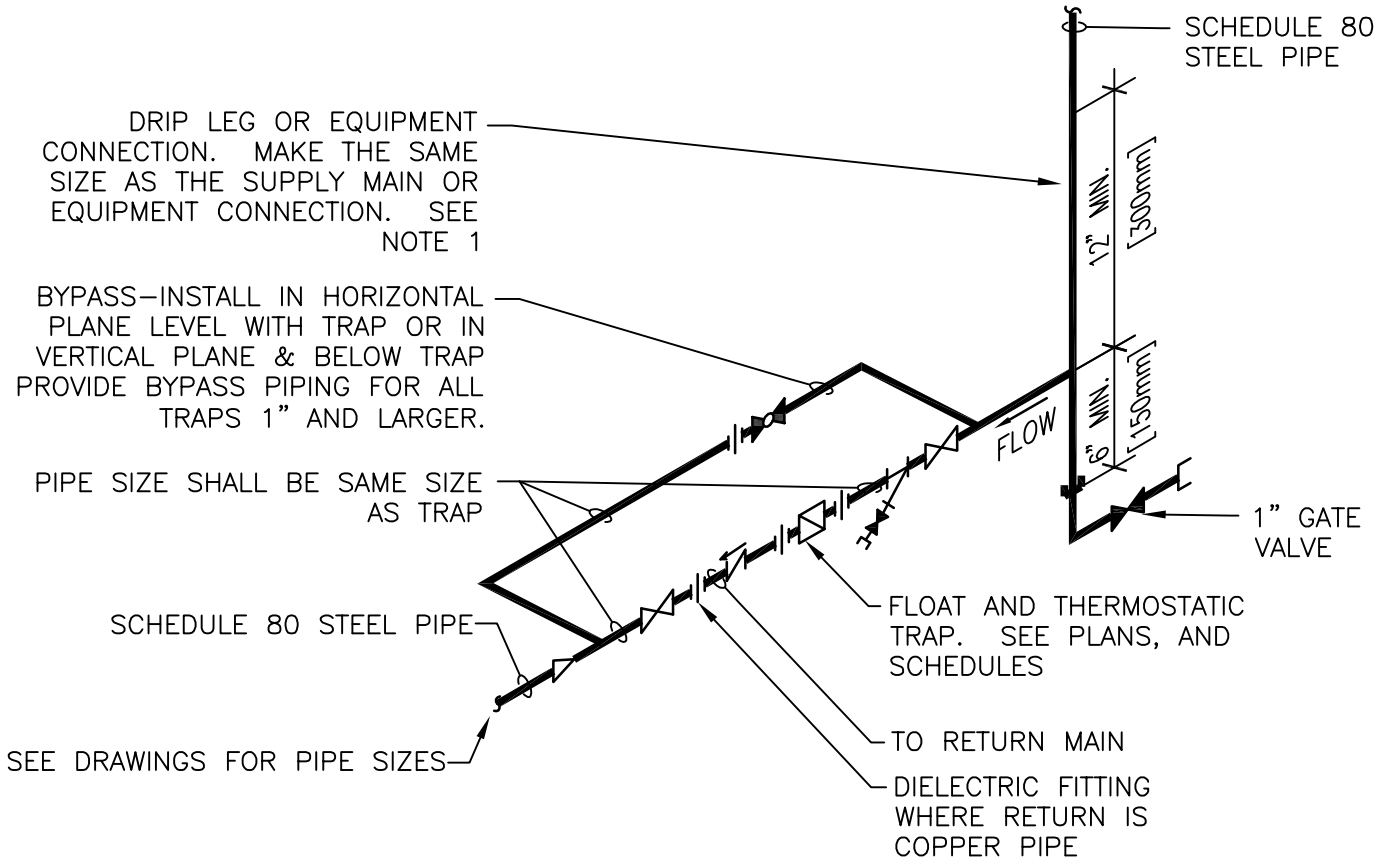
NTS

Department of Veterans Affairs

DETAIL TITLE / INVERTED BUCKET STEAM TRAP ASSEMBLY

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213-02.DWG



NOTE:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY

#

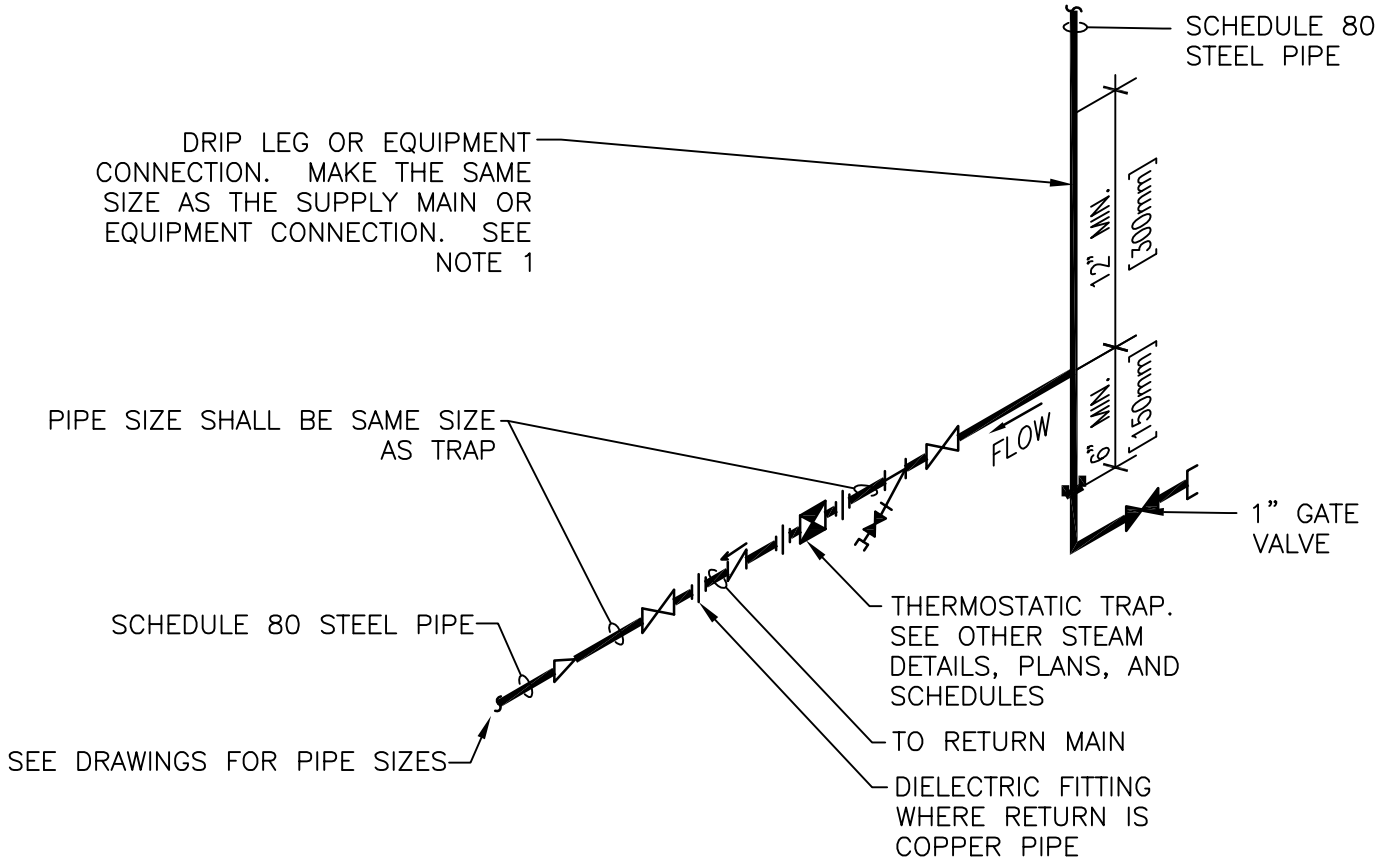
NTS

Department of Veterans Affairs

DETAIL TITLE / FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213–03.DWG



NOTE:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

THERMOSTATIC STEAM TRAP ASSEMBLY

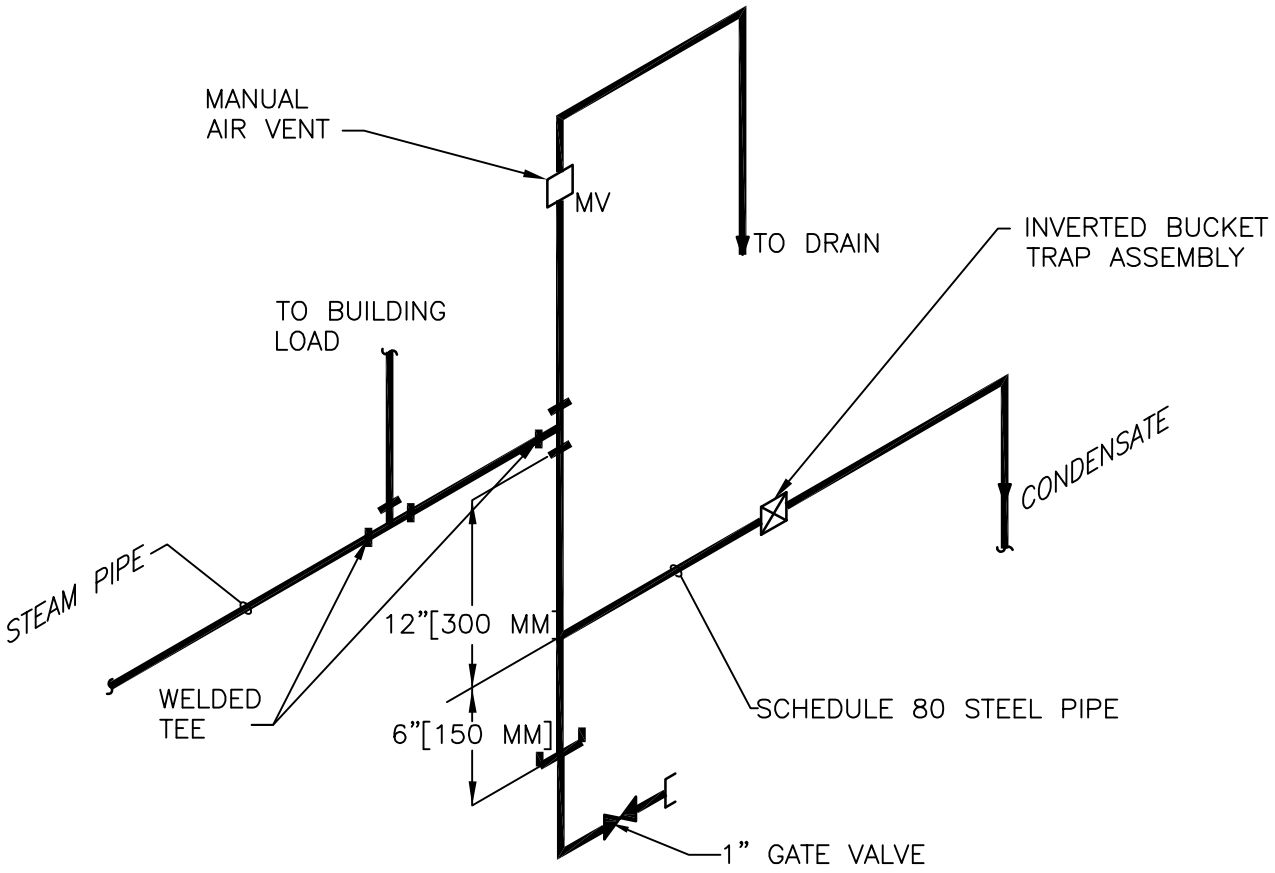
NTS

Department of Veterans Affairs

DETAIL TITLE / THERMOSTATIC STEAM TRAP ASSEMBLY

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: S232213-04.DWG



END OF STEAM LINE DRIP TRAP

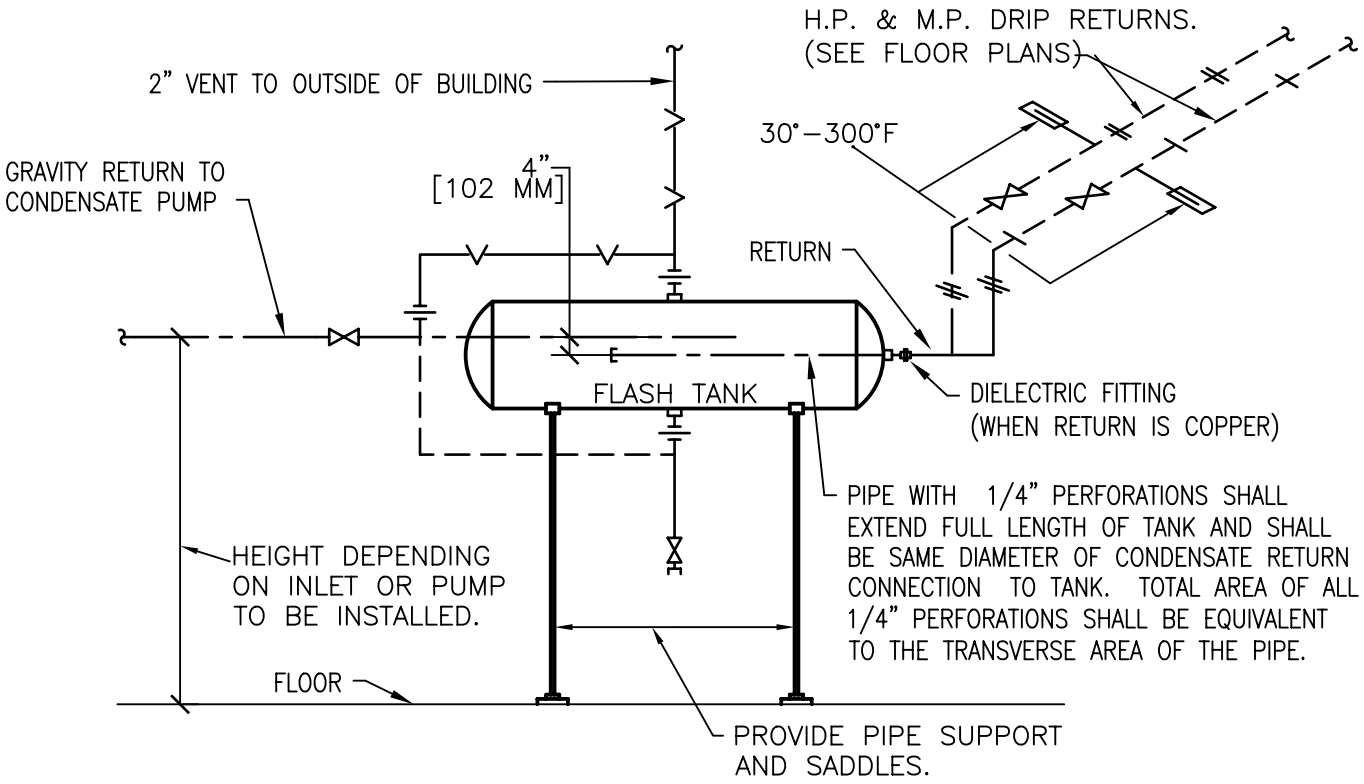
NTS

Department of Veterans Affairs

DETAIL TITLE / END OF STEAM LINE DRIP TRAP

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213-05.DWG



FLASH TANK SCHEDULE

CONDENSATE PUMP CAPACITY– GPM	APPROX. CAPACITY OF FLASH TANK– GALLONS	SIZE OF FLASH TANK– INCHES
0 THRU 15	16	14 DIA. X 24 LONG
16 " 22	24	14 DIA. X 36 LONG
23 " 30	31	16 DIA. X 36 LONG
31 " 37	37	16 DIA. X 42 LONG
38 " 45	42	16 DIA. X 48 LONG
46 " 60	61	18 DIA. X 54 LONG
61 " 75	75	18 DIA. X 66 LONG
76 " 97	95	24 DIA. X 54 LONG
98 " 150	155	24 DIA. X 78 LONG

TYPICAL CONNECTIONS TO FLASH TANK

NTS

DESIGNER'S NOTE:

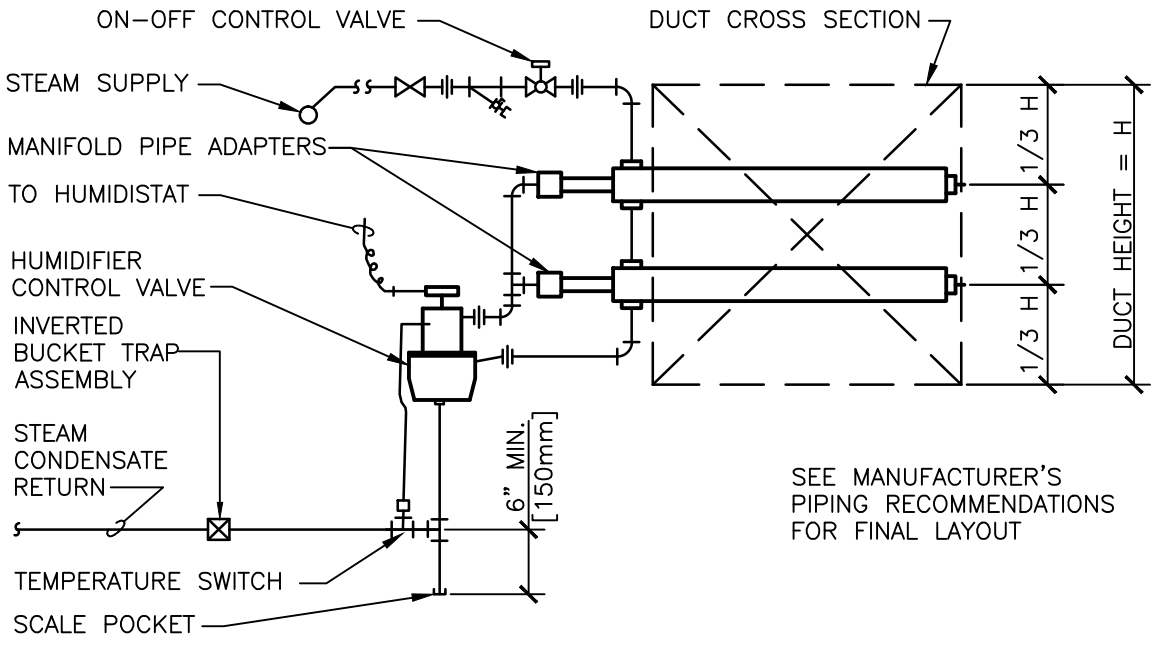
INDICATE THE HEIGHT ON FLOOR PLANS AND/OR SECTIONS.
PROVIDE A FLASH TANK FOR EACH CONDENSATE PUMP, WHICH SERVES MPR OR HPR CONDENSATE.

Department of Veterans Affairs

DETAIL TITLE / TYPICAL CONNECTIONS TO FLASH TANK

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213–06.DWG



STEAM HUMIDIFIER – PIPING CONNECTIONS (MULTIPLE DISPERSION TUBES)

#

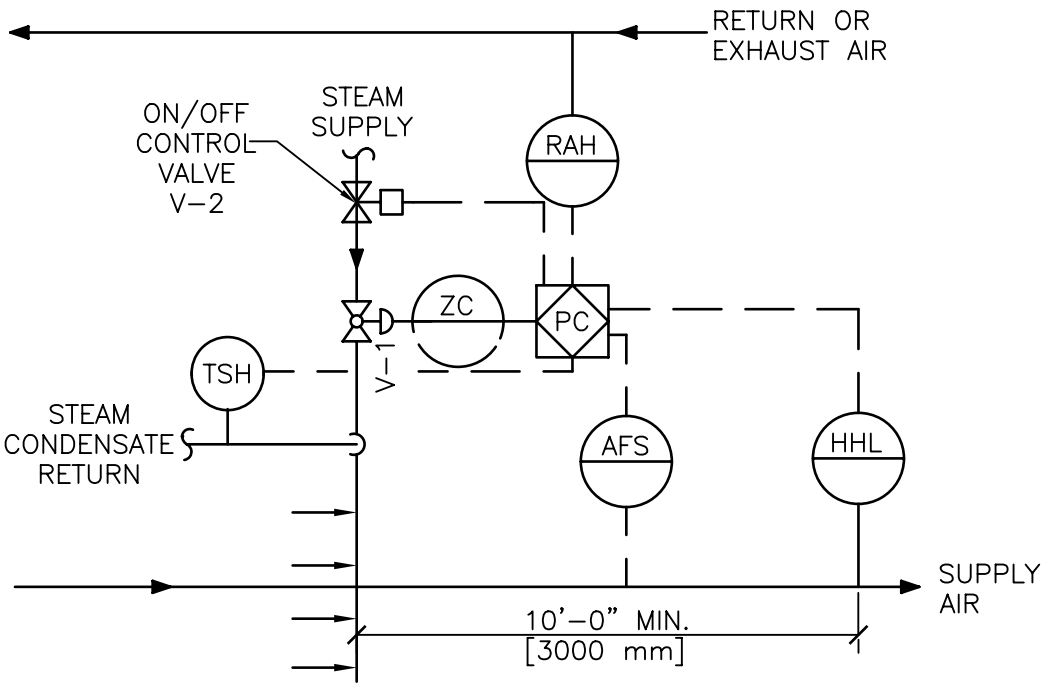
NTS

Department of Veterans Affairs

DETAIL TITLE / STEAM HUMIDIFIER – PIPING CONNECTIONS (MULTIPLE DISPERSION TUBES)

SCALE :NONE

DATE ISSUED: MARCH 2010 CAD DETAIL NO.: SD232213–07.DWG



STEAM HUMIDIFIER

RETURN (OR EXHAUST) AIR HUMIDITY SHALL BE MONITORED. ON A CALL FOR HUMIDIFICATION, HUMIDIFIER VALVE V-1 SHALL MODULATE TO MAINTAIN THE RETURN (OR EXHAUST) AIR HUMIDITY SET POINT TO 30% (ADJUSTABLE). PRIOR TO ACTIVATION OF V-1, THE ON/OFF CONTROL VALVE V-2 SHALL BE ENABLED THROUGH ECC AND JACKET TEMPERATURE SENSED BY TSH SHALL BE WARM ENOUGH TO PREVENT CONDENSATION. THE HIGH LIMIT HUMIDITY SENSOR, LOCATED IN THE SUPPLY AIR DUCT 10 FEET AWAY FROM THE HUMIDIFIER SHALL DISABLE THE HUMIDIFIER AND GIVE AN ALARM SIGNAL TO THE ECC, IF THE SUPPLY AIR HUMIDITY EXCEEDS 90% RH (ADJUSTABLE). THE AIRFLOW SWITCH SHALL PROVE AIRFLOW BEFORE HUMIDITY CONTROLS ARE ACTIVATED.

STEAM HUMIDIFIER CONTROLS

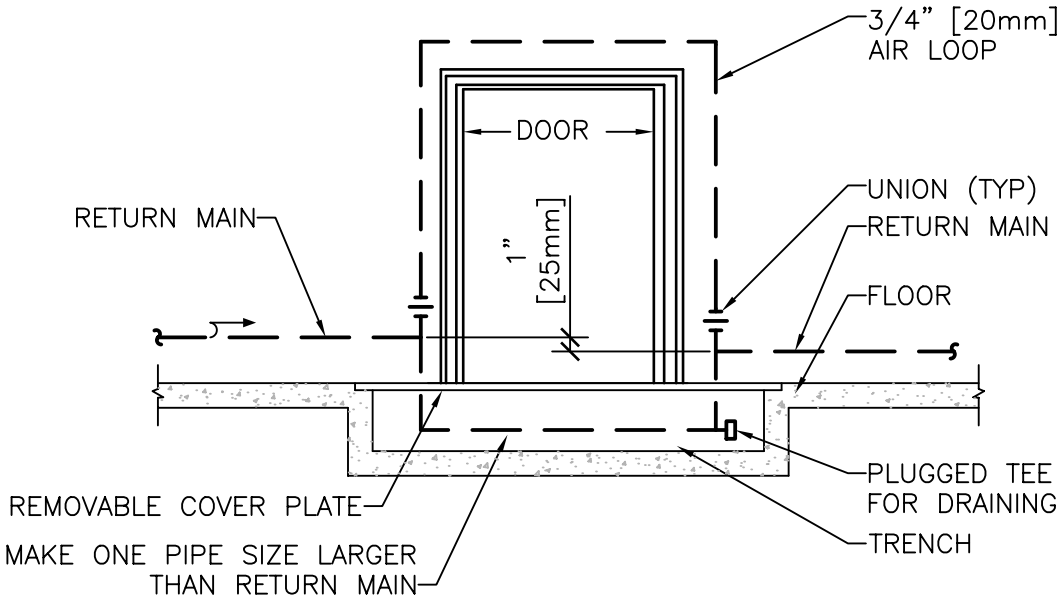
NTS

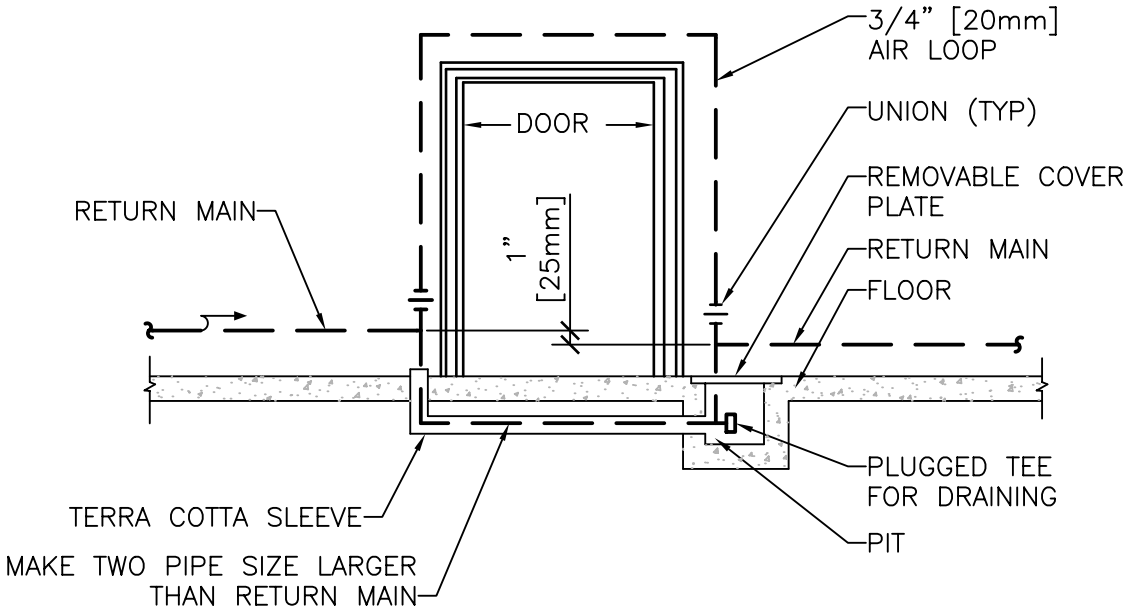
Department of Veterans Affairs

DETAIL TITLE / STEAM HUMIDIFIER CONTROLS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD232213-08.DWG





CONDENSATE RETURN PIPING AROUND OPENINGS

#

NTS

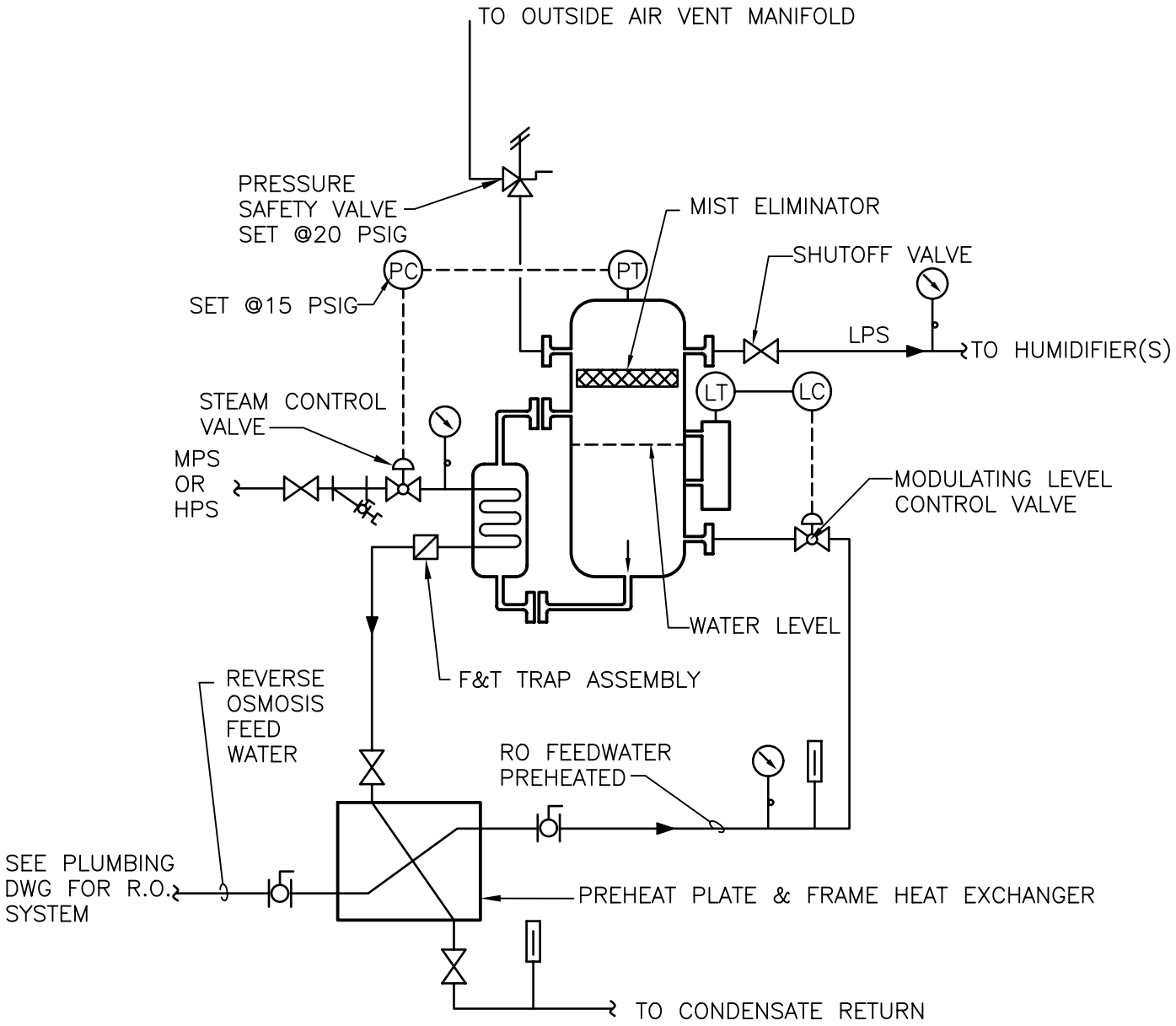
Department of Veterans Affairs

DETAIL TITLE / CONDENSATE RETURN PIPING AROUND OPENINGS

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD232213-09.DWG



CLEAN STEAM GENERATOR

NTS

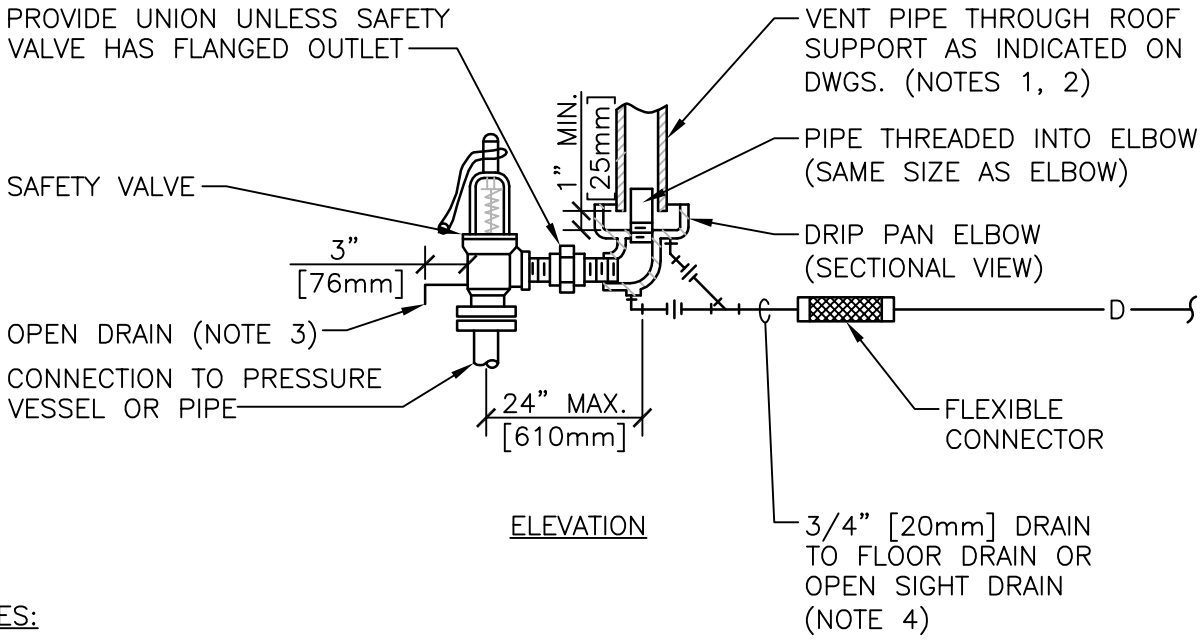
DESIGNER NOTES:
1.PREHEAT HEAT EXCHANGER IS OPTIONAL.

Department of Veterans Affairs

DETAIL TITLE / CLEAN STEAM GENERATOR

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213-10.DWG



ELEVATION

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 6' [1829mm] MIN. ABOVE FINISHED ROOF.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

STEAM SAFETY VALVE

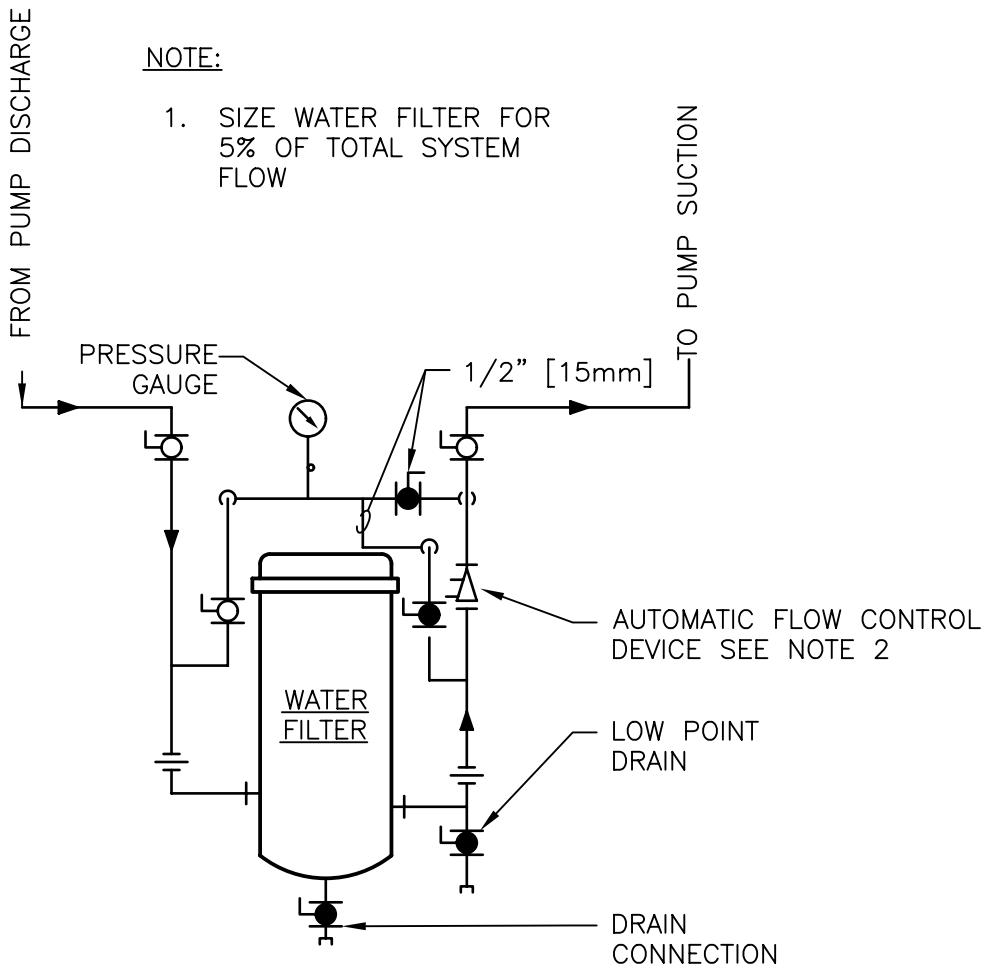
NTS

Department of Veterans Affairs

DETAIL TITLE / STEAM SAFETY VALVE

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232213-11.DWG



WATER FILTERS - CLOSED LOOP HYDRONIC SYSTEMS

#

NTS

DESIGNER'S NOTE:

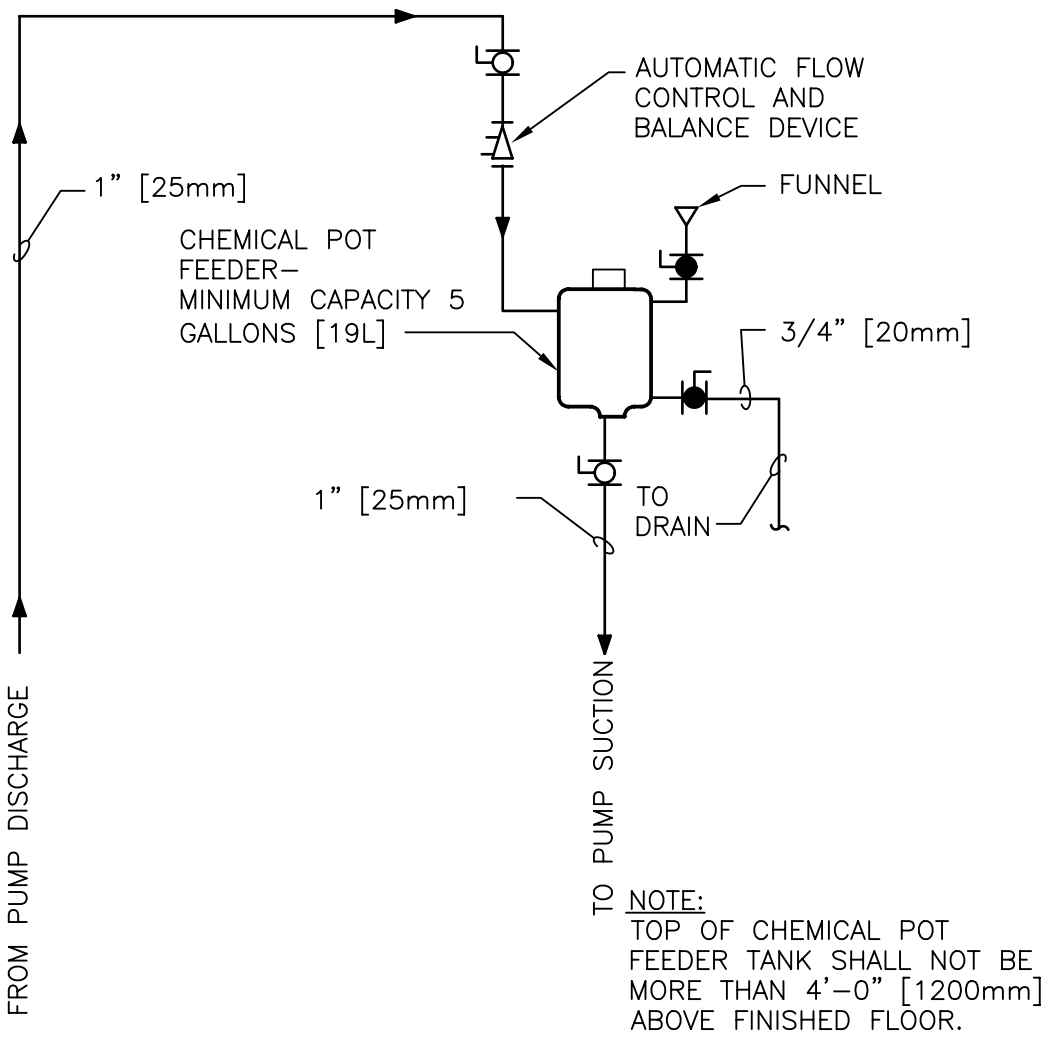
1. PROVIDE SEDIMENT WATER FILTER ON EACH CHILLED WATER, HOT WATER AND GLYCOL WATER HEATING SYSTEM. CAPACITY SHALL BE APPROXIMATELY 5% OF THE TOTAL CIRCULATING FLOW. SHOW FILTER LOCATIONS ON THE DRAWINGS. INCLUDE THE FILTER FLOW RATE IN PUMP CAPACITIES. SIZE PIPES TO WATER FILTER.
2. SELECT PRESSURE RANGE PER PROJECT NEED. SPECIFY PRESSURE RANGE ON DRAWINGS.

Department of Veterans Affairs

DETAIL TITLE / WATER FILTERS - CLOSED LOOP HYDRONIC SYSTEMS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232500-01.DWG



WATER TREATMENT – CLOSED SYSTEMS

#

NTS

DESIGNER'S NOTE:

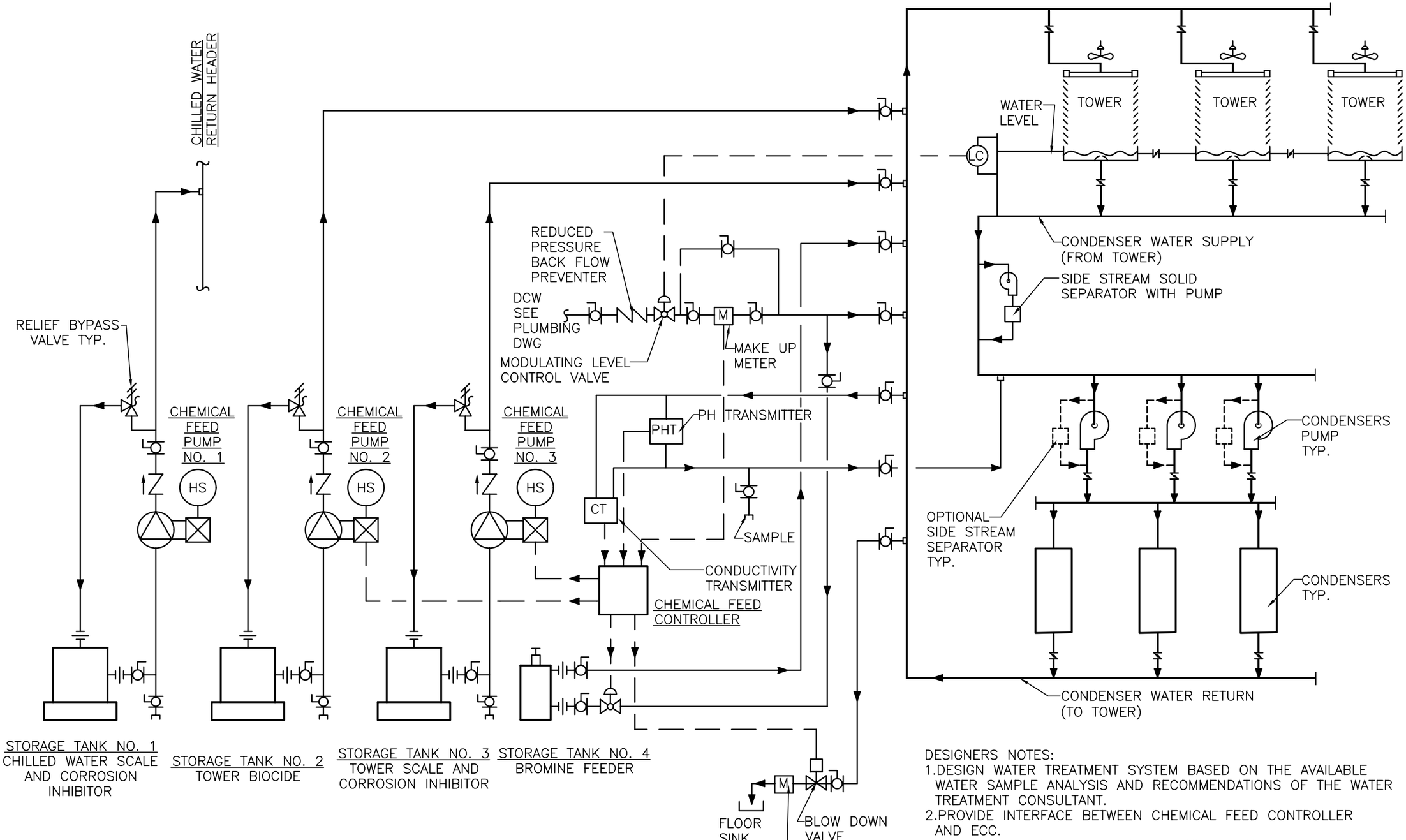
1. SHOW LOCATION OF ALL CHEMICAL POT FEEDER TANKS ON PIPING DIAGRAMS FOR EACH CHILLED WATER AND HEATING HOT WATER SYSTEM. FEEDER MAY ALSO BE USED FOR MAKE–UP FOR SMALL GLYCOL–WATER SYSTEMS (UNDER 50 GPM [190 LPM] IN LIEU OF A TANK/PUMP MAKE–UP SYSTEM.

Department of Veterans Affairs

DETAIL TITLE / WATER TREATMENT – CLOSED SYSTEMS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232500–02.DWG



WATER TREATMENT SYSTEM - COOLING TOWER

#

NTS

DESIGNERS NOTES:

1. DESIGN WATER TREATMENT SYSTEM BASED ON THE AVAILABLE WATER SAMPLE ANALYSIS AND RECOMMENDATIONS OF THE WATER TREATMENT CONSULTANT.
2. PROVIDE INTERFACE BETWEEN CHEMICAL FEED CONTROLLER AND ECC.
3. CHILLED WATER WATER TREATMENT SYSTEM SHALL BE OPERATED MANUALLY.
4. ADDITIONAL STORAGE TANKS AND FEED PUMPS MAY BE REQUIRED BASED ON THE OUTCOME OF THE WATER SAMPLE ANALYSIS.
5. ENSURE CLOSE COORDINATION BETWEEN THE CONTRACT SPECIFICATIONS AND DETAILS.

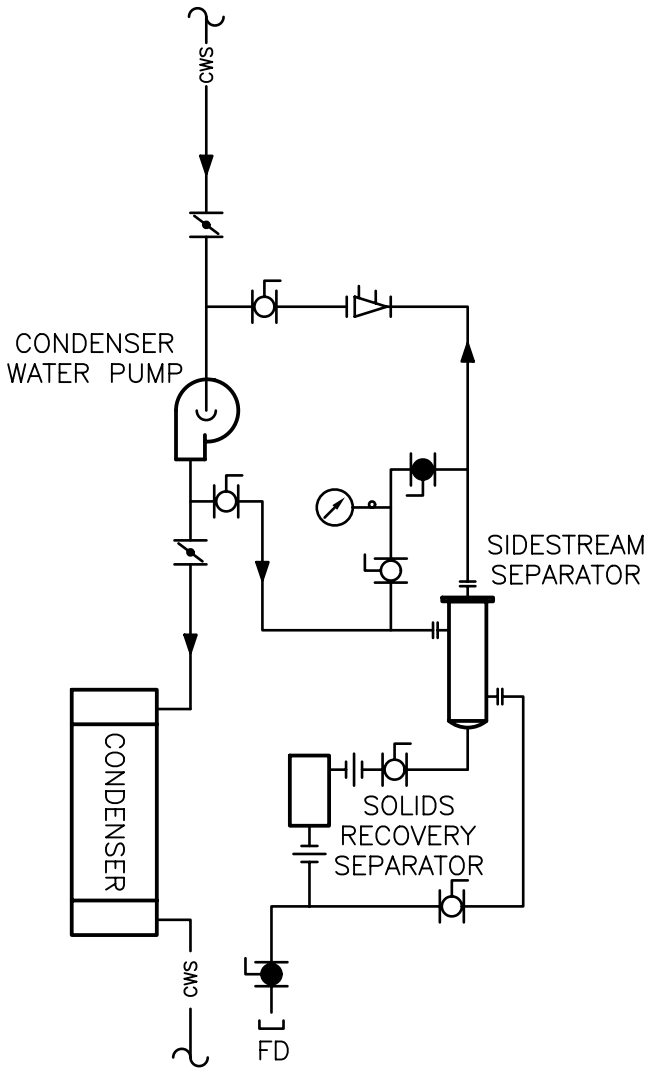
DETAIL TITLE / WATER TREATMENT SYSTEM - COOLING TOWER

SCALE :NONE

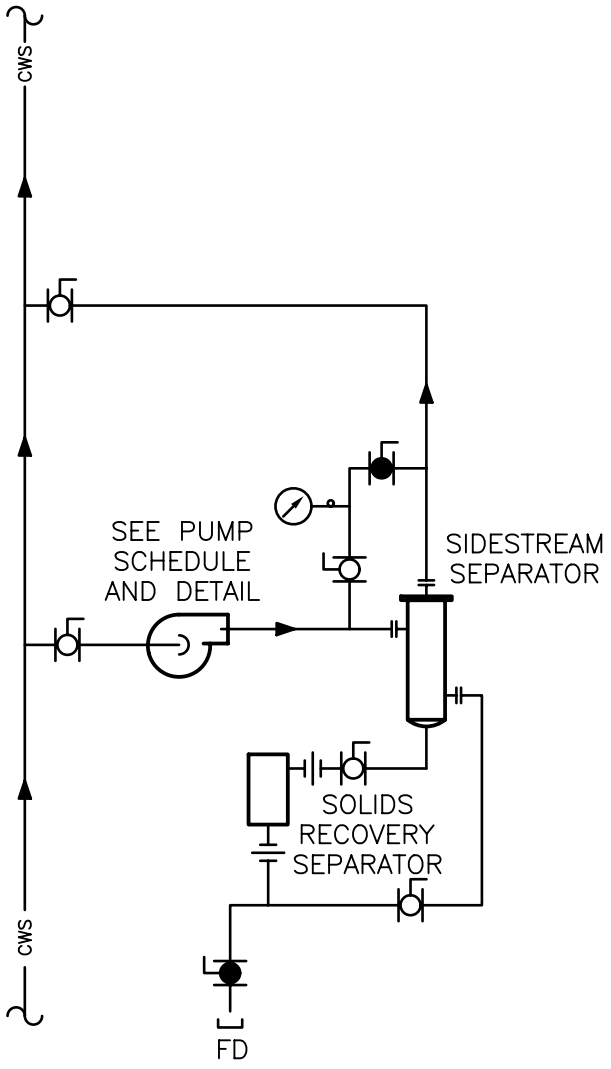
DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD232500-03.DWG

Department of Veterans Affairs



SEPARATOR DETAIL WITHOUT SIDESTREAM PUMP



SEPARATOR DETAIL WITH SIDESTREAM PUMP

DESIGNER'S NOTE:

1. PROVIDE EITHER A COMMON SIDESTREAM SOLID SEPARATOR WITH PUMP OR A DEDICATED SEPARATOR FOR EACH CONDENSER WATER SYSTEM.

2. INCREASE CONDENSER WATER PUMP CAPACITY 5%–8% FOR A DEDICATED SIDESTREAM SEPARATOR.

SIDESTREAM SOLID SEPARATOR

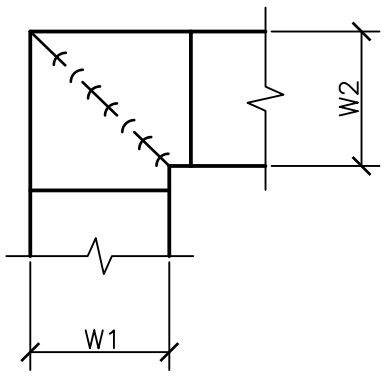
NTS

Department of Veterans Affairs

DETAIL TITLE / SIDE STREAM SOLID SEPARATOR

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD232500–04.DWG



NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" [50mm] RADIUS, 1 1/2" [40mm] MAXIMUM SPACE BETWEEN VANES AND A 3/4" [20mm] TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" [500mm] VANES SHALL BE DOUBLE VANE TYPE.

DUCTWORK SQUARE VANE ELBOWS

NTS

Department of Veterans Affairs

DETAIL TITLE / DUCTWORK SQUARE VANED ELBOWS

SCALE :NONE

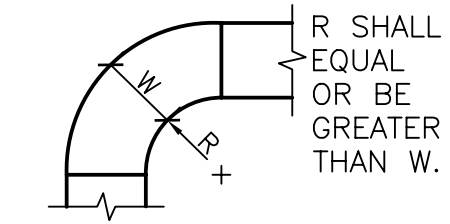
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-01.DWG

Department of Veterans Affairs

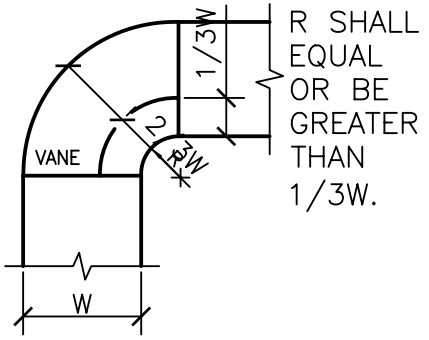
DETAIL TITLE / DUCTWORK RADIUS ELBOWS

SCALE :NONE

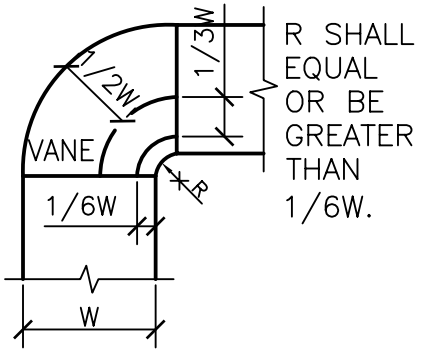
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-02.DWG



STANDARD RADIUS OR LONG RADIUS ELBOW



SHORT RADIUS ELBOW WITH ONE VANE



SHORT RADIUS ELBOW WITH TWO VANES

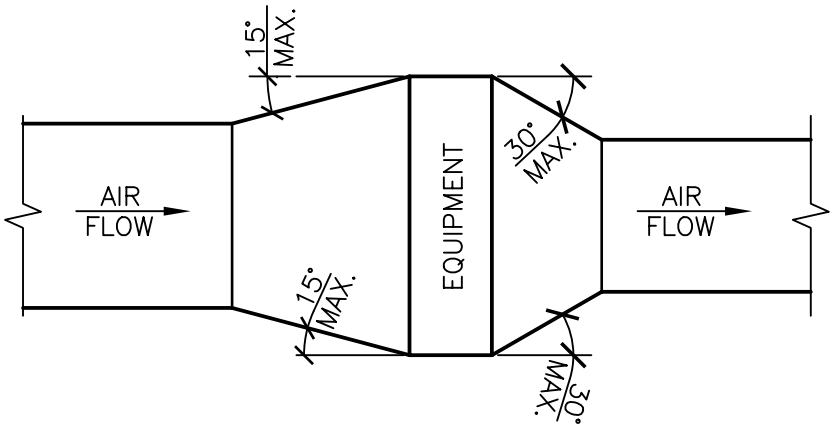
NOTE:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

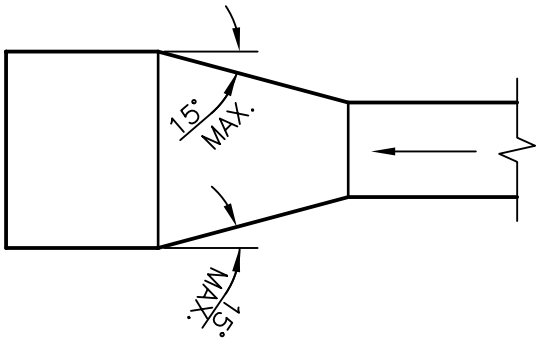
DUCTWORK RADIUS ELBOWS

NTS

DESIGNER'S NOTE:
DO NOT SHOW MITERED ELBOWS AND MITERED OFFSETS (TRANSITIONS) GREATER THAN 15 DEGREES ON DRAWINGS.



TYPICAL DUCTWORK TRANSITION WITH EQUIPMENT MOUNTED IN DUCT PLAN OR SIDE VIEW



TYPICAL DUCTWORK TRANSITION PLAN OR SIDE VIEW

NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)

#

NTS

Department of Veterans Affairs

DETAIL TITLE / DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-03.DWG

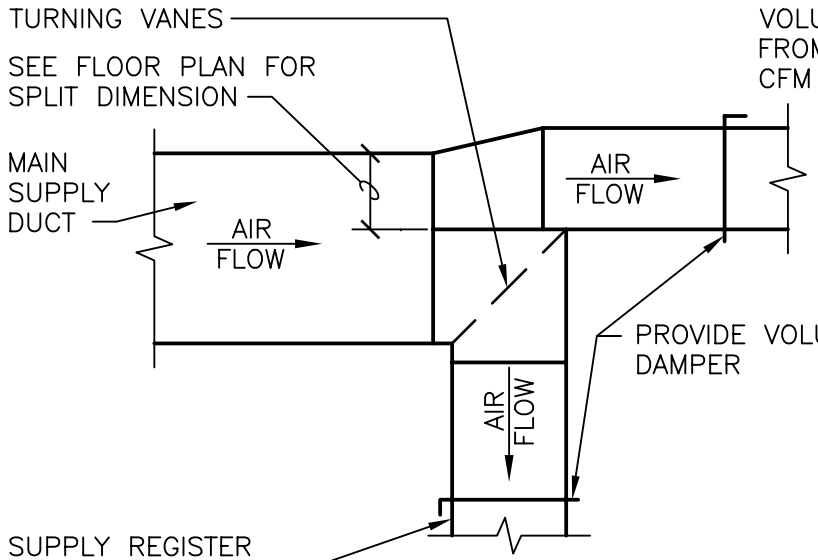
Department of Veterans Affairs

DETAIL TITLE / SUPPLY DUCTWORK TAKE-OFFS

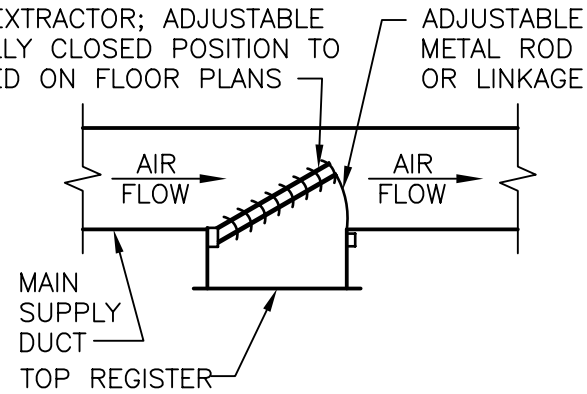
SCALE :NONE

DATE ISSUED: DECEMBER 2008

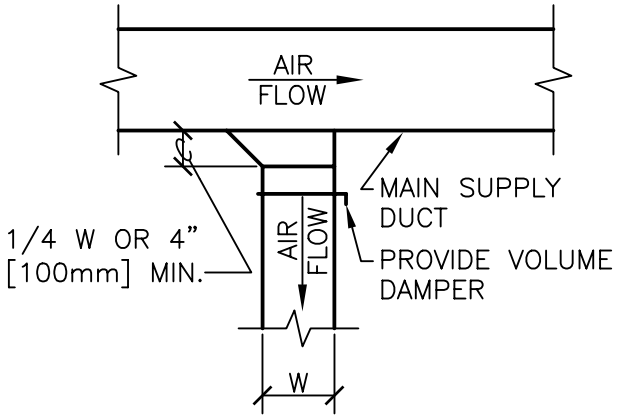
CAD DETAIL NO.: SD233100-04.DWG



AIR SPLIT DUCT TAKE-OFF
PLAN VIEW



SUPPLY REGISTER TAKE-OFF
PLAN VIEW



BRANCH DUCT TAKE-OFF PLAN VIEW

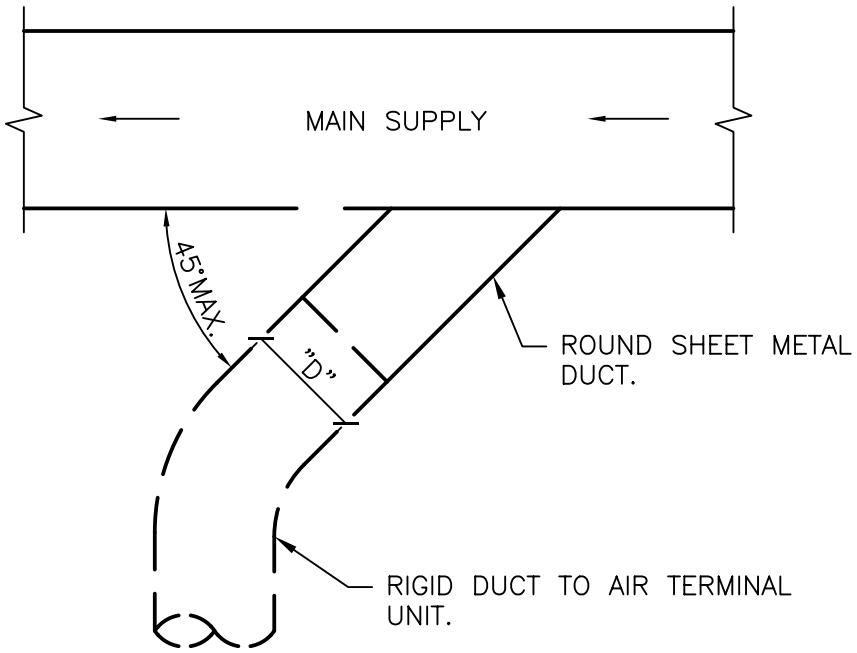
SUPPLY DUCTWORK TAKE-OFFS

NTS

DESIGNER'S NOTES:

1. THE SUPPLY REGISTER TAKE-OFF MAY BE USED FOR UP UP TO 25% OF THE MAIN DUCT CFM. THE BRANCH DUCT TAKE-OFF MAY BE USED FOR UP TO 15% OF THE MAIN DUCT CFM ANYTIME AND UP TO 40% WHEN THE MAIN DUCT VELOCITY IS 1000 FPM [5.1 M/S] OR LESS. THE AIR SPLIT DUCT TAKE-OFF SHALL BE USED IN ALL OTHER CASES AND MAY BE USED AT ANYTIME.

2. SHOW ALL VOLUME DAMPERS ON FLOOR PLANS.



PLAN VIEW

SUPPLY DUCT TAKEOFF - AIR TERMINAL UNIT

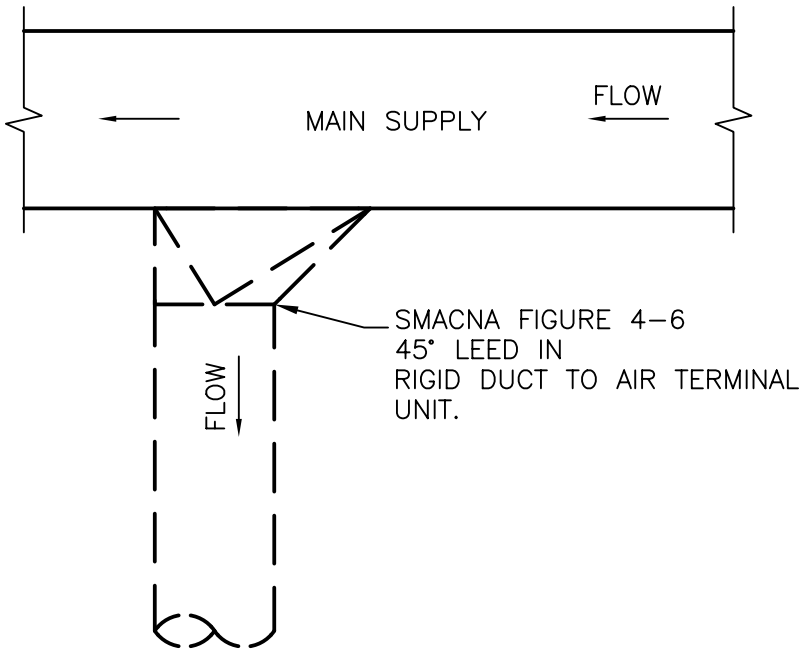
NTS

Department of Veterans Affairs

DETAIL TITLE / SUPPLY DUCT TAKEOFF- AIR TERMINAL UNITS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-05.DWG



PLAN VIEW

ALTERNATE SUPPLY DUCT TAKEOFF - AIR TERMINAL UNITS

#

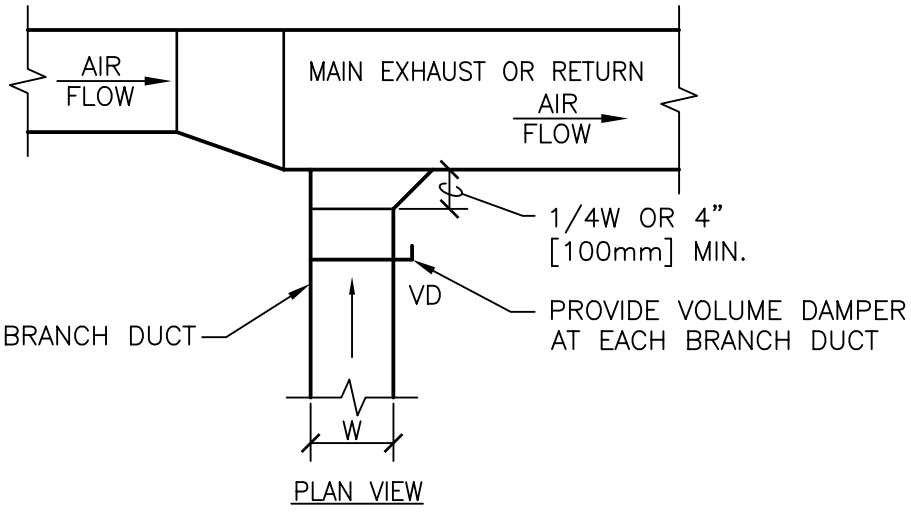
NTS

Department of Veterans Affairs

DETAIL TITLE / ALTERNATE SUPPLY DUCT TAKEOFF - AIR TERMINAL UNITS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-06.DWG



EXHAUST OR RETURN BRANCH DUCTWORK

NTS

DESIGNER'S NOTE:

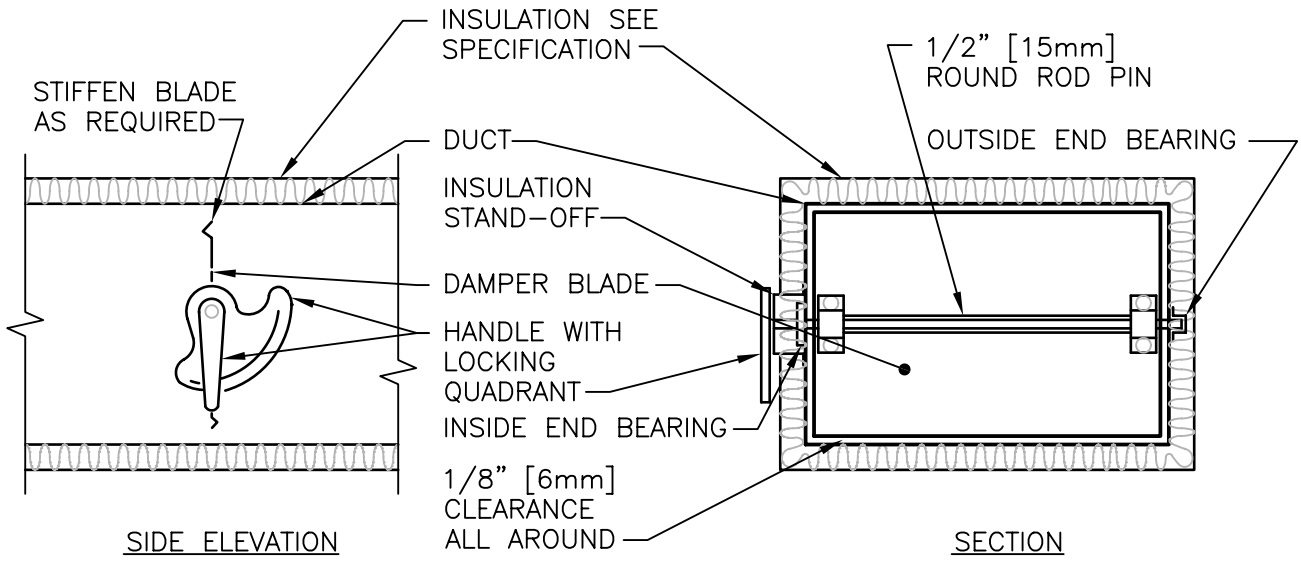
1. SHOW ALL VOLUME DAMPERS ON FLOOR PLANS.

Department of Veterans Affairs

DETAIL TITLE / EXHAUST OR RETURN BRANCH DUCTWORK

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-07.DWG



NOTE:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

VOLUME DAMPER DETAIL

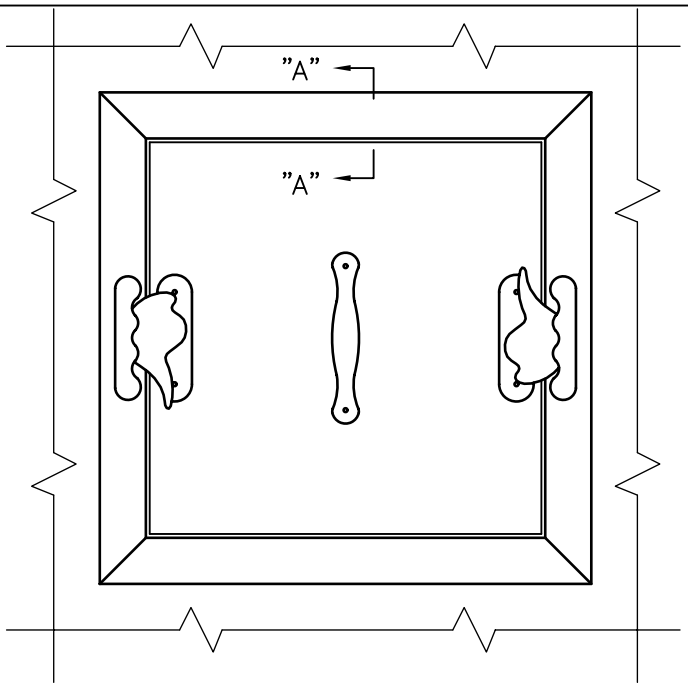
NTS

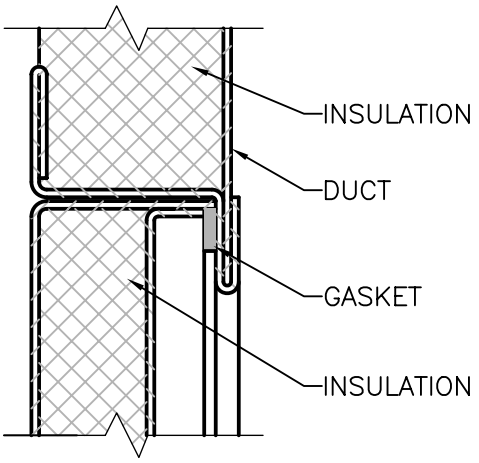
Department of Veterans Affairs

DETAIL TITLE / VOLUME DAMPER DETAIL

SCALE :NONE

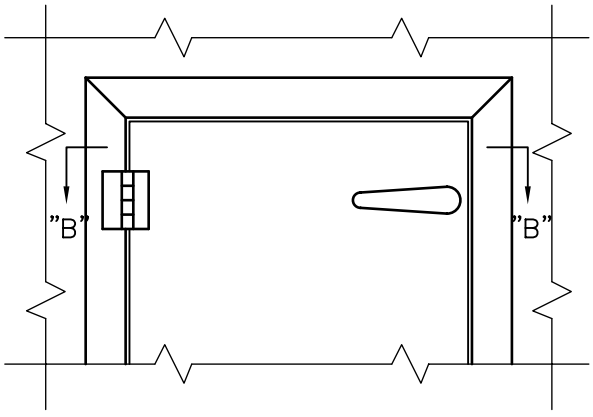
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-08.DWG

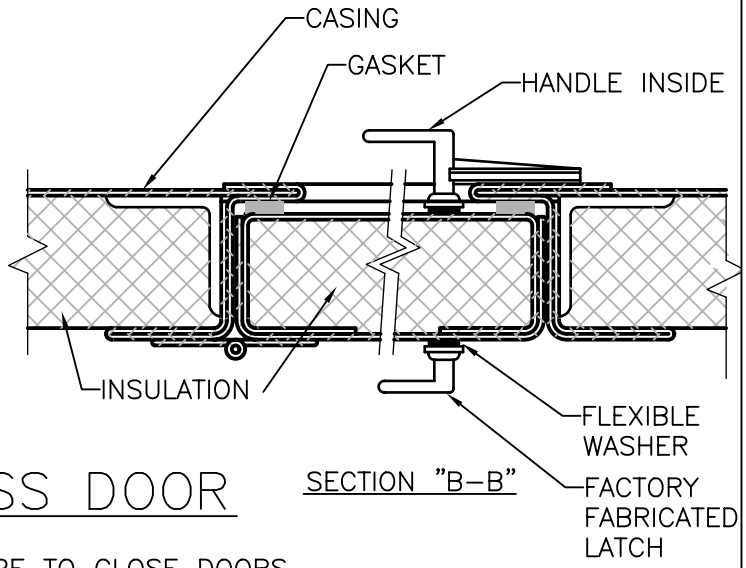




SECTION "A–A"

ACCESS PANEL





SECTION "B–B"

ACCESS DOOR

NOTES:
1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON–CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9–15

ACCESS PANEL AND DOOR DETAIL

#

NTS

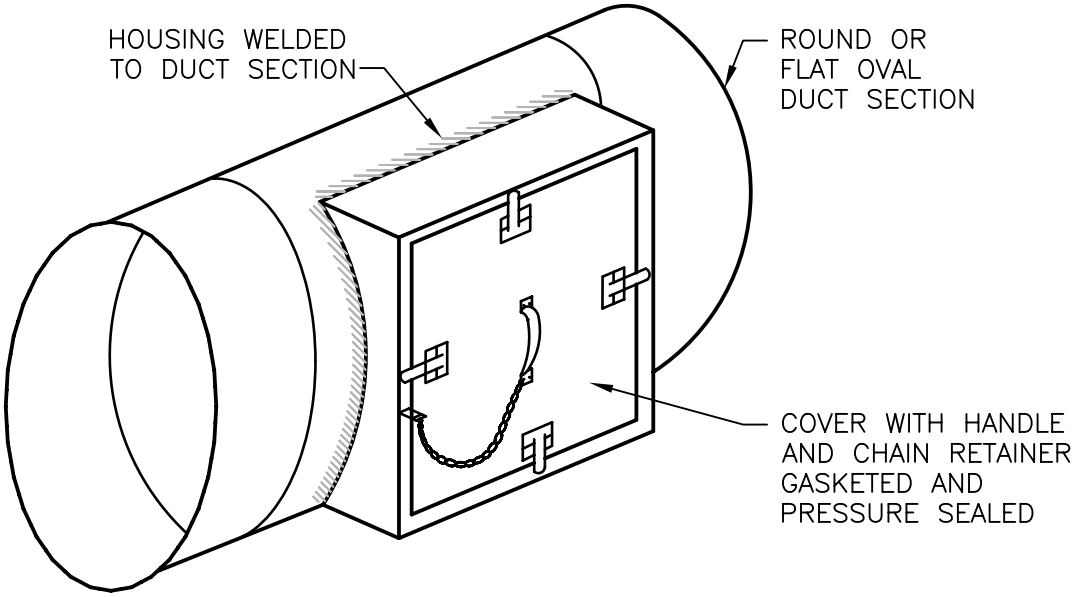
DESIGNERS NOTES:
1. USE ACCESS DOORS ON AIR HANDLING UNITS AND DUCTWORK INSTALLED IN EQUIPMENT ROOMS.
2. USE ACCESS PANELS ON ALL EQUIPMENT AND DUCTWORK INSTALLED ABOVE FINISHED CEILINGS.

Department of Veterans Affairs

DETAIL TITLE / ACCESS PANEL AND DOOR DETAIL

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD233100–09.DWG



ACCESS SECTION FOR ROUND/OVAL DUCT

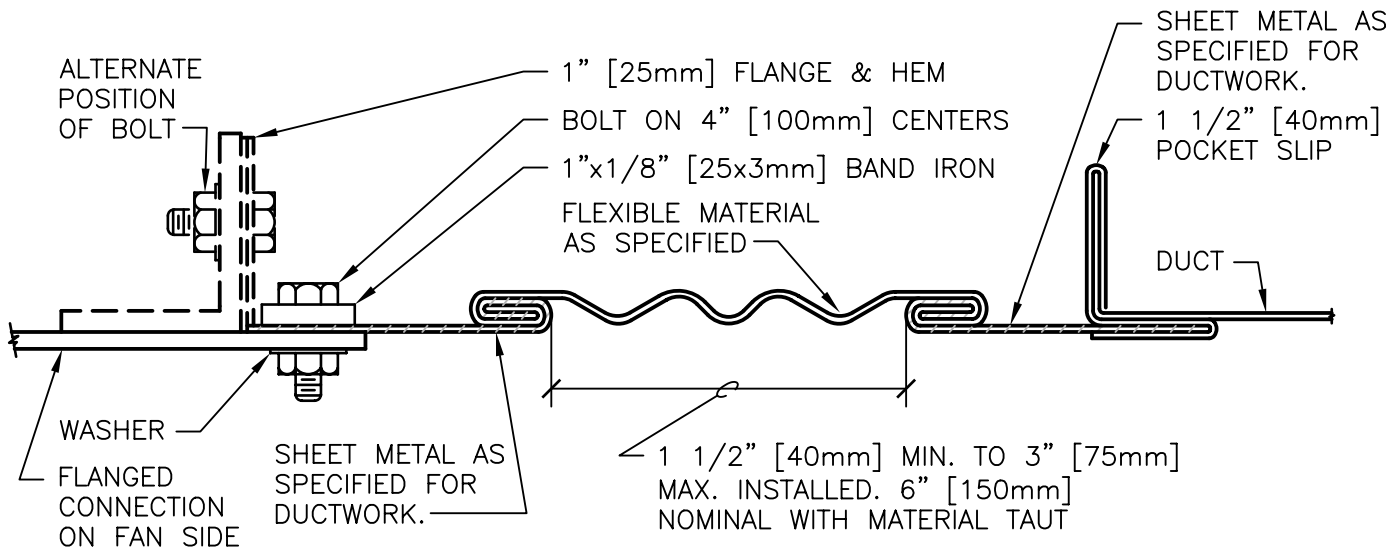
NTS

Department of Veterans Affairs

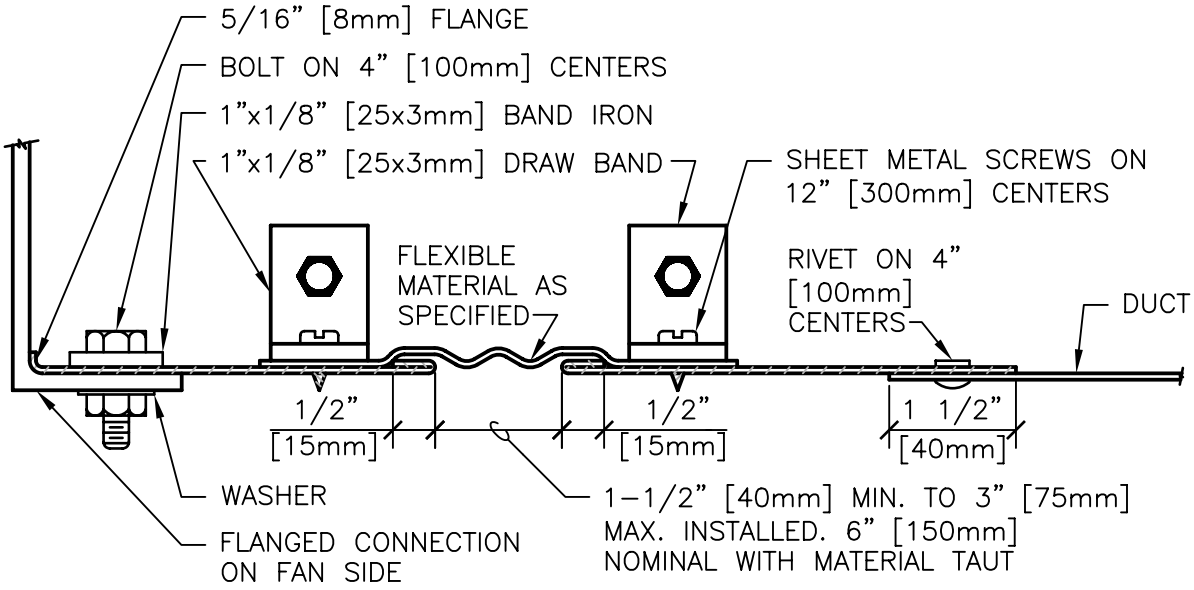
DETAIL TITLE / ACCESS SECTION FOR ROUND/OVAL DUCT

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-10.DWG



RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

FLEXIBLE DUCT CONNECTIONS

#

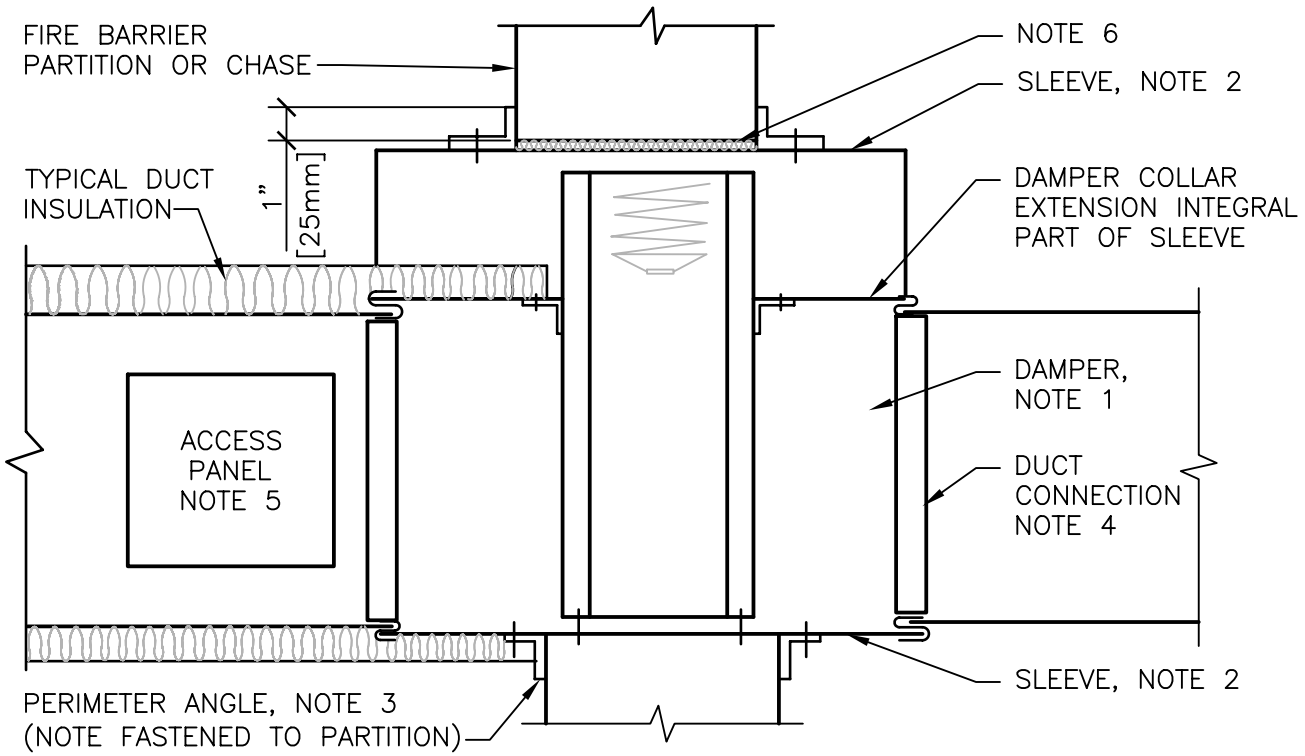
NTS

Department of Veterans Affairs

DETAIL TITLE / FLEXIBLE DUCT CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-11.DWG



NOTE:

1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, 1S SIMILAR. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION OR FLOOR AND NOT OUTSIDE THE PENETRATION.

2. GALVANIZED SLEEVE: GAGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.

3. PERIMETER ANGELS: GALVANIZED STEEL, NOT LESS THAN 1 1/2"x1 1/2" [40x40mm], 14 GAGE, TO PROVIDE 1" [25mm] MINIMUM OVERLAP OF OPENING ON ALL 4 SIDES.

4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES SHOWN IN SMACNA. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS.

5. PROVIDE 1/4" TO 1/2" [6 TO 15mm] CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.

6. ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND MECHANICAL ROOM FLOORS, SHALL BE PROVIDED WITH 3" [75mm] HIGH

7. CONCRETE CURB AROUND OPENING FOR DUCT.

SECTION THRU
FIRE DAMPER INSTALLATION

#

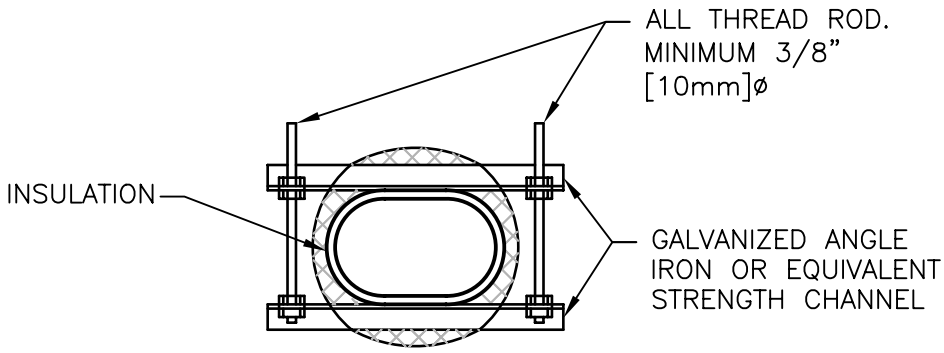
NTS

Department of Veterans Affairs

DETAIL TITLE / SECTION THRU
FIRE DAMPER INSTALLATION

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-12.DWG



NOTE:

1. PROVIDE BRACING TO LIMIT THE AMPLITUDE OF WALL VIBRATION AND WALL DEFLECTION TO SPECIFIED MAXIMUMS.

2. MINIMUM BRACING REQUIREMENTS:

MAXIMUM DUCT WIDTH IN. [mm]	MAXIMUM SIZE ANGLE IN. [mm]	MAXIMUM SPACING IN. [mm]
UP TO 26 [650]	NONE	
27 [675] TO 40 [1000]	1-1/2x1-1/2x3/16 [40x40x7]	72 [1800]
41 [1000] TO 60 [1500]	2x2x3/16 [50x50x7]	48 [1200]
61 [1500] TO 72 [1800]	2x2x3/16 [50x50x7]	24 [600]

3. INSULATION: FOR COLD DUCTS INSULATE BRACES AND PROVIDE VAPOR BARRIER.

FLAT OVAL DUCT HANGERS/REINFORCEMENT

NTS

Department of Veterans Affairs

DETAIL TITLE / FLAT OVAL DUCT HANGERS/REINFORCEMENT

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-13.DWG

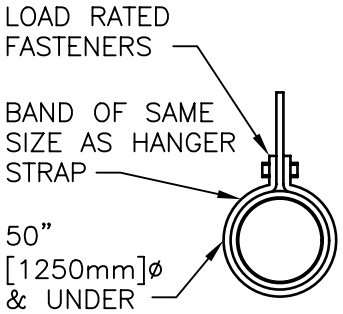
Department of Veterans Affairs

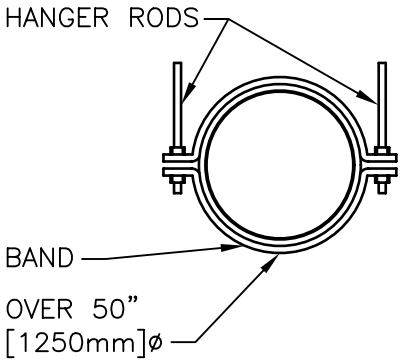
DETAIL TITLE / ROUND DUCT HANGERS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD233100-14.DWG





HANGER STRAPS OR RODS

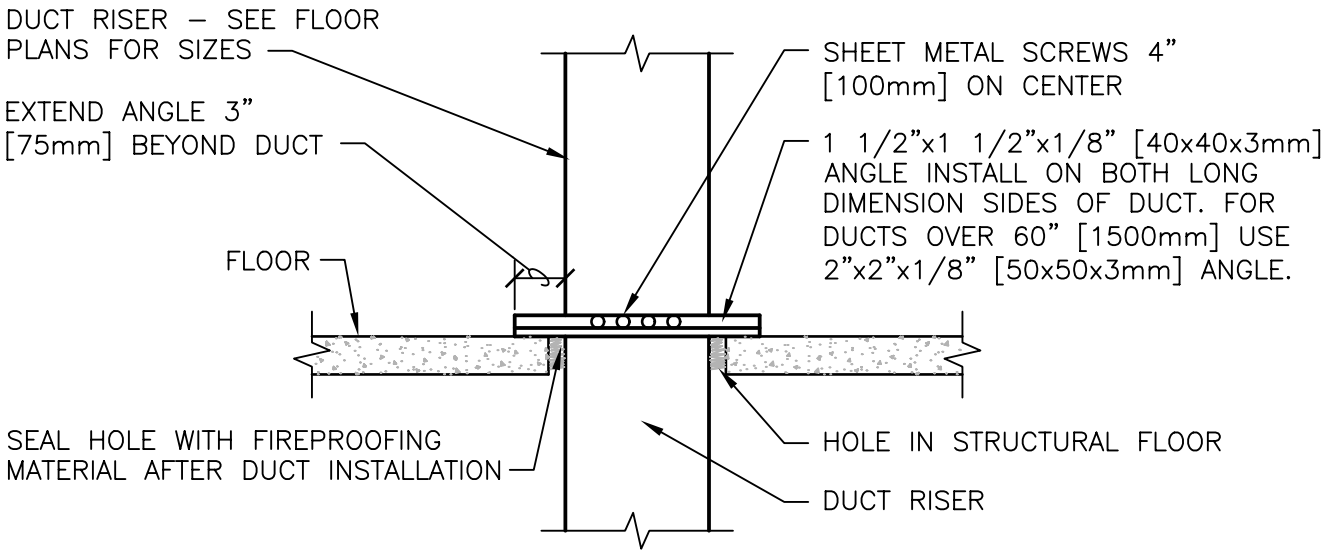
MAX. DUCT ø IN. [mm]	QUANTITY/SIZE IN. [mm]	MAX. LOAD LBS. [kg]	MAX. SPACING IN. [mm]
26 [650]	ONE 1 [25] x 22 GA STRAP	260 [119]	144 [3600]
36 [900]	ONE 1 [25] x 18 GA STRAP	420 [190]	144 [3600]
50 [1250]	ONE 1 [25] x 16 GA STRAP	700 [317]	144 [3600]
60 [1500]	TWO 3/8 [10]ø. RODS	1320 [598]	144 [3600]
84 [2100]	TWO 1/2 [13]ø RODS	2500 [1133]	144 [3600]

NOTE:
TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

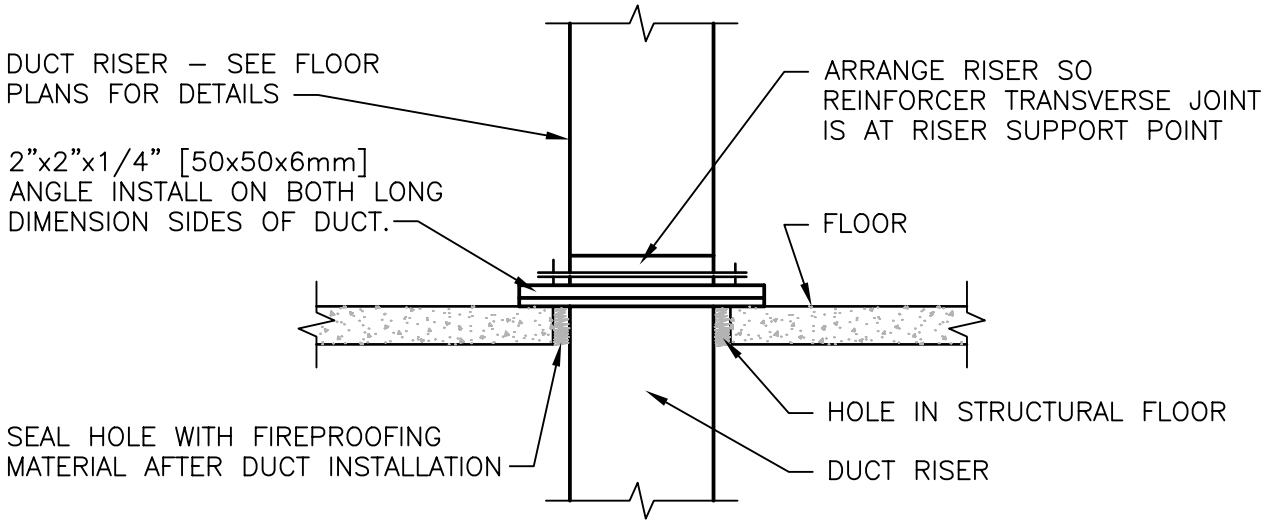
ROUND DUCT HANGERS

NTS

DESIGNER'S NOTE:
DESCRIBE OR DETAIL UPPER ATTACHMENTS APPLICABLE TO PARTICULAR PROJECTS.



0.5 INCH WG [125Pa] TO 2 INCHES WG [500Pa] DUCT RISER SUPPORT



2 INCHES WG [500Pa] TO 4 INCHES WG [1000Pa] DUCT RISER SUPPORT

NOTE:
ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND FAN ROOM FLOORS SHALL BE PROVIDED WITH A 3" [75mm] HIGH CONCRETE CURB AROUND OPENING FOR DUCT.

DUCT RISER SUPPORTS

NTS

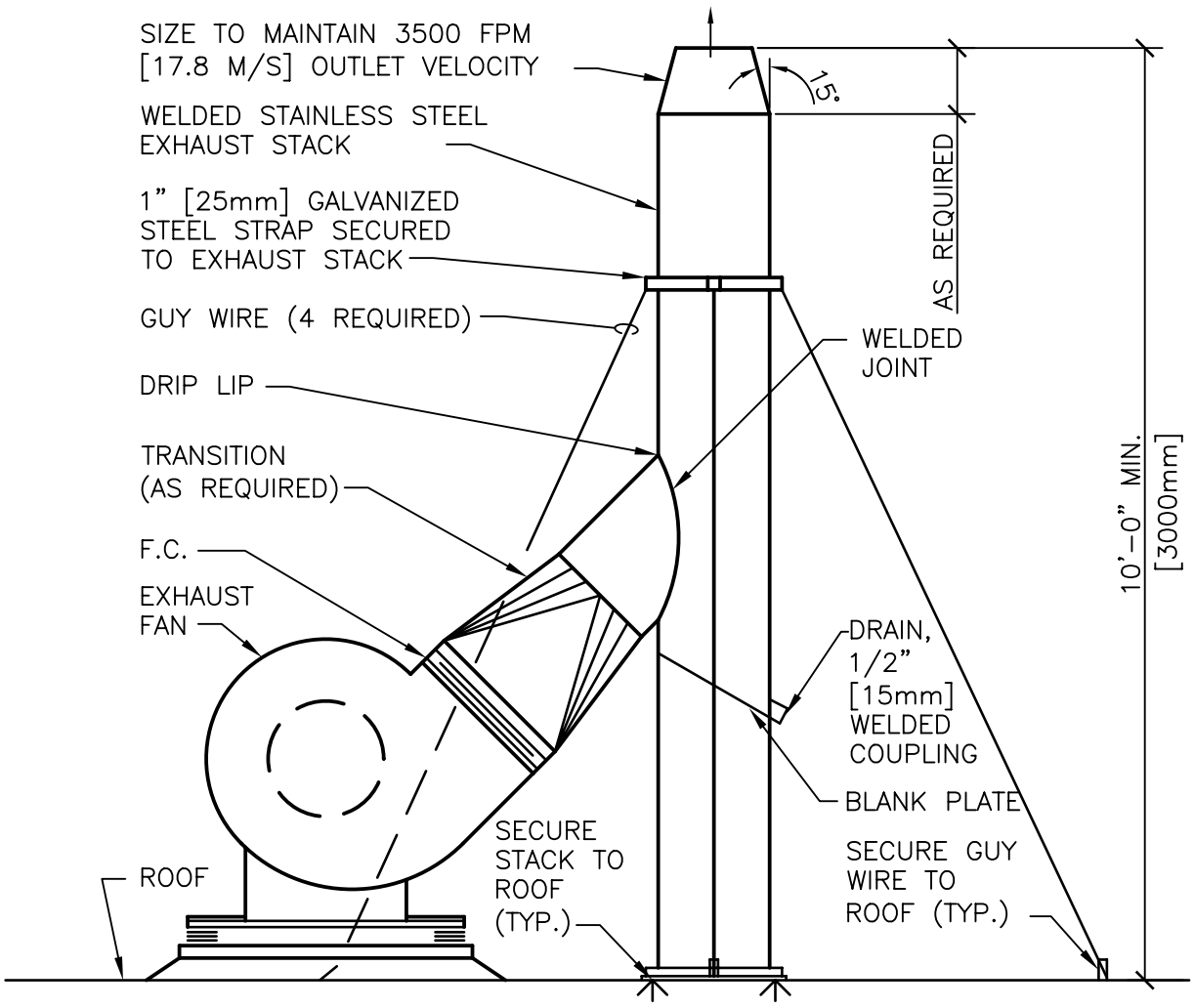
DESIGNER'S NOTE:
INDICATE ON DRAWING THE DUCT PRESSURE CLASS 2" WG [500Pa] WG, 3" WG [750Pa] OR 4" WG [1000Pa].

Department of Veterans Affairs

DETAIL TITLE / DUCT RISER SUPPORTS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-15.DWG



EXHAUST STACK DETAIL

NTS

DESIGNER'S NOTE:

1. 10 FEET MINIMUM HEIGHT IS SHOWN. INCREASE THE HEIGHT, AS REQUIRED, TO COMPLY WITH THE RECOMMENDATIONS OF THE DISPERSION ANALYSIS.

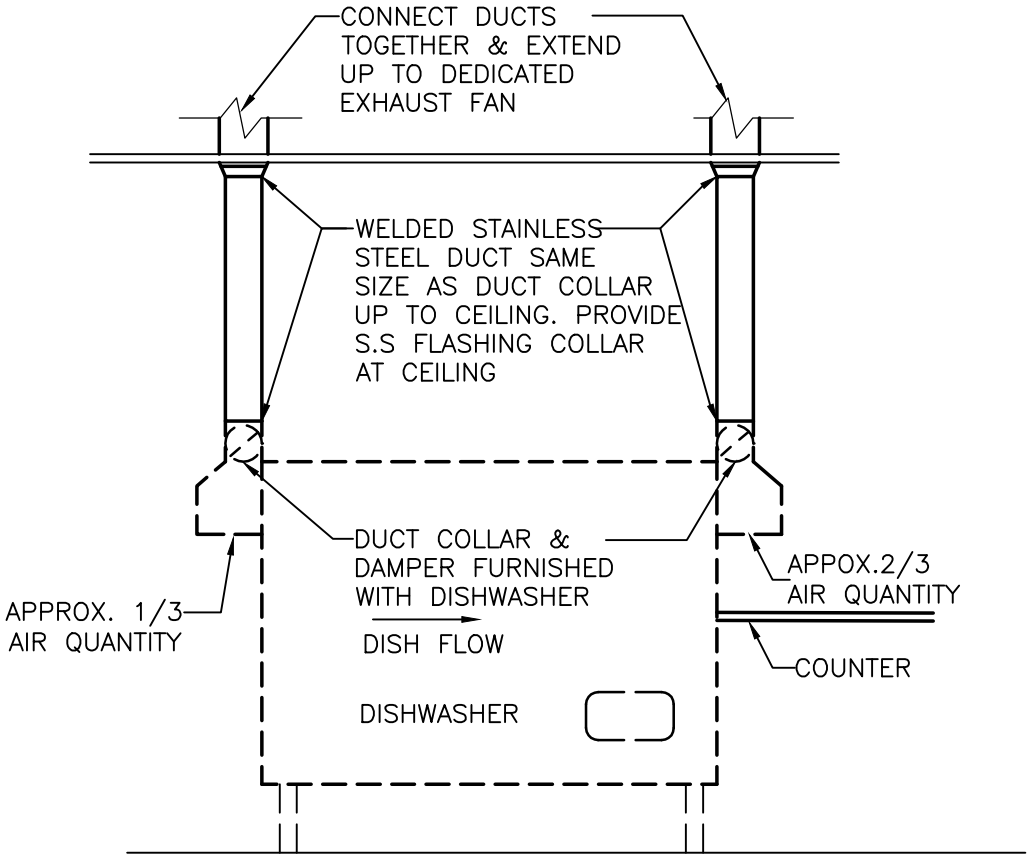
2. USE THIS DETAIL FOR FUME HOODS,BIOLOGICAL SAFETY CABINETS, ISOLATION ROOM EXHAUST AND ANY OTHER APPLICABLE AREA.

Department of Veterans Affairs

DETAIL TITLE / EXHAUST STACK DETAIL

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-16.DWG



NOTES:

1. ALL DUCTS SHALL BE WATER TIGHT WELDED STAINLESS STEEL TO EXHAUST FAN.
2. PITCH DUCTS DOWN TOWARD INTAKE OPENINGS OR PROVIDE DRAIN AT ANY POINT WHERE WATER WILL COLLECT.
3. SEE FLOOR PLANS FOR EXHAUST AIR VOLUME AND DUCT SIZES.

EXHAUST DUCTWORK - GLASSWASHER

NTS

DESIGNER'S NOTES:

1. DETAIL IS FOR DISHWASHER/GLASSWASHER SEE EQUIPMENT DRAWINGS.

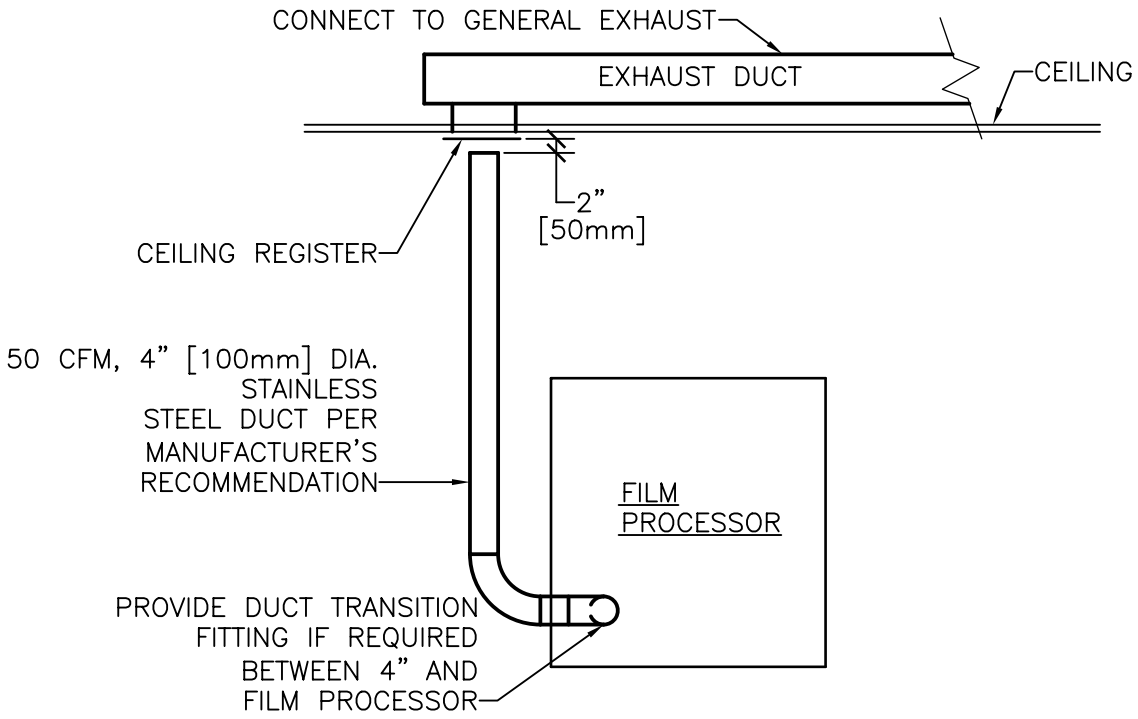
Department of Veterans Affairs

DETAIL TITLE / EXHAUST DUCTWORK -GLASSWASHER

SCALE :NONE

DATE ISSUED :MAY 2011

CADD DETAIL NO. : SD233100-17.DWG



NOTE:

1. USE THIS DETAIL ONLY IF THE FILM PROCESSING INVOLVES USE OF CHEMICALS.

DUCTWORK CONNECTION - FILM PROCESSOR

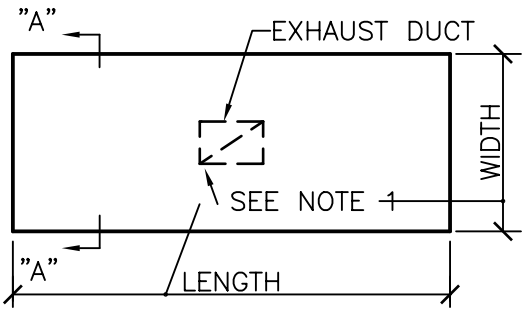
NTS

Department of Veterans Affairs

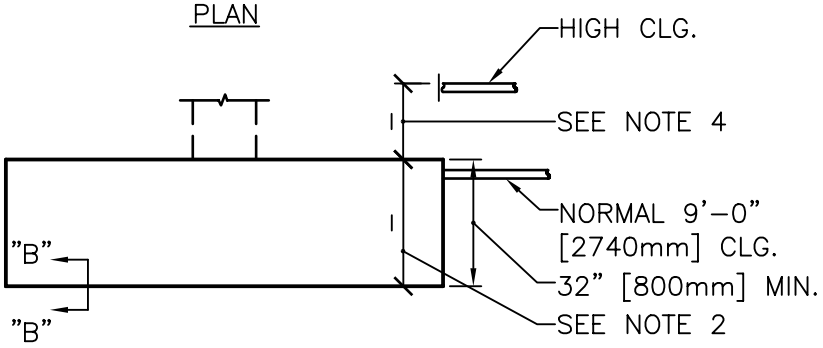
DETAIL TITLE / DUCTWORK CONNECTION - FILM PROCESSOR

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD233100-18.DWG

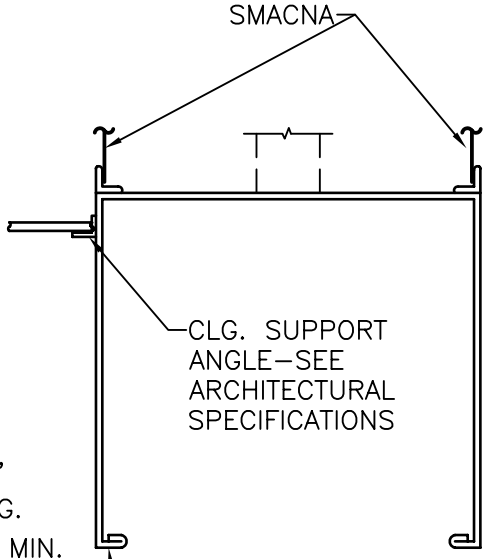


PLAN

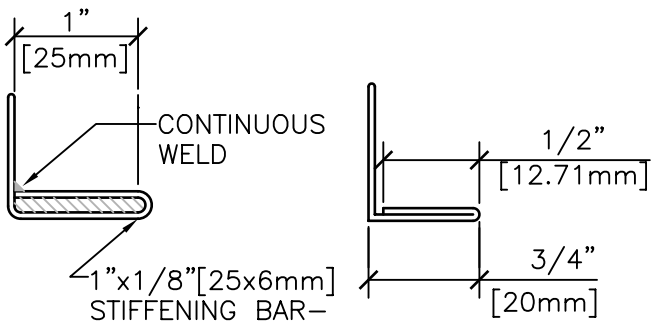


FRONT ELEVATION

SUPPORT ANGLES OR STANDING SEAMS SECURE TO STRUCTURE TO ABOVE AS RECOMMENDED BY SMACNA



SECTION "A–A"



SECTION "B–B"

NOTES:

1. HOODS SHALL BE STAINLESS STEEL, SEE SPECIFICATIONS. FOR HOOD SIZE & LOCATION SEE EQUIPMENT SCHEDULE. FOR EXHAUST DUCT CONNECTIONS – SEE FLOOR PLANS.
2. ALL HOODS SHALL BE 6'–6" [2m] ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. HOODS OVER URNS SHALL BE 7'–6" [2.3m] MINIMUM ABOVE FINISHED FLOOR.
3. HOODS OVER 6'–0" [1.9m] LONG WITH 2 OR MORE SECTIONS, SHALL HAVE INSIDE STANDING SEAM AND 1"x1/8" [25x6mm] STIFFENING BAR – SEE SECTION "B–B".
4. EXTEND SIDE & END SHEET TO SUIT HIGH CEILING WHEN REQUIRED.
5. DETAIL SHOWS HOOD IN OPEN SPACE. WHEN HOOD IS INSTALLED AT WALL OR PARTITION SECURE TO WALL OR PARTITION WITH EXPANSION BOLTS.

HOOD TYPE "A"

NTS

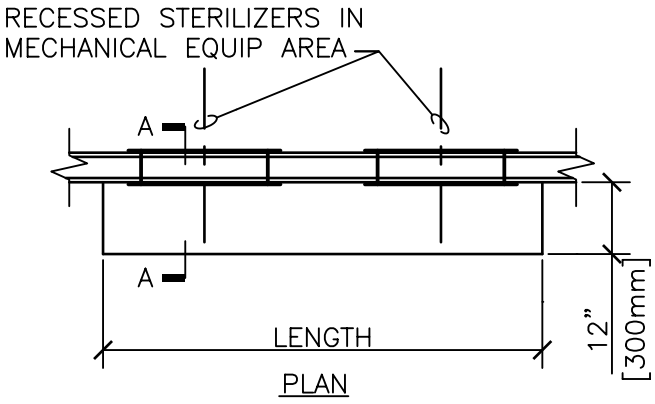
DESIGNER'S NOTE:
VERIFY ALL DIMENSIONS. SEE ARCHITECTURAL FLOOR PLANS FOR REQUIRED HOOD LOCATIONS.

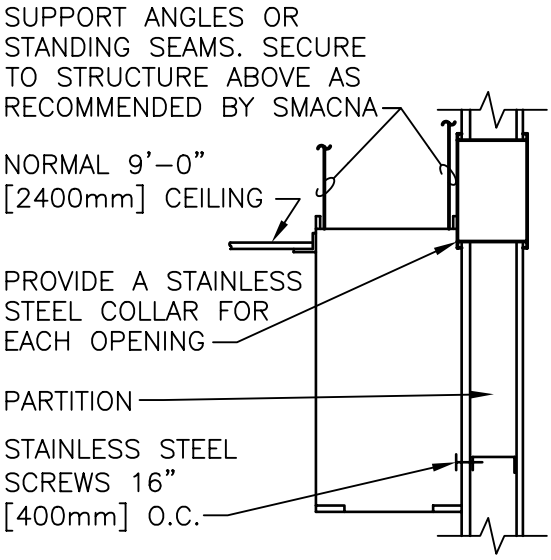
Department of Veterans Affairs

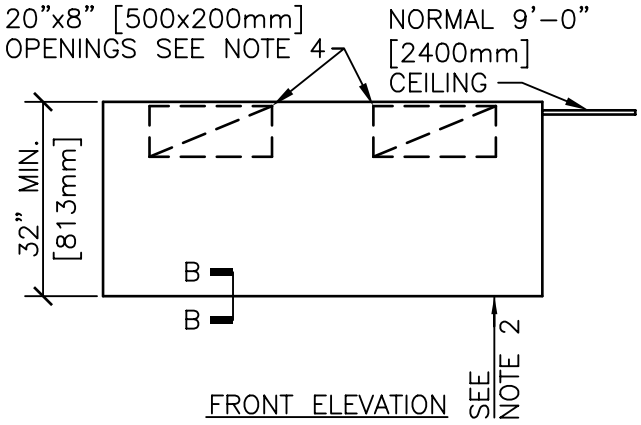
DETAIL TITLE / HOOD TYPE "A"

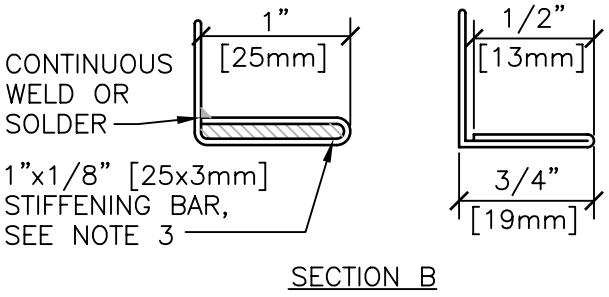
SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD233100–19.DWG









NOTE:

1. HOODS SHALL BE STAINLESS STEEL. SEE SPECIFICATIONS. FOR HOOD SIZES & LOCATIONS SEE EQUIPMENT SCHEDULE OR FLOOR PLANS.
2. HOODS SHALL BE 6'-6" [1950mm] ABOVE FINISHED FLOOR.
3. HOODS OVER 6'-0" [1800mm] LONG WITH 2 OR MORE SECTIONS SHALL HAVE INSIDE STANDING SEAM AND 1"x1/8" [25x3mm] STIFFENING BAR. SEE SECTION B.
4. PROVIDE A 20"x8" [500x200mm] OPENING OVER EACH STERILIZER. LOCATE OPENING AS HIGH AS POSSIBLE IN HOOD, BUT BELOW CEILING IN MECHANICAL EQUIPMENT AREA IF ROOM HAS A CEILING.

HOOD TYPE "B"

NTS

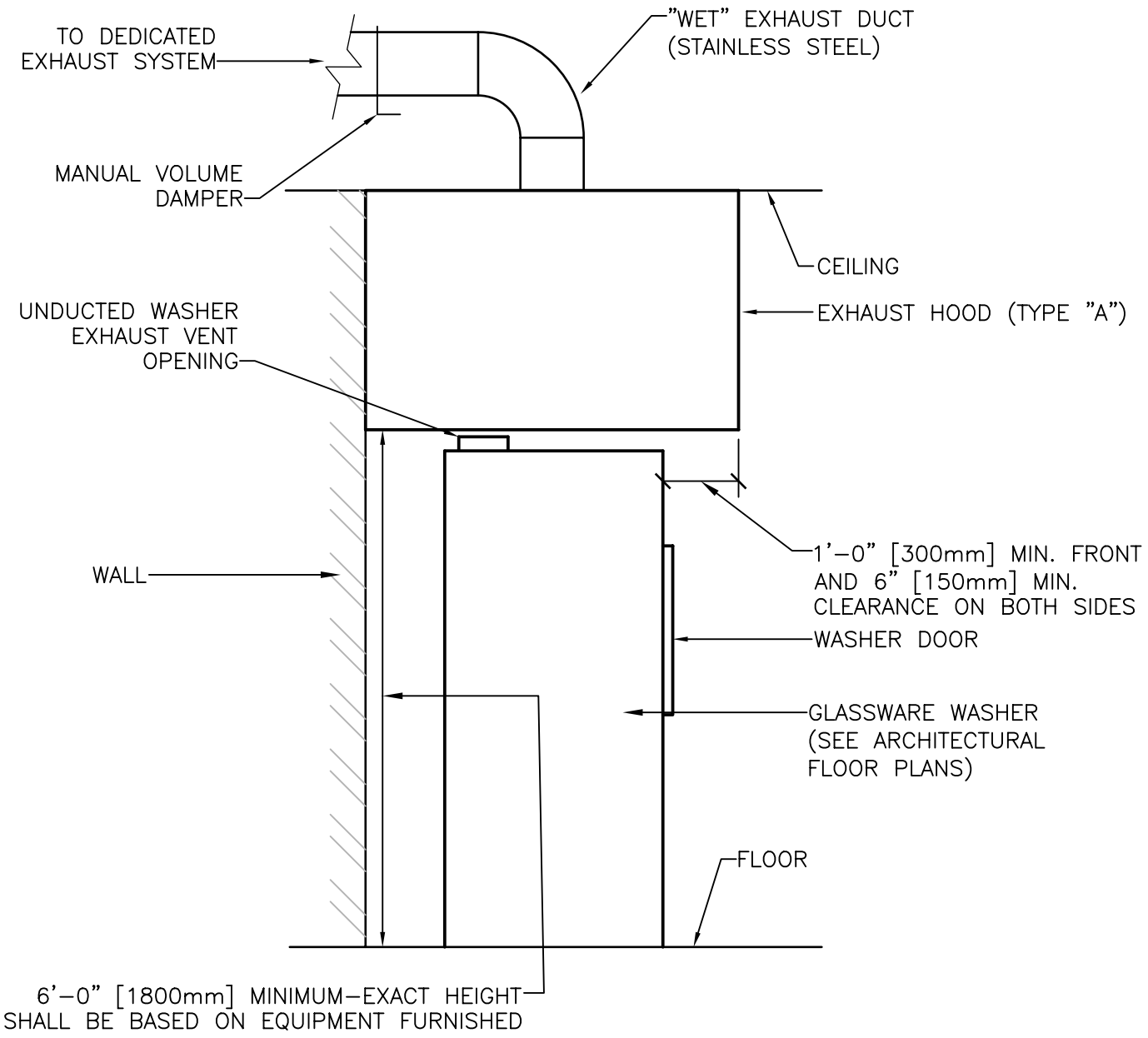
DESIGNER'S NOTE:
1. SEE ARCHITECTURAL PLANS FOR REQUIRED HOOD LOCATIONS. USE TYPE "B" HOOD FOR RECESSED STERILIZERS, WHEN STERILIZERS ARE INSTALLED IN A MECHANICAL EQUIPMENT AREA.

Department of Veterans Affairs

DETAIL TITLE / HOOD TYPE "B"

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-20.DWG



EXHAUST DUCTWORK- GLASSWARE WASHER

NTS

DESIGNER'S NOTES:

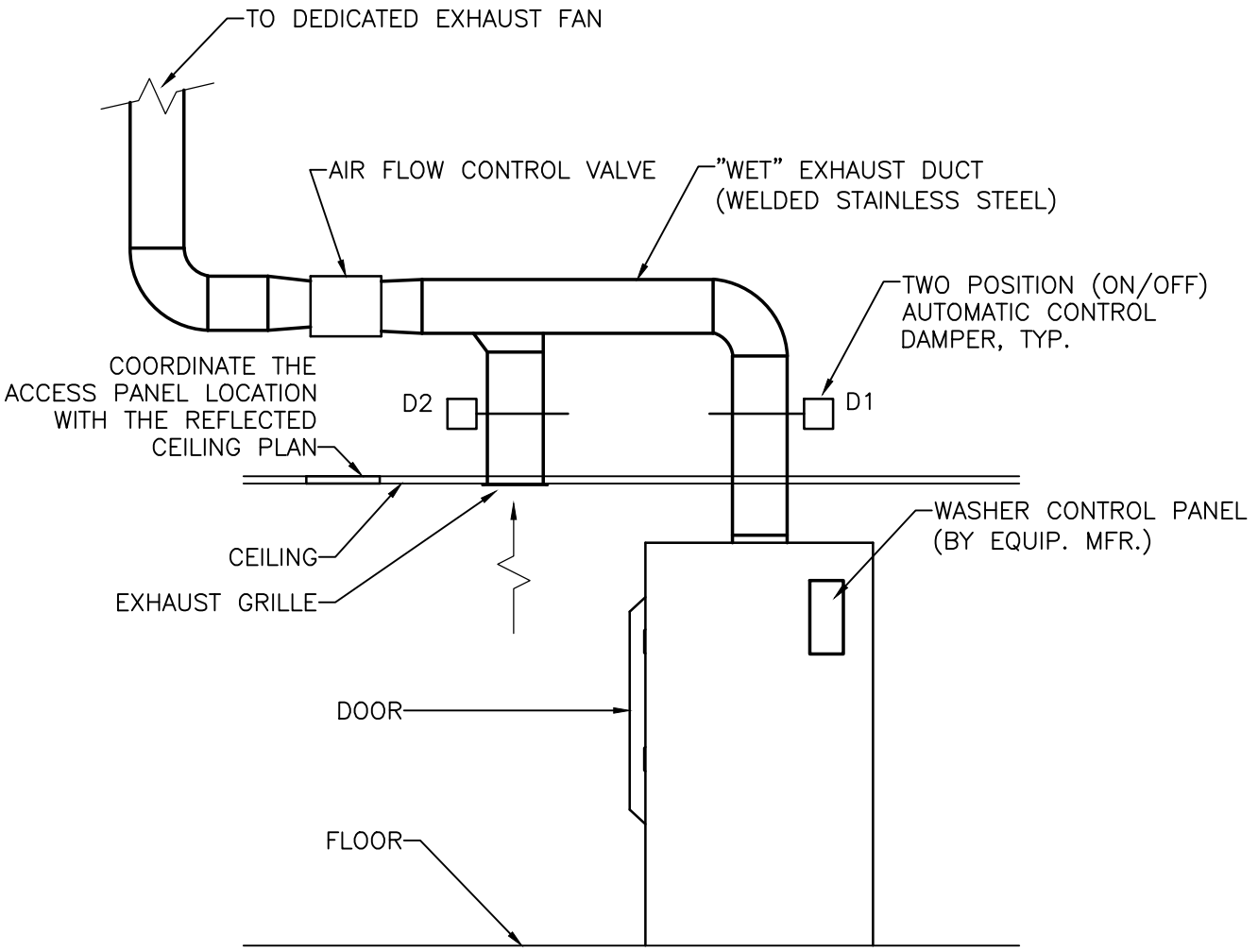
1. SEE VA STANDARD DETAIL 23 31 00-20 FOR CONSTRUCTION & INSTALLATION DETAILS.
2. COORDINATE HOOD DIMENSIONS AND EXHAUST AIR VOLUME SHOWN ON THE EQUIPMENT DRAWINGS. EXHAUST AIR VOLUME SHALL BE BASED ON THE 100 FPM [.5 M/sec] VELOCITY THRU THE FACE AREA OF THE HOOD.

Department of Veterans Affairs

DETAIL TITLE / EXHAUST DUCTWORK - GLASSWARE WASHER

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD233100-21.DWG



SEQUENCE OF CONTROL

1. WHEN WASHER DOOR IS OPEN CONTROL DAMPER D1 OPENS AND CONTROL DAMPER D2 CLOSES.
2. WHEN WASHER DOOR IS CLOSED CONTROL DAMPER D1 CLOSES AND CONTROL DAMPER D2 OPENS.
3. MAINTAIN EXHAUST DUCT UNDER NEGATIVE PRESSURE THROUGHOUT ITS RUN.

EXHAUST DUCTWORK - CAGE WASHER

NTS

DESIGNER'S NOTES:

1. COORDINATE EXHAUST CFM WITH THE ARCHITECTURAL EQUIPMENT DRAWINGS.
2. COORDINATE DAMPER OPERATION WITH WASHER DOOR, THRU THE WASHER CONTROL PANEL.

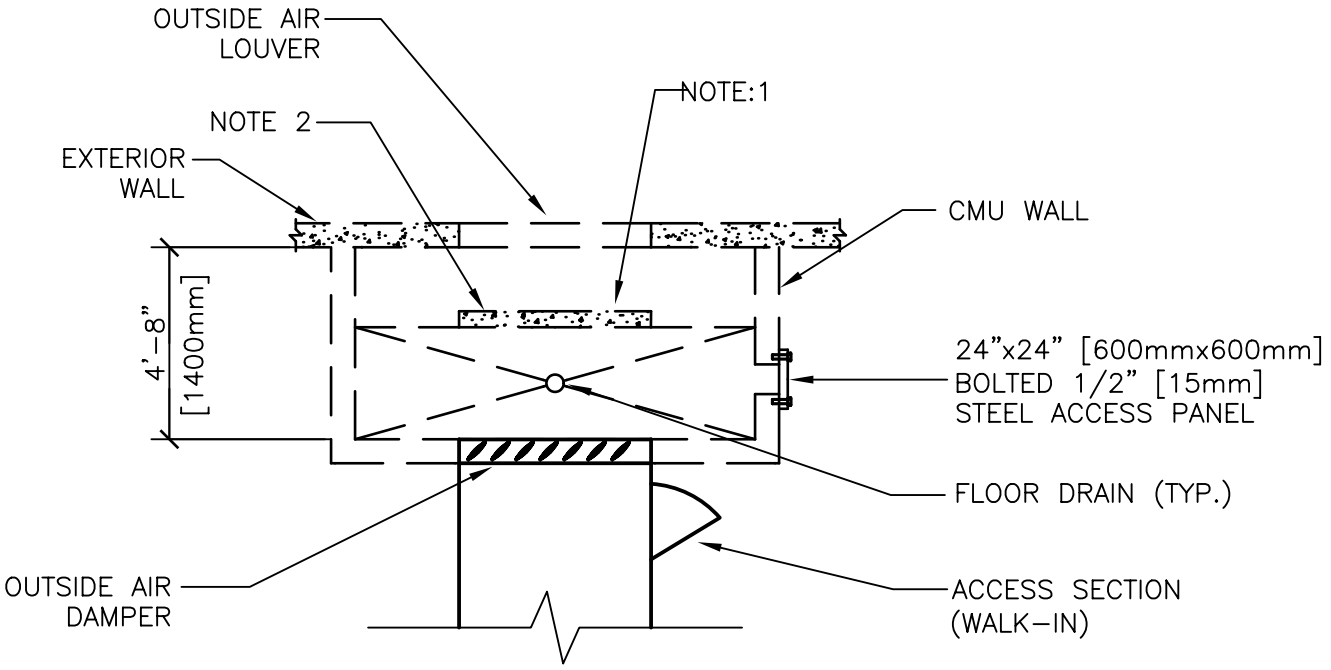
Department of Veterans Affairs

DETAIL TITLE / EXHAUST DUCTWORK - CAGE WASHER

SCALE :NONE

DATE ISSUED :MAY 2011

CADD DETAIL NO. : SD233100-22.DWG



DETAIL KEYNOTES:

1. THE DESIGN AND SUPPORTING DOCUMENTATION FOR THE BLAST RESISTANT CONCRETE WALL SHALL BE COORDINATED AND APPROVED BY A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER SPECIALIZING IN BLAST RESISTANT CONSTRUCTION.

2. LIMIT AIR VELOCITY TO 800 FPM [4.0 m/s] THRU PLENUM.

OUTSIDE AIR INTAKE FOR AIR HANDLER UNIT FOR MISSION CRITICAL FACILITY

#

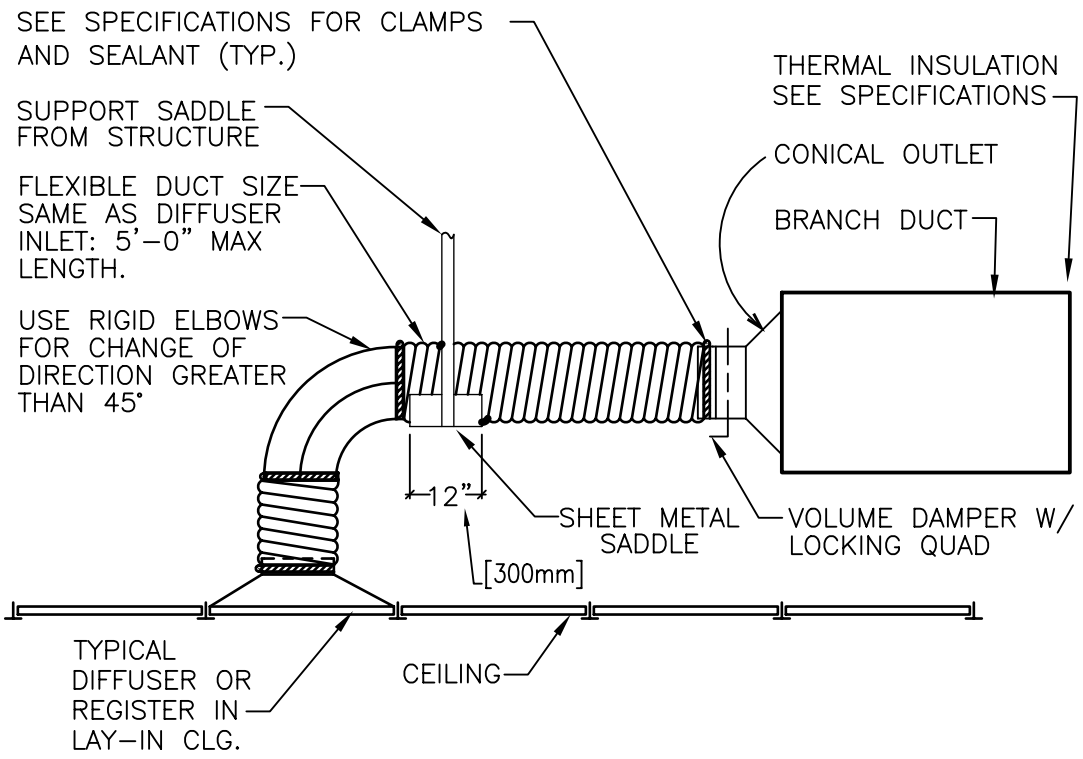
NTS

Department of Veterans Affairs

DETAIL TITLE / OUTSIDE AIR INTAKE FOR AIR HANDLER UNIT FOR MISSION CRITICAL FACILITY

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-23.DWG



NOTE:
THE USE OF FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

FLEXIBLE AIR DUCT CONNECTOR

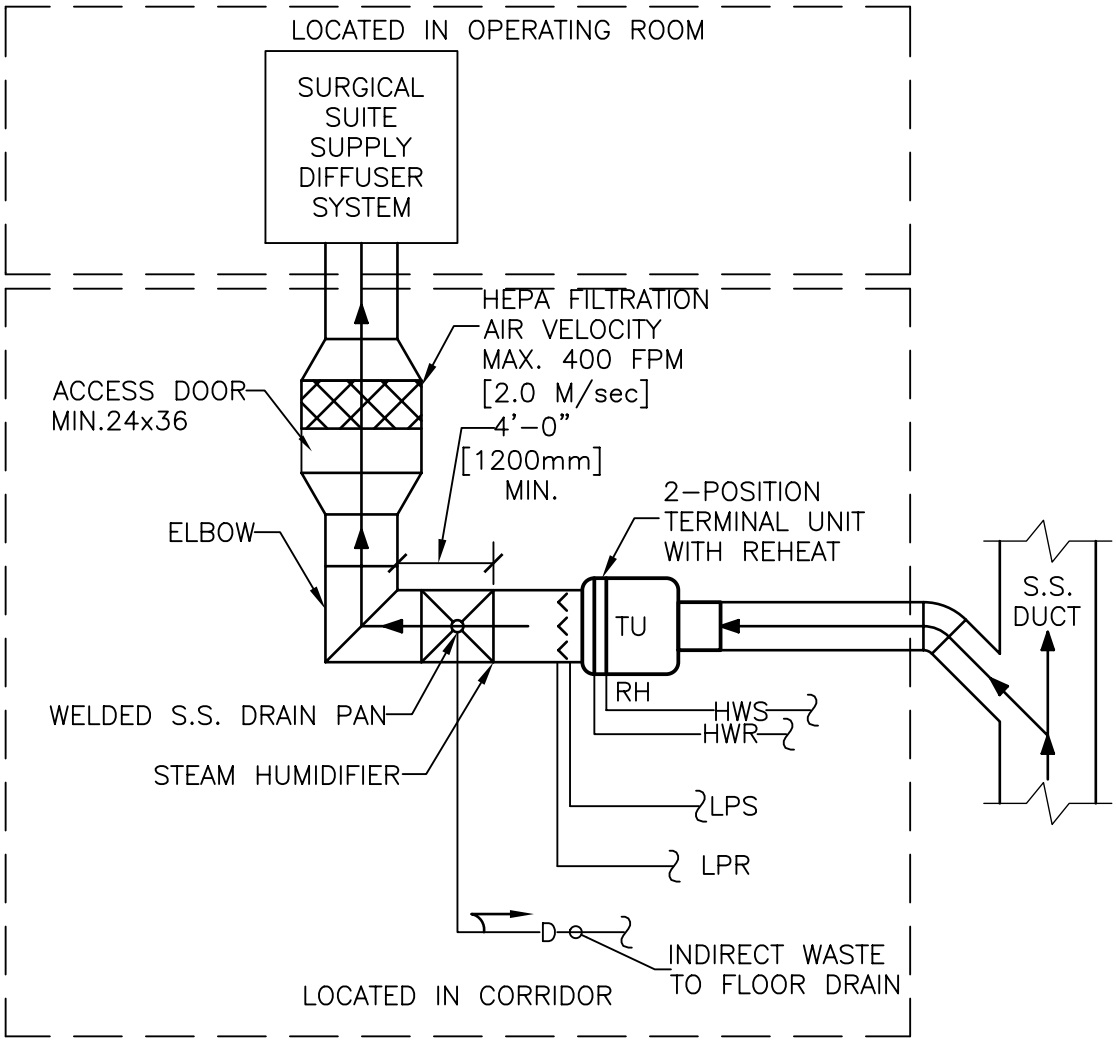
NTS

Department of Veterans Affairs

DETAIL TITLE / FLEXIBLE AIR DUCT CONNECTOR

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD233100-24.DWG



NOTES:
1.ALL DUCTWORK IS STAINLESS STEEL

SUPPLY DUCT DETAIL - OPERATING ROOM

#

NTS

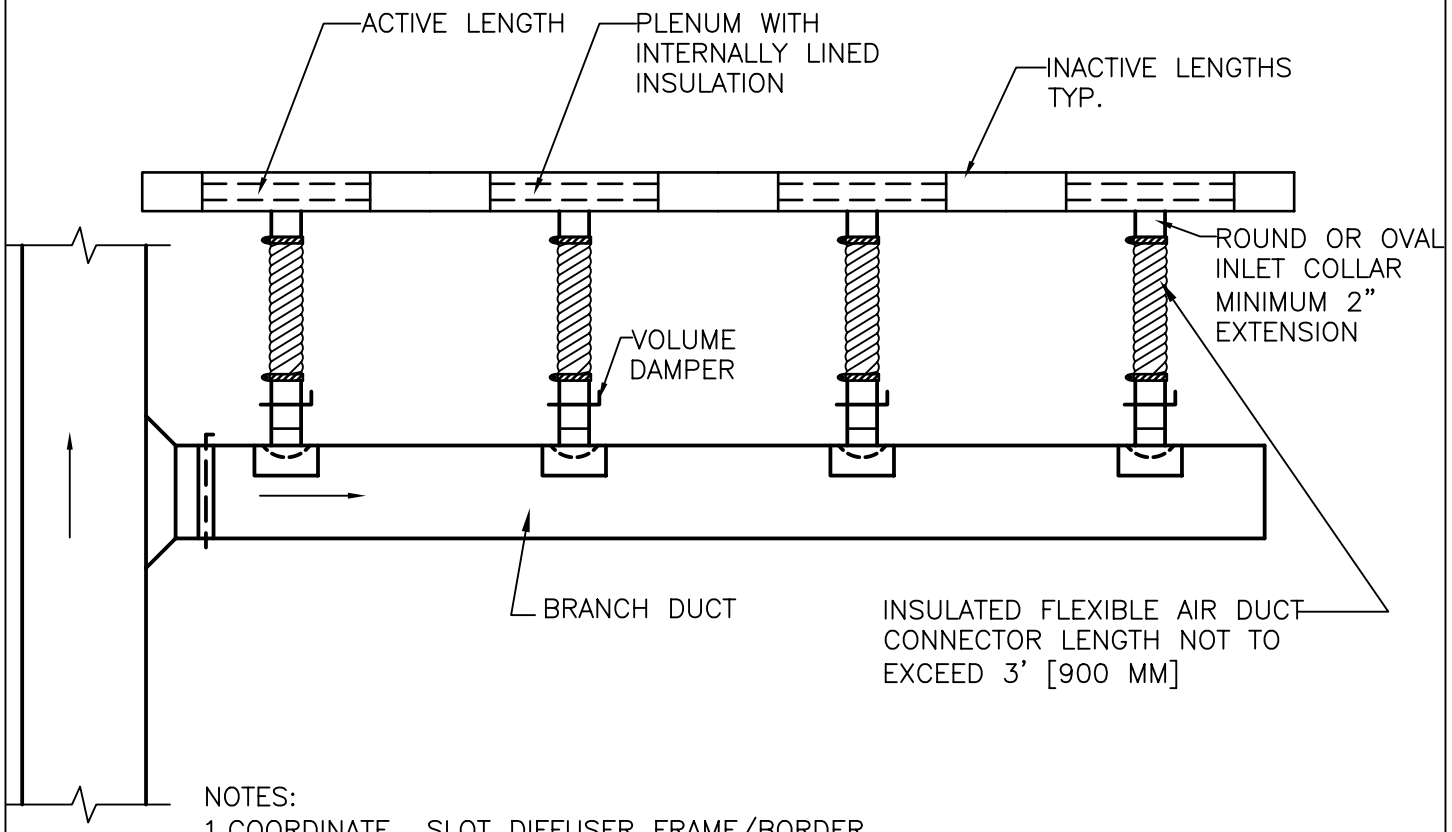
DESIGNERS NOTES:
1.PROVIDE 2 FULL CROSS SECTIONS THRU EACH OR.

Department of Veterans Affairs

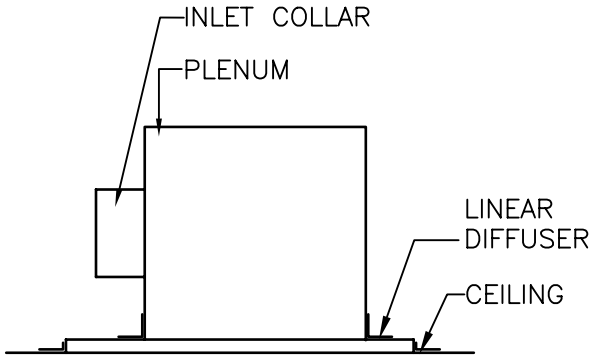
DETAIL TITLE / SUPPLY DUCT TAKEOFF DETAIL - OPERATING ROOM

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD233100-25.DWG



NOTES:
1. COORDINATE SLOT DIFFUSER FRAME/BORDER TYPE AND END BORDER CONFIGURATION WITH CEILING TYPE.



LINEAR SLOT DIFFUSER

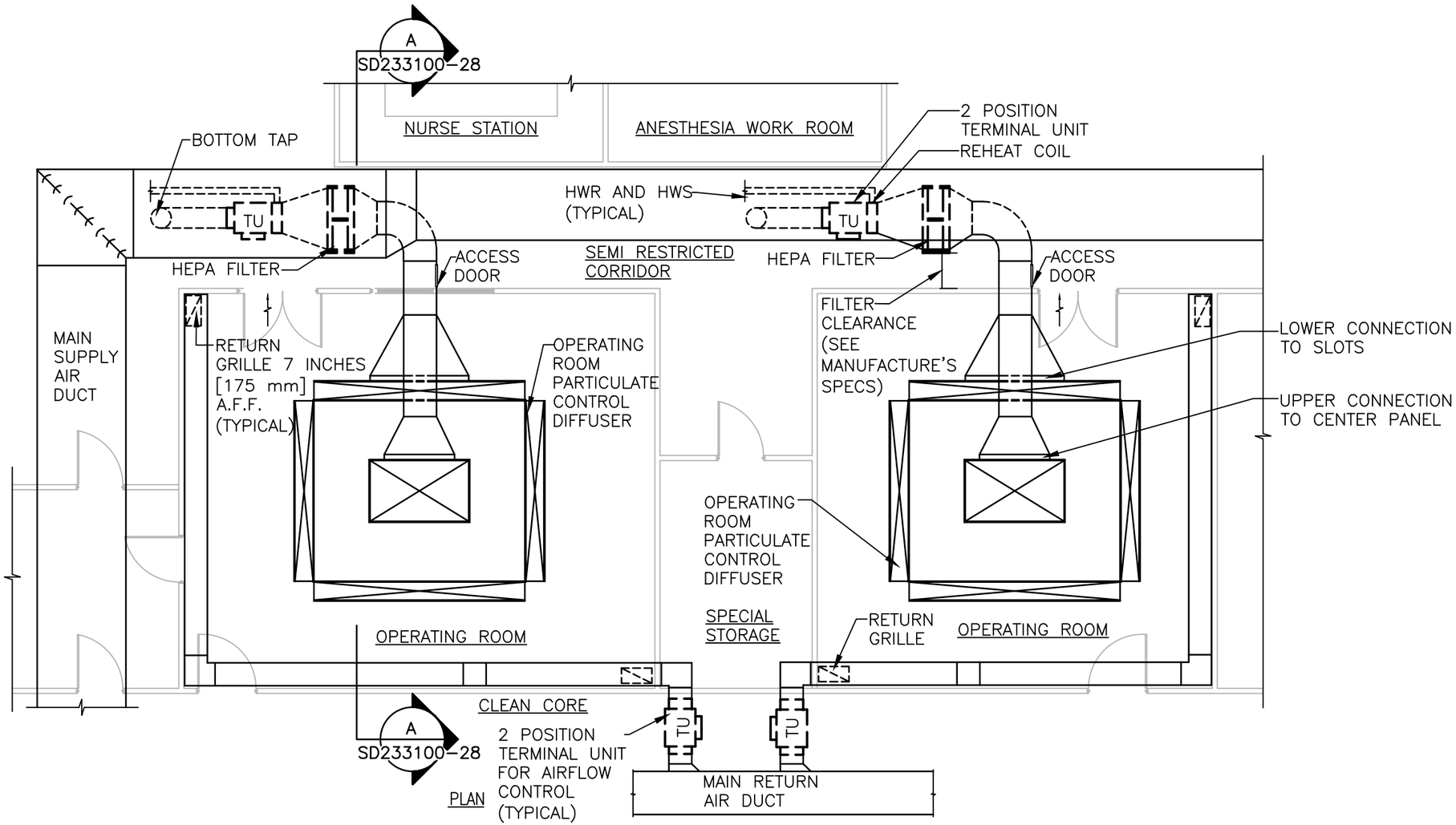
NTS

Department of Veterans Affairs

DETAIL TITLE / LINEAR SLOT DIFFUSERS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233100-26.DWG



NOTES: 1. ROOMS SHOWN ARE TYPICAL FOR VA DESIGN GUIDE PLATE FOR SURGERY. REFER TO ACTUAL FLOOR PLANS FOR SIZE AND LOCATION OF ROOMS.

2. THE AIR DISTRIBUTION LAYOUT IS APPLICABLE TO THE CYSTOSCOPY ROOM WHEN LOCATED WITHIN THE SURGERY SUITE.

OPERATING ROOM HVAC SYSTEM (TYPICAL)

NTS

DETAIL TITLE / OPERATING ROOM HVAC SYSTEM (TYPICAL)

SCALE :NONE

DATE ISSUED :MARCH 2010

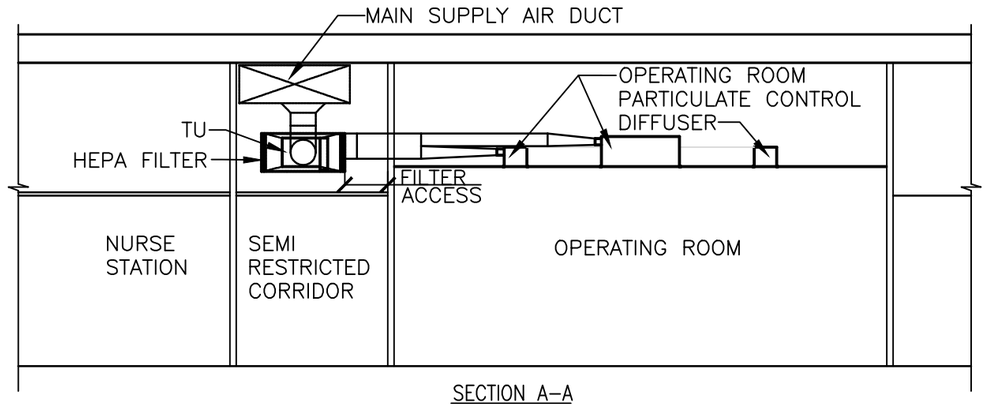
CADD DETAIL NO. SD233100-27.DWG

Department of Veterans Affairs

HEPA FILTER SIZING

FILTER IN SECTION VIEW	AIRFLOW RANGE		NOMINAL HEPA SIZE		NO. REQ.	APPROXIMATE OVERALL HOUSING SIZE		NET MAX FACE VELOCITY		AIR SIDE PRESSURE DROP			
										MAX INITIAL RESISTANCE		MAX CHANGE OUT RESISTANCE	
	CFM	(L/S)	INxINxIN	(mmxmmxmm)		INxINxIN	(mmxmmxmm)	FPM	(M/S)	IN WG	[Pa]	IN WG	[Pa]
	0–230	0–109	12x12x12	305x305x305	1	15x15x21	380x380x530	250	2	1	340	1.5	370
	230–500	109–236	24x12x12	610x305x305	1	24x15x21	610x380x530	250	2	1	340	1.5	370
	500–1100	236–519	24x24x12	610x610x305	1	24x27x21	610x685x530	250	2	1	250	1.5	370
	500–1100	236–519	24x12x12	610x305x305	2	48x15x21	1220x380x530	250	2	1	250	1.5	370
	1100–2200	519–1038	24x24x12	610x610x305	2	48x27x21	1220x685x530	250	2	1	250	1.5	370

NOTES:
1. SEE FILTER SCHEDULE SS234000–01



SECTION A–A

NOTES:
1.COORDINATE ACTUAL HEPA FILTER AND HOUSING SIZES WITH SELECTED MANUFACTURER.

HEPA FILTER SIZING CHART AND SURGICAL ROOM SECTION A-A

#

NTS

DESIGNER NOTES:
1.FOR GUIDANCE ONLY

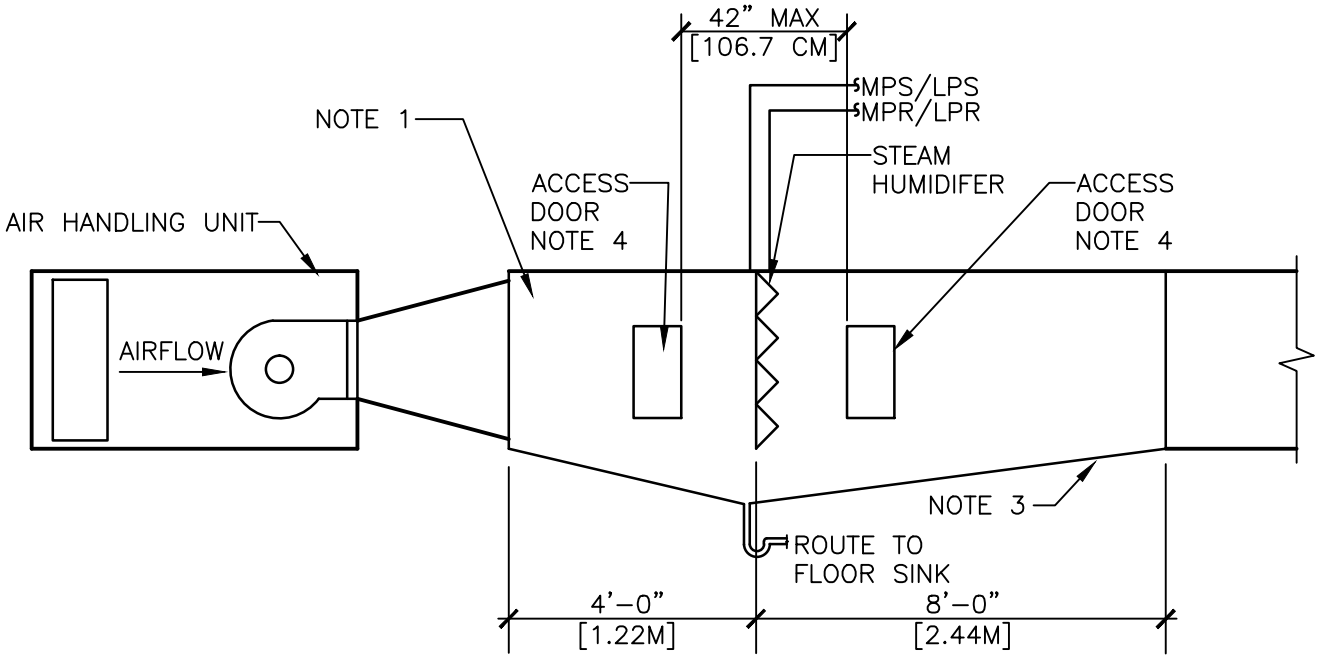
DETAIL TITLE / HEPA FILTER SIZING CHART & SURGICAL ROOM SECTION A-A

SCALE :NONE

DATE ISSUED :MARCH 2010

CADD DETAIL NO. SD233100-28.DWG

Department of Veterans Affairs



NOTES:

1. TRANSITION WELDED STAINLESS STEEL 4'[1.22M] UPSTREAM OF HUMIDIFIER AND 8' [2.44M] DOWNSTREAM OF HUMIDIFIER.
2. DETAIL ONLY APPLICABLE TO AHU'S WITHOUT AFTER FILTER DOWNSTREAM OF THE SUPPLY AIR FAN.
3. INTEGRAL STAINLESS STEEL DRAIN PAN SLOPE FROM ALL DIRECTIONS TO DRAIN CONNECTION. SLOPE .125" PER 1'-0" [0.3 CM PER 0.3 M].
4. PROVIDE MIN. 18" [45 CM] WIDE ACCESS DOOR, DIRECTLY UPSTREAM AND DOWNSTREAM OF HUMIDIFIER.

DUCT MOUNTED HUMIDIFIER

NTS

DESIGNER'S NOTE:

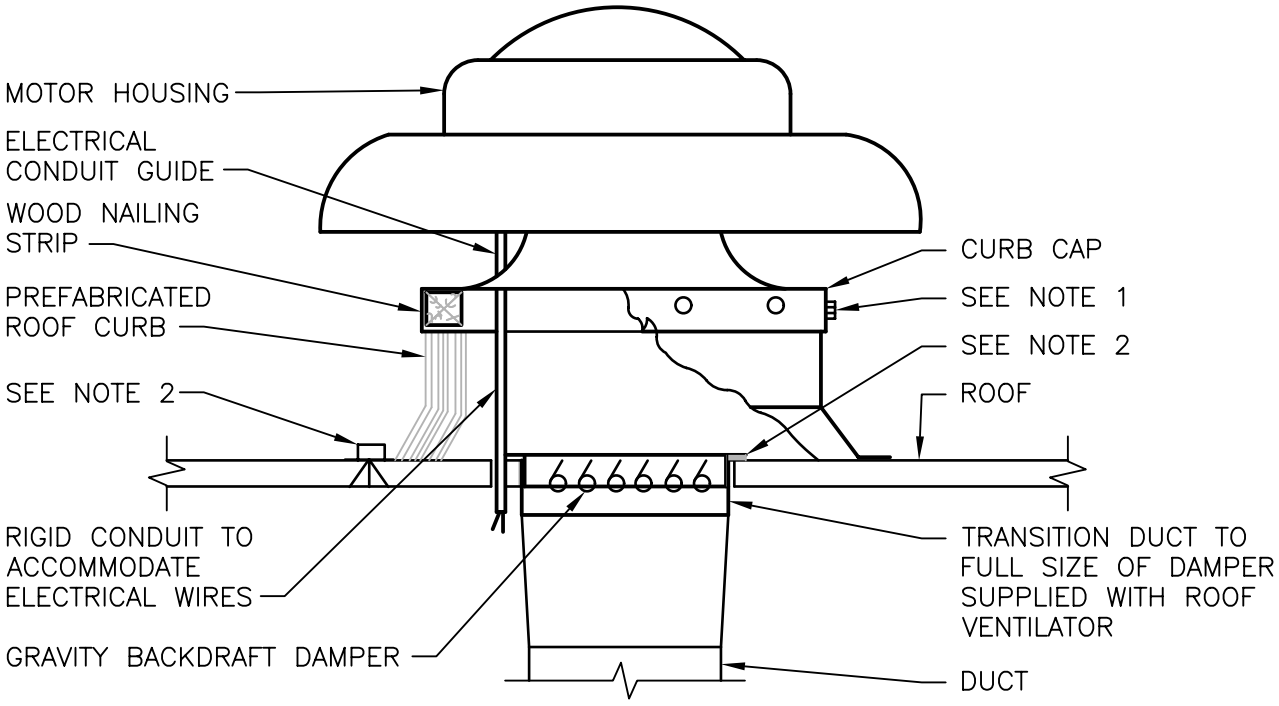
1. SEE DETAIL SD232213-07 FOR STEAM HUMIDIFIER PIPING CONNECTIONS.

Department of Veterans Affairs

DETAIL TITLE / DUCT MOUNTED HUMIDIFIER

SCALE :NONE

DATE ISSUED: MARCH 2010 CAD DETAIL NO.: SD233100-29.DWG



NOTE:

1. SECURE CURB CAP TO WOOD NAILING STRIP WITH 3/8" [10mm] CADMIUM PLATED LAG BOLTS NOT OVER 12" [300mm] ON CENTER.

2. SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF).

3. RUN ELECTRICAL LINES THROUGH CLEARANCE HOLE PROVIDED IN GRAVITY DAMPER, THEN THROUGH VENTILATOR ELECTRICAL CONDUIT GUIDE.

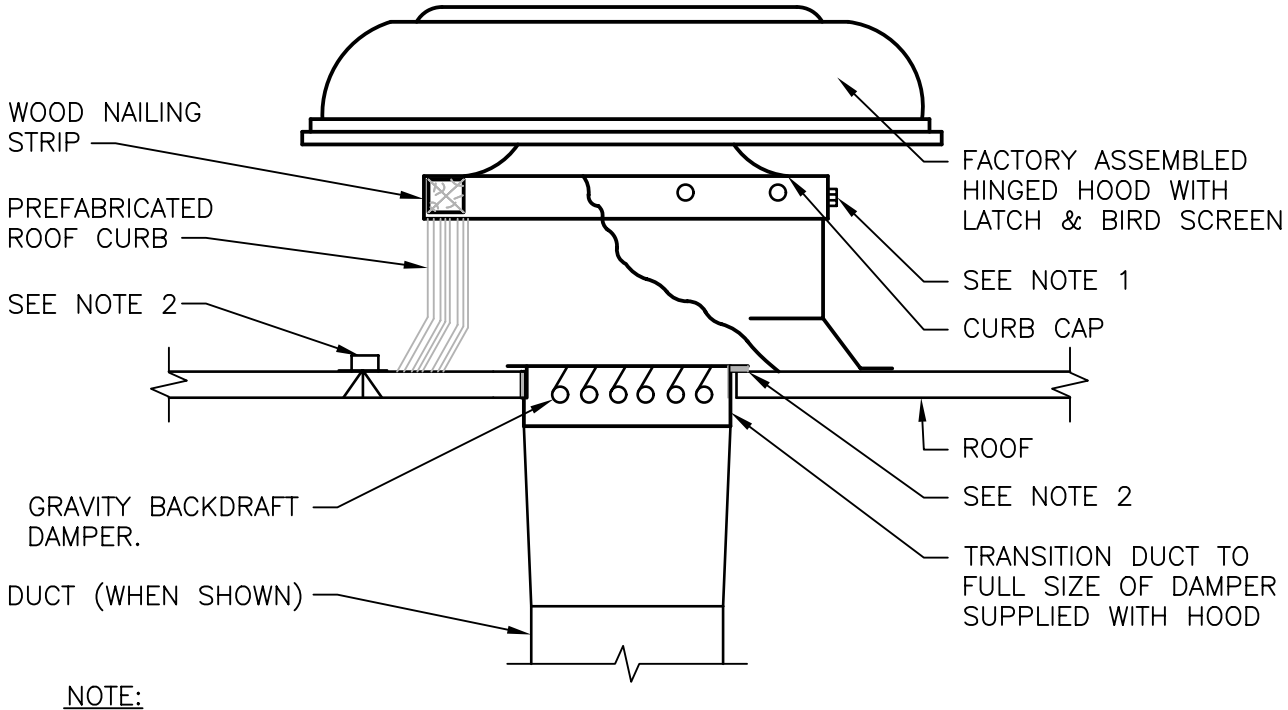
POWER ROOF VENTILATOR

NTS

DESIGNERS NOTES:
1.PROVIDE A MOTORIZED DAMPER, IF APPLICABLE.

2.PROVIDE DIRECT DRIVE FANS FOR LOCATIONS NOT EASILY ACCESSIBLE. AS ATTIC OR PIPE BASEMENT AND LESS THAN 2 HP.

3.MINIMUM CURB HEIGHT SHALL BE 12 INCHES [300 mm]. INCREASE HEIGHT, IF REQUIRED, TO OVERCOME SNOW DRIFT.



NOTE:

1. SECURE HOOD TO WOOD NAILING STRIP WITH 3/8" [10mm] CADMIUM PLATED LAG BOLTS NOT OVER 12" [300mm] ON CENTER.

2. SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (MENTAL DECK & BAR JOIST ROOF).

LOW-SILHOUETTE EXHAUST OR INTAKE HOOD

NTS

DESIGNER'S NOTE:
1.PROVIDE A MOTORIZED DAMPER, WHERE APPLICABLE.

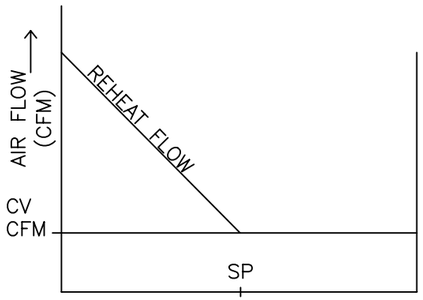
2.MINIMUM CURB HEIGHT SHALL BE 12" [300 MM]. INCREASE HEIGHT, IF REQUIRED, TO OVER COME SNOW DRIFT

Department of Veterans Affairs

DETAIL TITLE / LOW-SILHOUETTE EXHAUST OR INTAKE HOOD

SCALE :NONE

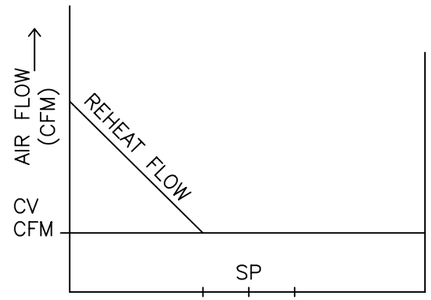
DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233400-02.DWG



CV BOX CONTROL SEQUENCE

NO DEADBAND

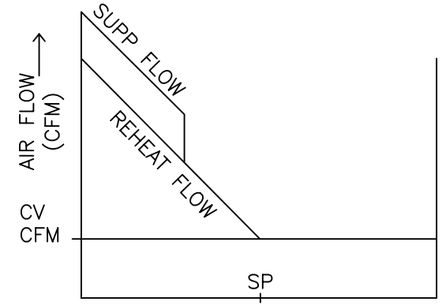
A. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5°, THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
B. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



CV BOX CONTROL SEQUENCE

W/DEADBAND

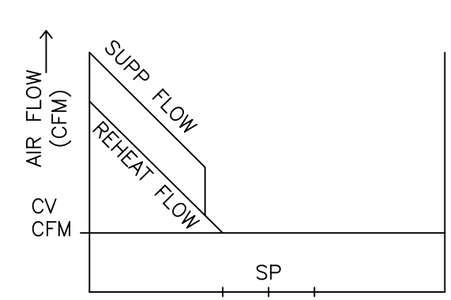
A. SET POINTS SHALL SET AS FOLLOWS:
COOLING 75° F (ADJ)
HEATING 70° F (ADJ)
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINT WILL BE MAINTAINED
B. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5°,THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



CV BOX CONTROL SEQUENCE

NO DEADBAND

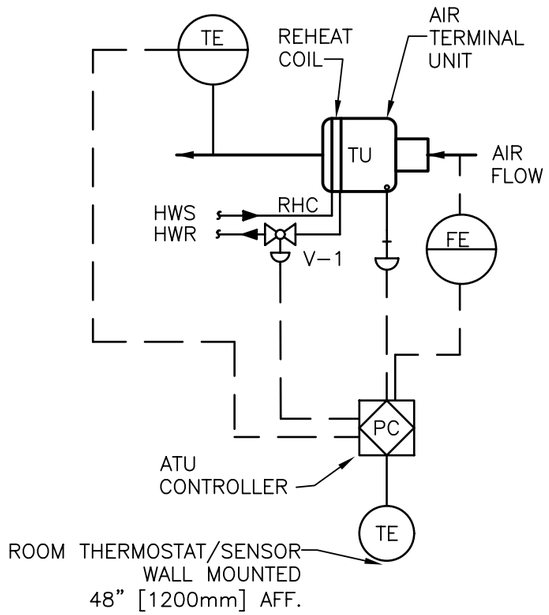
A. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5°, THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
B. VALVE V–2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V–1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ) V–2 SHALL THEN BE MODULATED TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
C. THE REVERSE SHALL OCCUR ON RISE IN AIR SPACE TEMPERATURE.



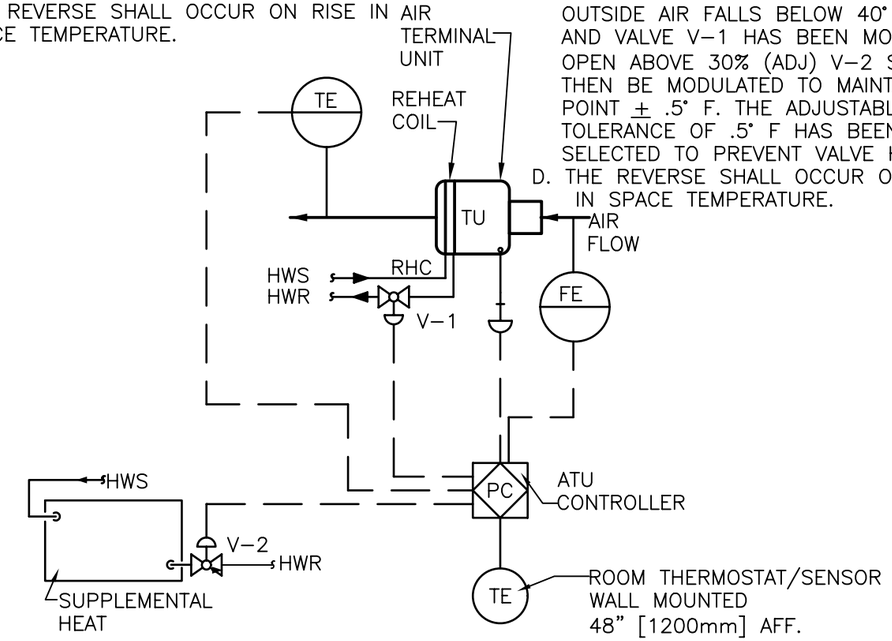
CV BOX CONTROL SEQUENCE

W/DEADBAND

A. SET POINTS SHALL SET AS FOLLOWS:
COOLING 75° F (ADJ)
HEATING 70° F (ADJ)
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINT WILL BE MAINTAINED
B. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5°,
THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. VALVE V–2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V–1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ) V–2 SHALL THEN BE MODULATED TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
D. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



NO SUPPLEMENTAL HEATING



WITH SUPPLEMENTAL HEATING

CONSTANT VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

NTS

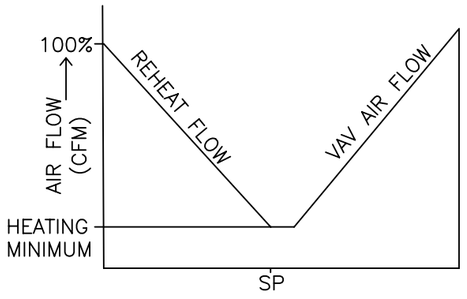
DETAIL TITLE / CONSTANT VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD233600–01.DWG

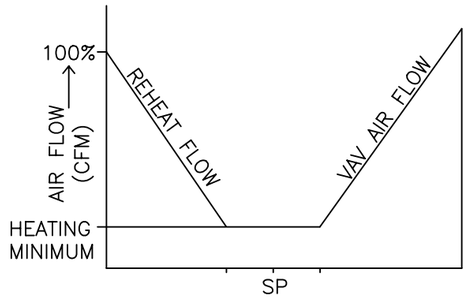
Department of Veterans Affairs



VAV BOX CONTROL SEQUENCE

NO DEADBAND

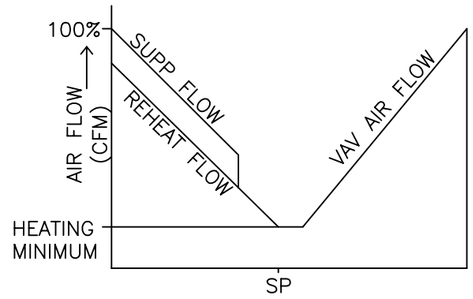
A. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
B. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



VAV BOX CONTROL SEQUENCE

W/DEADBAND

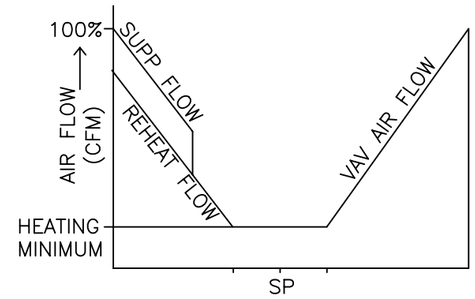
A. SET POINTS SHALL BE SET AS FOLLOWS:
COOLING 75°F (ADJ)
HEATING 70°F(ADJ)
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
D. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



VAV BOX CONTROL SEQUENCE

NO DEADBAND

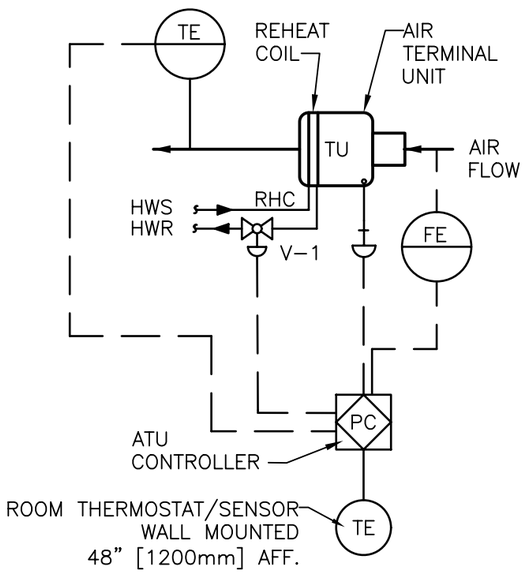
A. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
B. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. VALVE V–2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V–1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ). VALVE V–2 SHALL MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5°F HAS BEEN SELECTED TO PREVENT VALVE HUNTING. THE REVERSE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE.



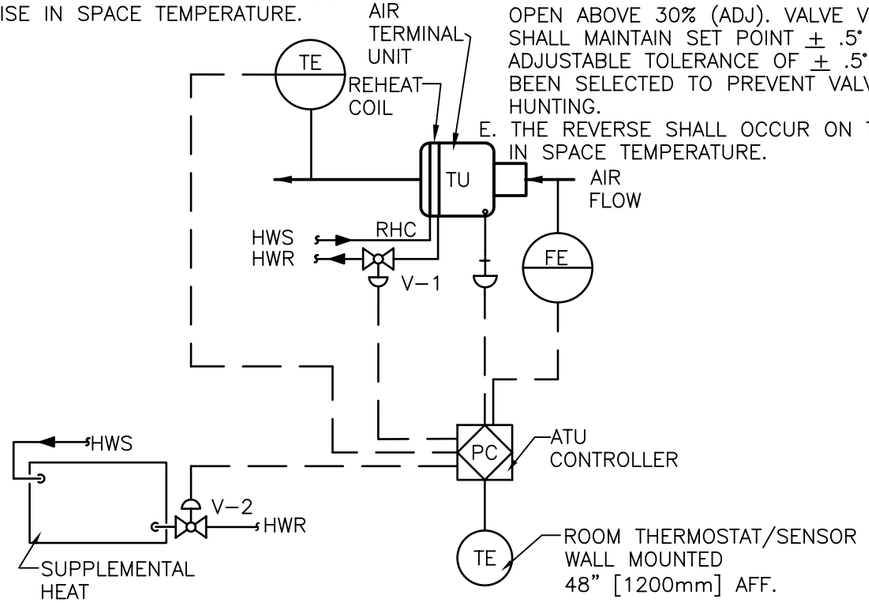
VAV BOX CONTROL SEQUENCE

W/DEADBAND

A. SET POINTS SHALL BE SET AS FOLLOWS:
COOLING 75°F (ADJ)
HEATING 70°F(ADJ)
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V–1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
D. VALVE V–2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V–1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ). VALVE V–2 SHALL MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5°F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
E. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



NO SUPPLEMENTAL HEATING



WITH SUPPLEMENTAL HEATING

VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

NTS

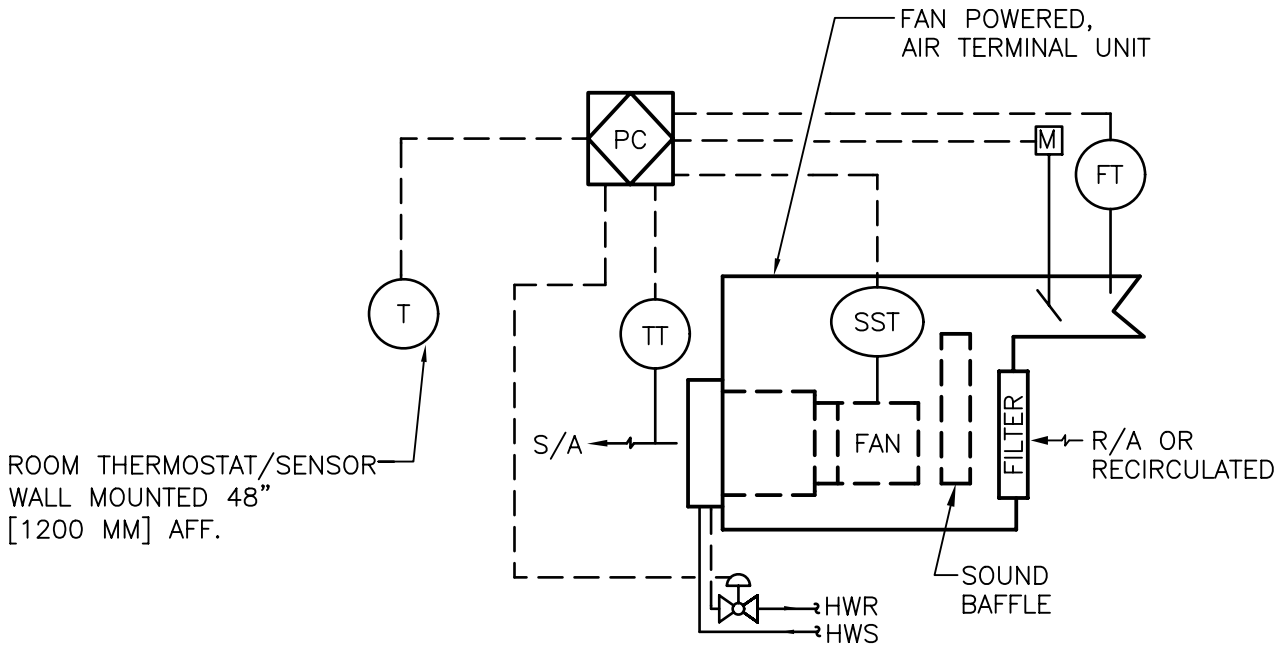
DETAIL TITLE / VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD233600–02.DWG

Department of Veterans Affairs



NOTES:

A. TERMINAL UNIT SHALL OPERATE ON A SCHEDULE SET BY THE ECC. THE SERIES FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS. THE SPACE TEMPERATURE SHALL BE MAINTAINED BETWEEN 70° (ADJ) AND 75°F (ADJ) BY MODULATING PRIMARY AIR VOLUME AND HOT WATER CONTROL VALVE IN SEQUENCE.

B. UPON FALL IN SPACE TEMPERATURE THE PRIMARY AIR DAMPER SHALL MODULATE TO PRESET MINIMUM AIR VOLUME. UPON FURTHER FALL IN SPACE TEMPERATURE BELOW 70° F THE HOT WATER VALVE SHALL MODULATE TO OPEN POSITION TO MAINTAIN SET POINT WITHIN $\pm$.5° (ADJ). THE TOLERANCE RANGE OF $\pm$ .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.

C. THE REVERSE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE.

SERIES FAN POWERED AIR TERMINAL UNIT CONTROL DIAGRAM

#

NTS

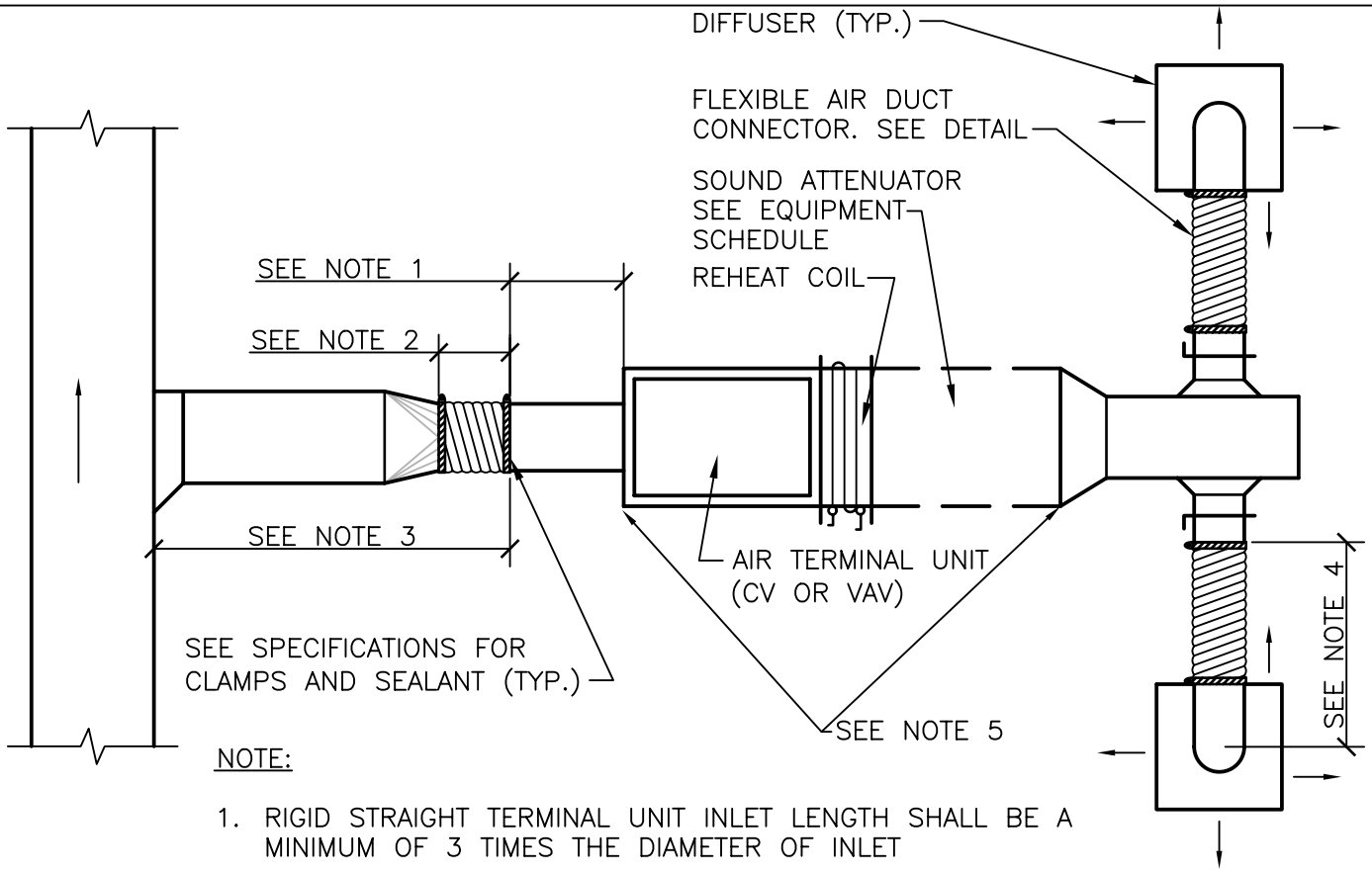
Department of Veterans Affairs

DETAIL TITLE / FAN POWERED AIR TERMINAL UNIT CONTROL DIAGRAM

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD233600-03.DWG



NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET

2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'–0" [900mm].

3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.64Pa/m].

4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'–0" [1500mm]. USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.

5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.

6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

DUCT CONNECTIONS - AIR TERMINAL UNITS

NTS

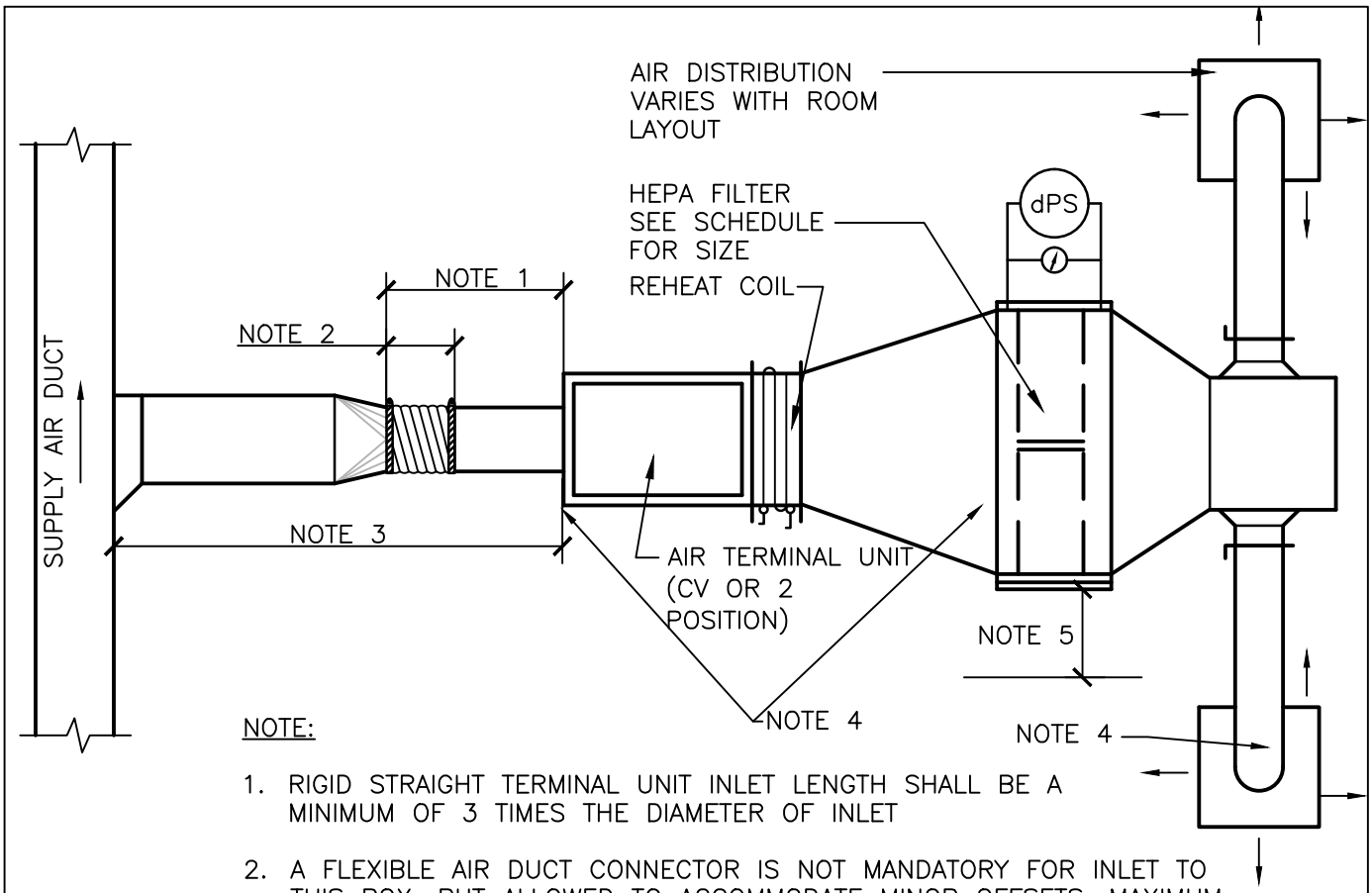
DESIGNER'S NOTE: 1.INDICATE SOUND ATTENUATOR AS REQUIRED BY ACOUSTICAL ANALYSIS

Department of Veterans Affairs

DETAIL TITLE / DUCT CONNECTIONS – AIR TERMINAL UNITS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD233600–04.DWG



NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET

2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 2'–0" [610mm].

3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET [3 M]. FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.6894Pa/m].

4. ALL DUCTWORK UPSTREAM AND DOWNSTREAM OF THE HEPA FILTER SHALL BE GALVANIZED STEEL,

5. PROVIDE SIDE ACCESS FOR FILTER SERVICE. SEE MANUFACTURER'S SPECIFICATION FOR CLEARANCE REQUIREMENT.

AIR TERMINAL UNITS WITH HEPA FILTER (BMT SUITE, POSITIVE ISOLATION ROOMS)

#

NTS

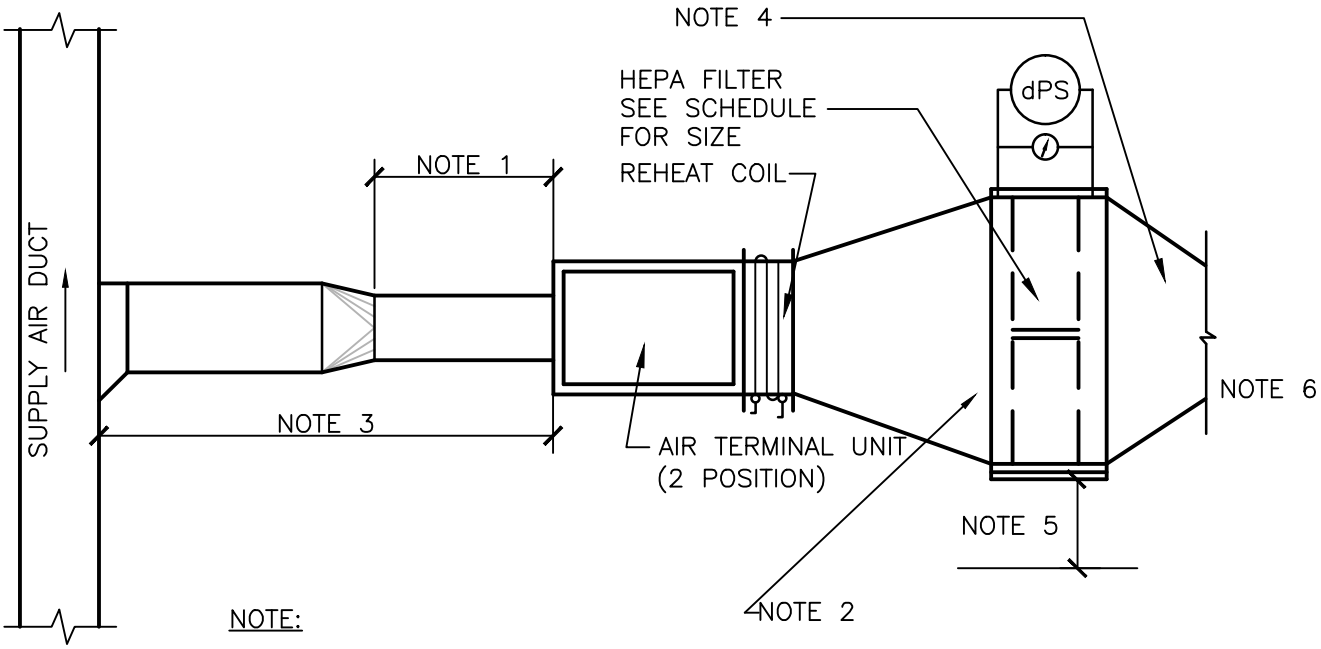
DESIGNER'S NOTE:1. IN LIEU OF DUCT MOUNTED HEPA FILTER, CEILING MOUNTED PANEL HEPA FILTERS MAY BE UTILIZED.
2. THIS DETAIL SHALL BE USED FOR SURGICAL SUITE ROOMS EXCLUDING OPERATING AND CYSTOSCOPY ROOMS.

Department of Veterans Affairs

DETAIL TITLE / AIR TERMINAL UNITS WITH HEPA FILTER BMT SUITE, POSITIVE ISOLATION ROOMS

SCALE :NONE

DATE ISSUED: MARCH 2010 CAD DETAIL NO.: SD233600–05.DWG



NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET.

2. ALL DUCTWORK UPSTREAM OF THE HEPA FILTER SHALL BE GALVANIZED STEEL.

3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET [3 M]. FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.1"/100' [0.6894Pa/m].

4. ALL DUCTWORK DOWNSTREAM OF THE HEPA FILTER SHALL BE STAINLESS STEEL, PROVIDE ACCESS DOOR FOR CLEANING. SEE DETAIL SD233100–27 FOR LOCATION.

5. PROVIDE SIDE ACCESS FOR FILTER SERVICE. SEE MANUFACTURER'S SPECIFICATION FOR CLEARANCES.

6. SEE DETAIL SD233100–27 FOR CONTINUATION OF DUCTWORK.

AIR TERMINAL UNITS WITH HEPA FILTER (OPERATING AND CYSTOSCOPY ROOMS)

#

NTS

Department of Veterans Affairs

DETAIL TITLE / AIR TERMINAL UNITS WITH HEPA FILTER OPERATING AND CYSTOSCOPY ROOMS

SCALE :NONE

DATE ISSUED: MARCH 2010 CAD DETAIL NO.: SD233600–06.DWG

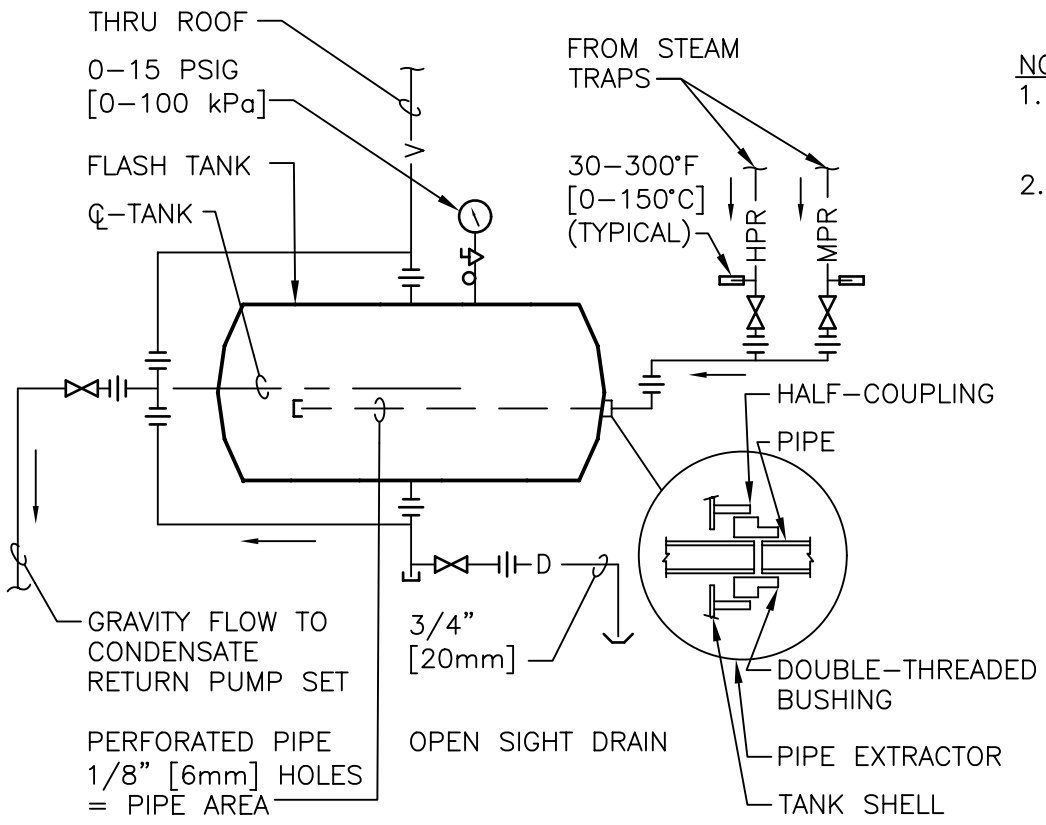
Department of Veterans Affairs

DETAIL TITLE / FLASH TANK

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD235011-01.DWG



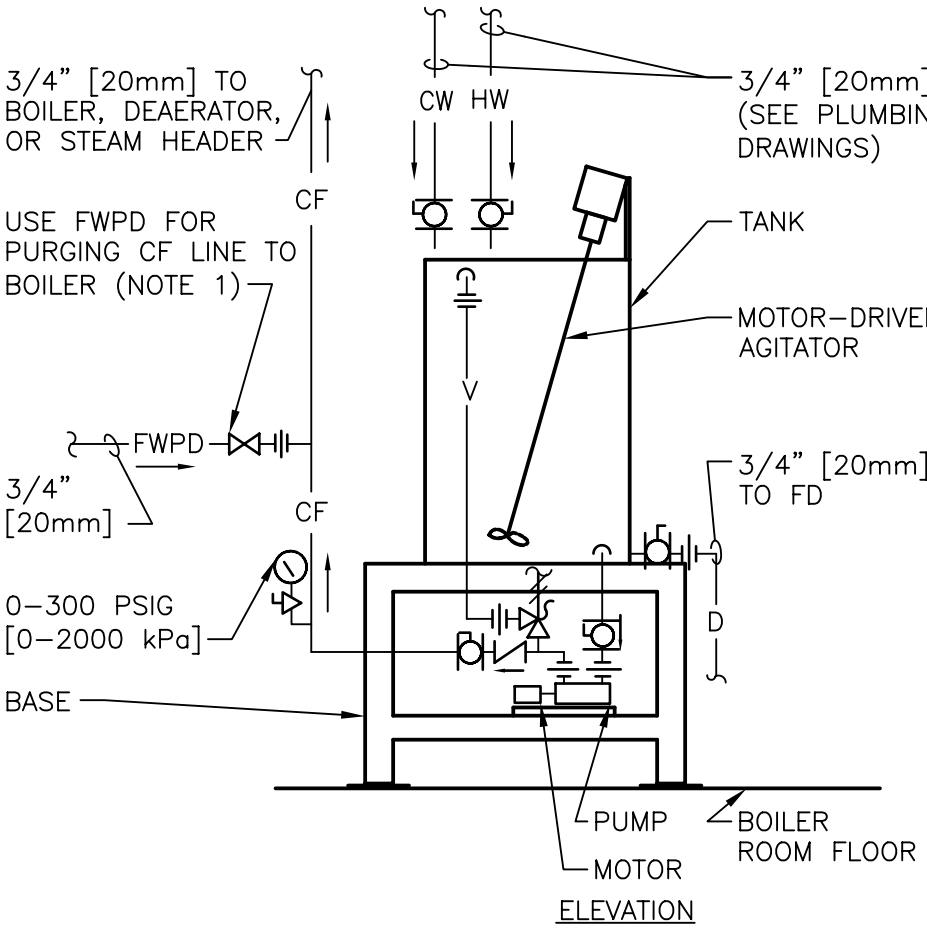
NOTES

1. PRESSURE UPSTREAM OF STEAM TRAP.
2. LENGTH x DIAMETER AT CENTER OF TANK PER THOUSAND POUNDS OF CONDENSATE. TANK AT ATMOSPHERIC PRESSURE.

STEAM PRESSURE PSIG [kPa] NOTE 1	TANK AREA SQ. FT.[SQ. M] NOTE 2
150 [1034]	3.71 [0.35]
125 [862]	3.40 [0.32]
110 [758]	3.15 [0.29]
100 [689]	3.00 [0.28]
60 [414]	2.23 [0.21]
30 [207]	1.34 [0.13]

FLASH TANK

NTS



NOTES

1. DO NOT PROVIDE FWPD ON SYSTEM WHICH SERVES DEAERATOR
2. PROVIDE A SEPARATE CHEMICAL FEED SYSTEM FOR EACH BOILER, FOR THE DEAERATOR AND FOR MAIN STEAM.

1 CHEMICAL FEED SYSTEM - PUMPED TYPE

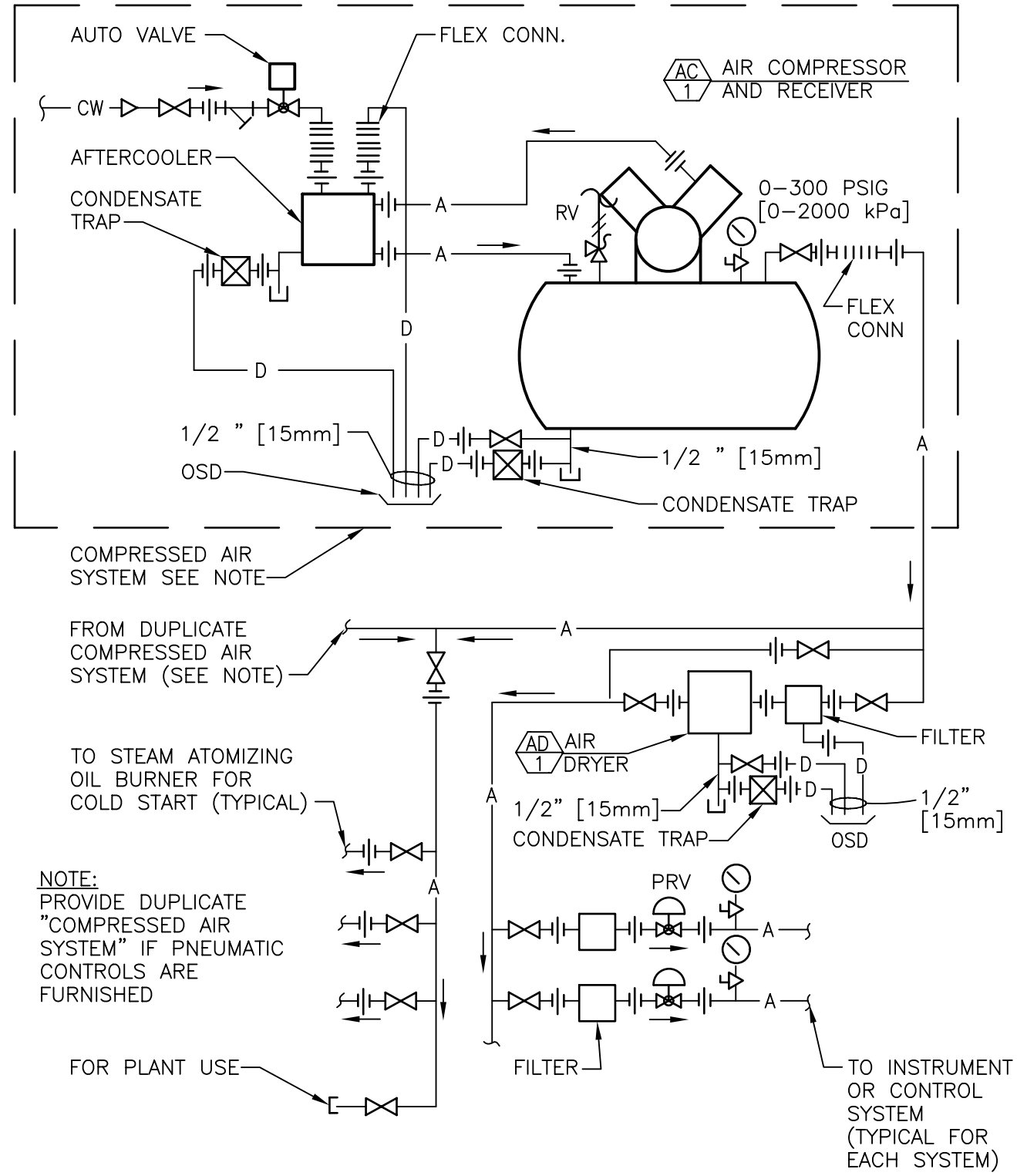
NTS

Department of Veterans Affairs

DETAIL TITLE / CHEMICAL FEED SYSTEM – PUMPED TYPE

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD235011–02.DWG



COMPRESSED AIR SYSTEM - STANDARD PIPING DIAGRAM

#

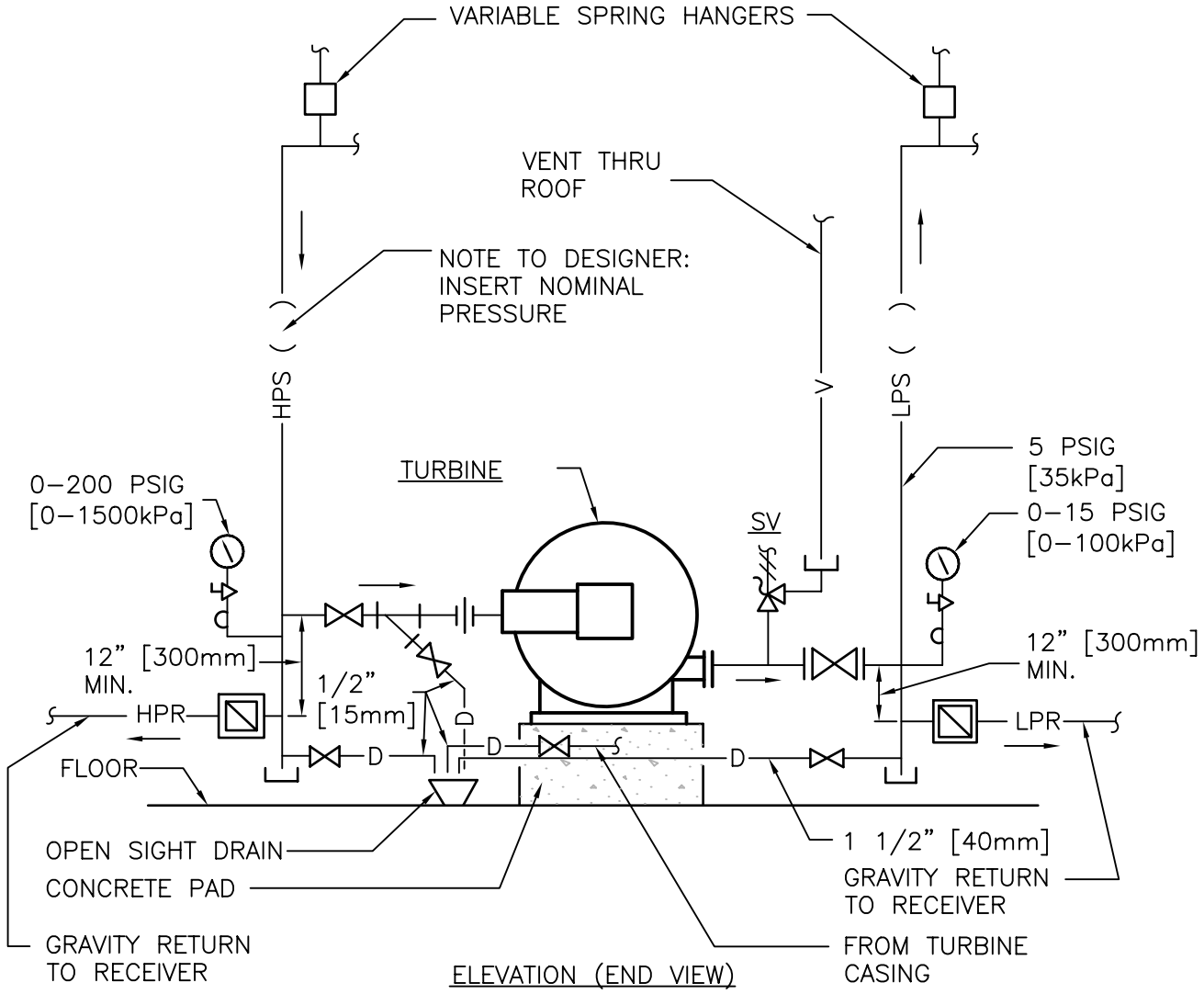
NTS

Department of Veterans Affairs

DETAIL TITLE / COMPRESSED AIR SYSTEM – STANDARD PIPING DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD235011–03.DWG



STEAM TURBINE DRIVE

NTS

Department of Veterans Affairs

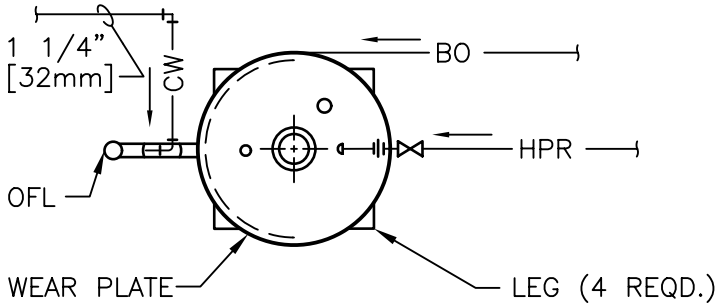
DETAIL TITLE / STEAM TURBINE DRIVE

SCALE :NONE

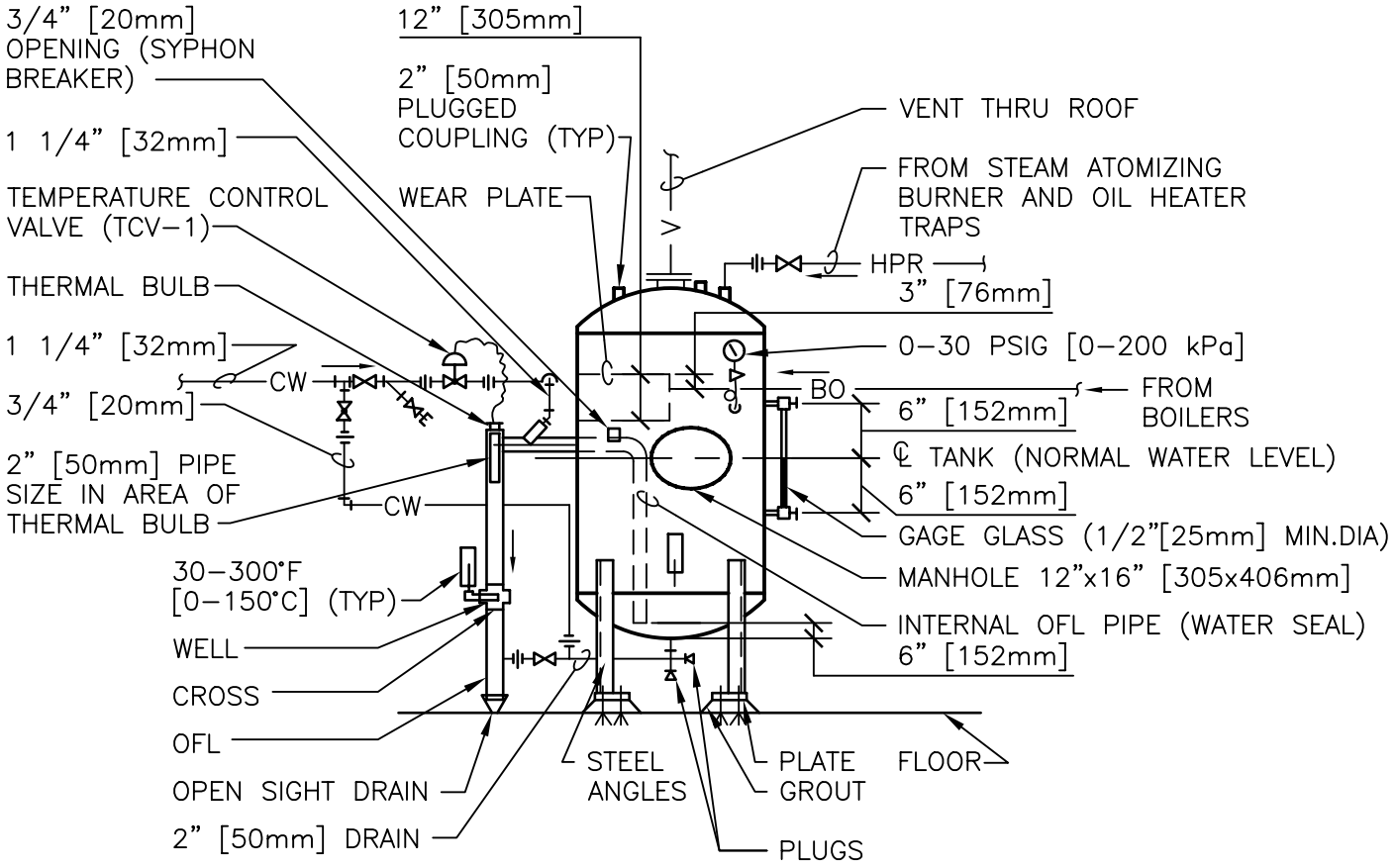
DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD235011–04.DWG

NOTE:
TANK DESIGN SHALL BE IN CONFORMANCE WITH NATIONAL BOARD "BOILER BLOWOFF EQUIPMENT"



PLAN VIEW



ELEVATION

BOILER BLOWOFF TANK

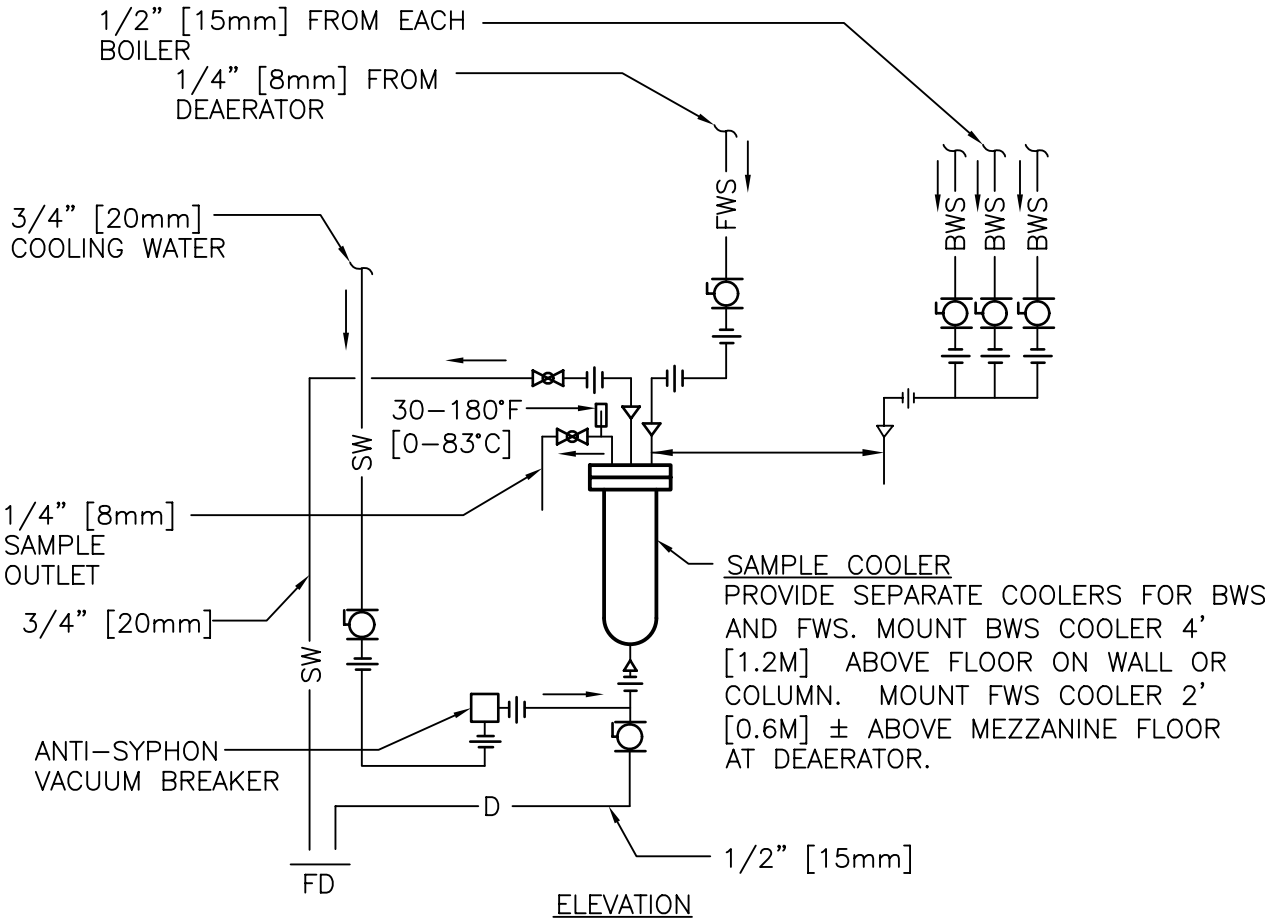
NTS

Department of Veterans Affairs

DETAIL TITLE / BOILER BLOWOFF TANK

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD235011-05.DWG



ELEVATION

WATER SAMPLE COOLERS BOILER WATER AND FEEDWATER

#

NTS

Department of Veterans Affairs	DETAIL TITLE / WATER SAMPLE COOLERS BOILER WATER AND FEEDWATER
	SCALE :NONE
	DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD235011–06.DWG

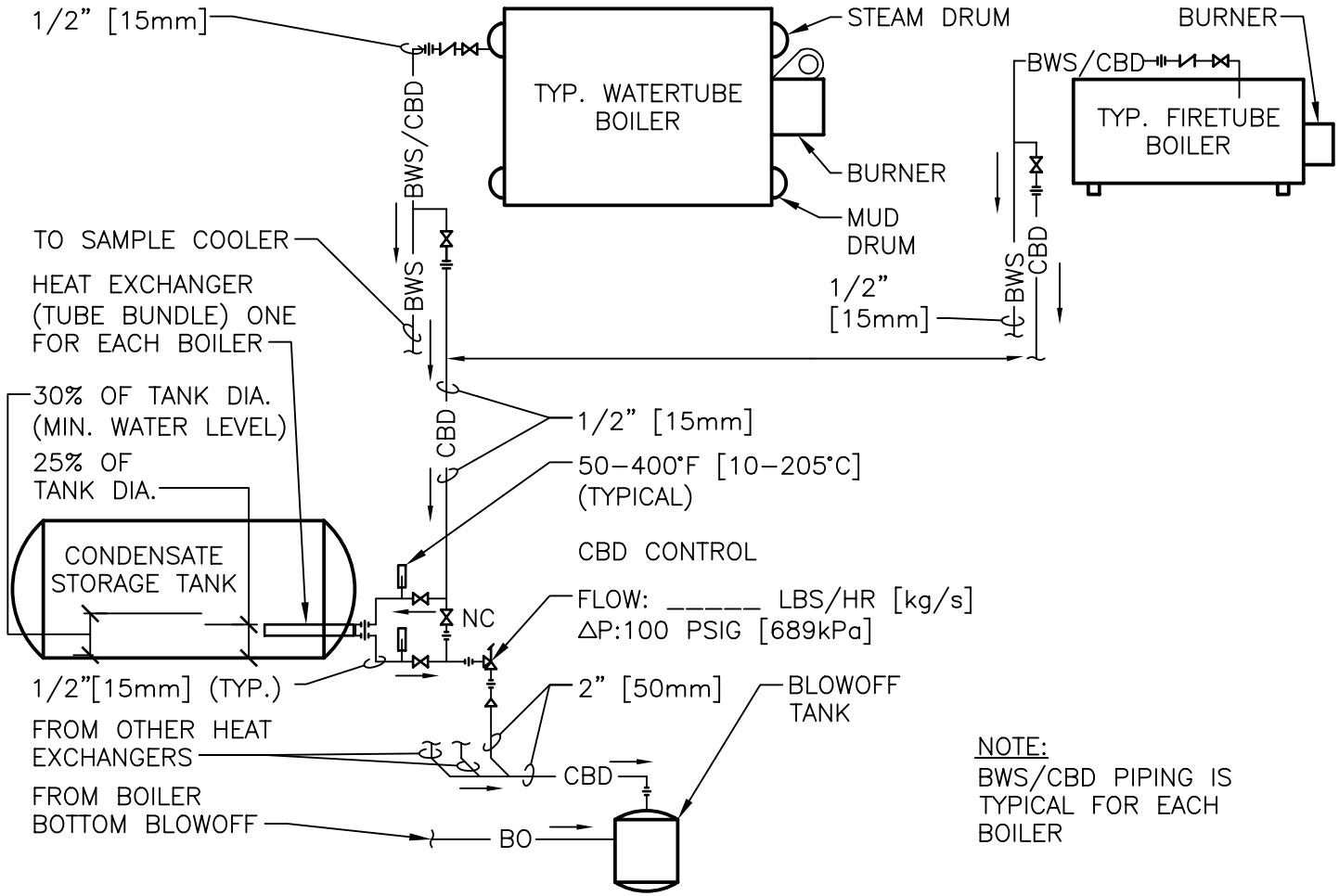
Department of Veterans Affairs

DETAIL TITLE / CONTINUOUS BLOWDOWN HEAT RECOVERY STANDARD PIPING DIAGRAM

SCALE :NONE

DATE ISSUED: DECEMBER 2008

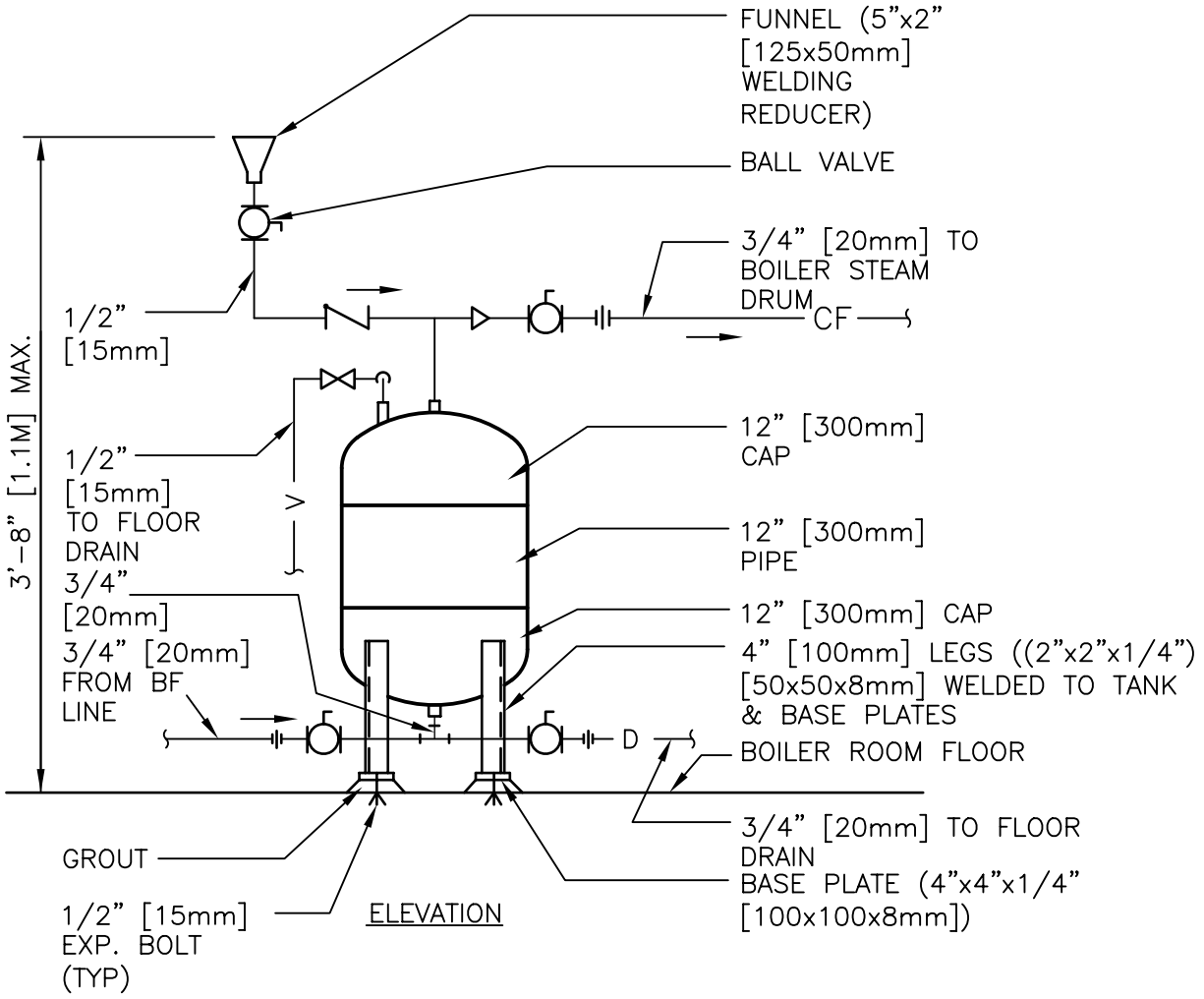
CAD DETAIL NO.: SD235011-07.DWG



CONTINUOUS BLOWDOWN HEAT RECOVERY STANDARD PIPING DIAGRAM

#

NTS



NOTE: NORMAL CHEMICAL FEED SHALL BE WITH A PUMP TYPE SYSTEM. SHOT TYPE SHALL BE USED ONLY FOR BOILER LAYUP.

BOILER CHEMICAL FEED SYSTEM - SHOT TYPE

#

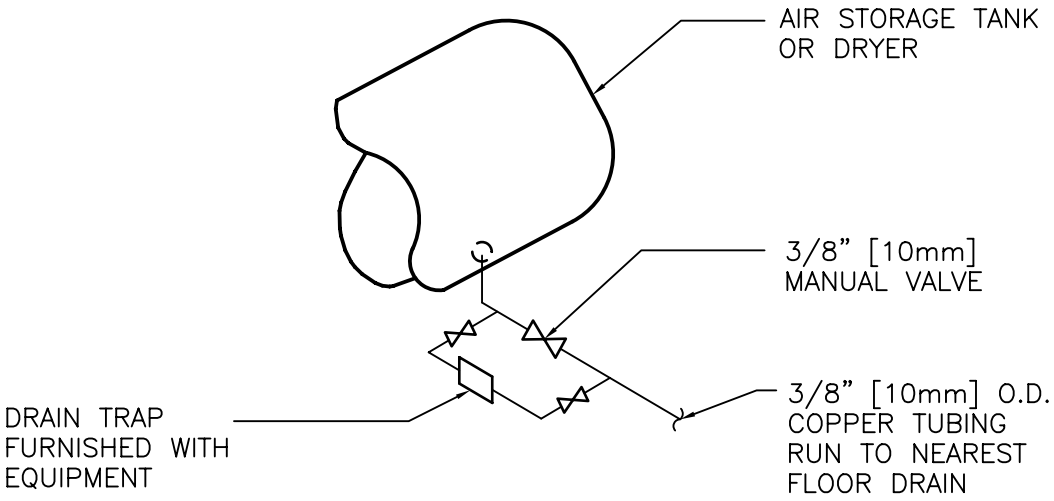
NTS

Department of Veterans Affairs

DETAIL TITLE / BOILER CHEMICAL FEED SYSTEM SHOT TYPE

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD235011-08.DWG



TYPICAL DRAIN FOR AIR COMPRESSOR AND DRYER

#

NTS

Department of Veterans Affairs

DETAIL TITLE / TYPICAL DRAIN FOR AIR COMPRESSOR AND DRYER

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD235011-09.DWG

Department of Veterans Affairs

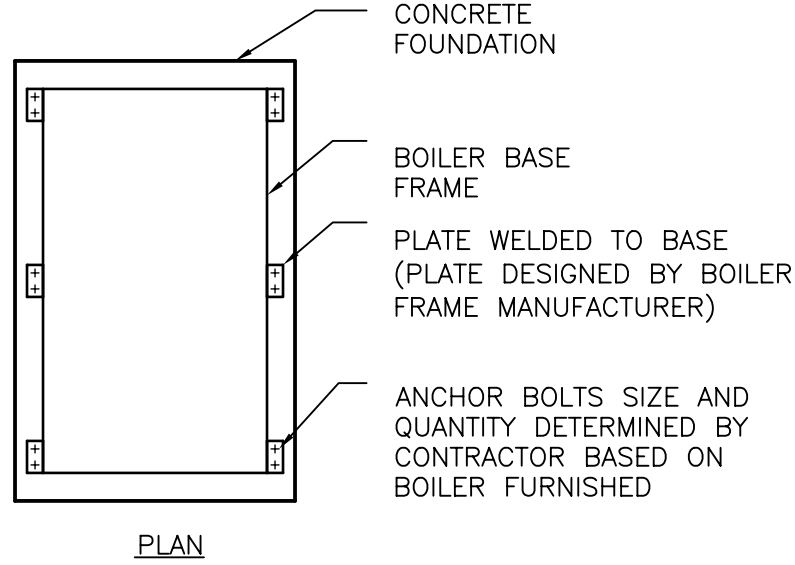
DETAIL TITLE / EQUIPMENT ANCHORING–PACKAGED BOILER AND DAEERATOR AND CONDENSATE STORAGE TANKS

SCALE :NONE

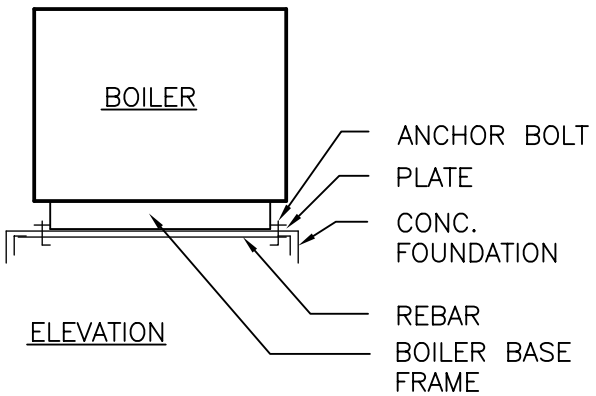
DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD235011–10.DWG

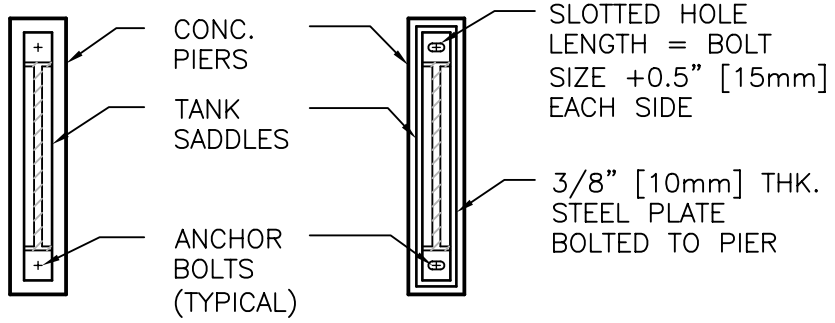
NOTES:
1. REFER TO SYMBOL AND SCHEDULE SHEETS FOR SEISMIC FORCE DESIGN INFORMATION
2. PROVIDE SLOTTED HOLES IN PLATES TO ALLOW THERMAL EXPANSION IF RECOMMENDED BY BOILER MANUFACTURER



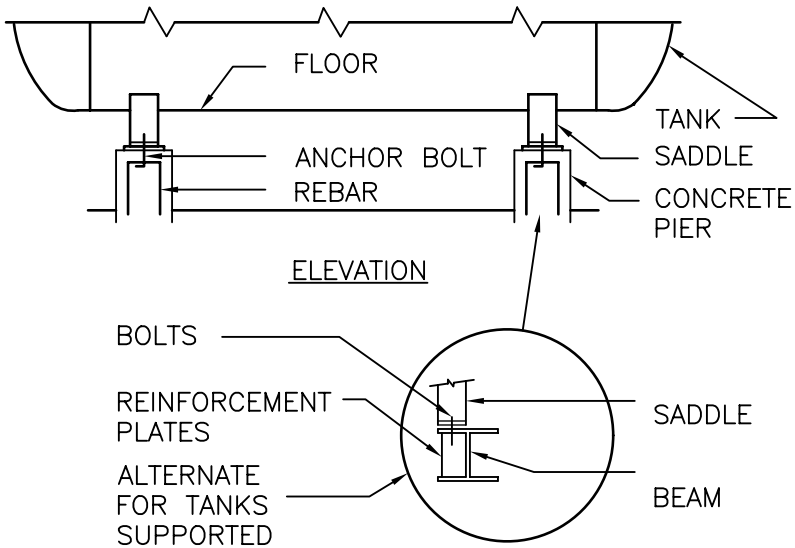
PLAN



ELEVATION



PLAN



ELEVATION

EQUIPMENT ANCHORING – PACKAGED BOILER AND DEAERATOR AND CONDENSATE STORAGE TANKS

#

NTS

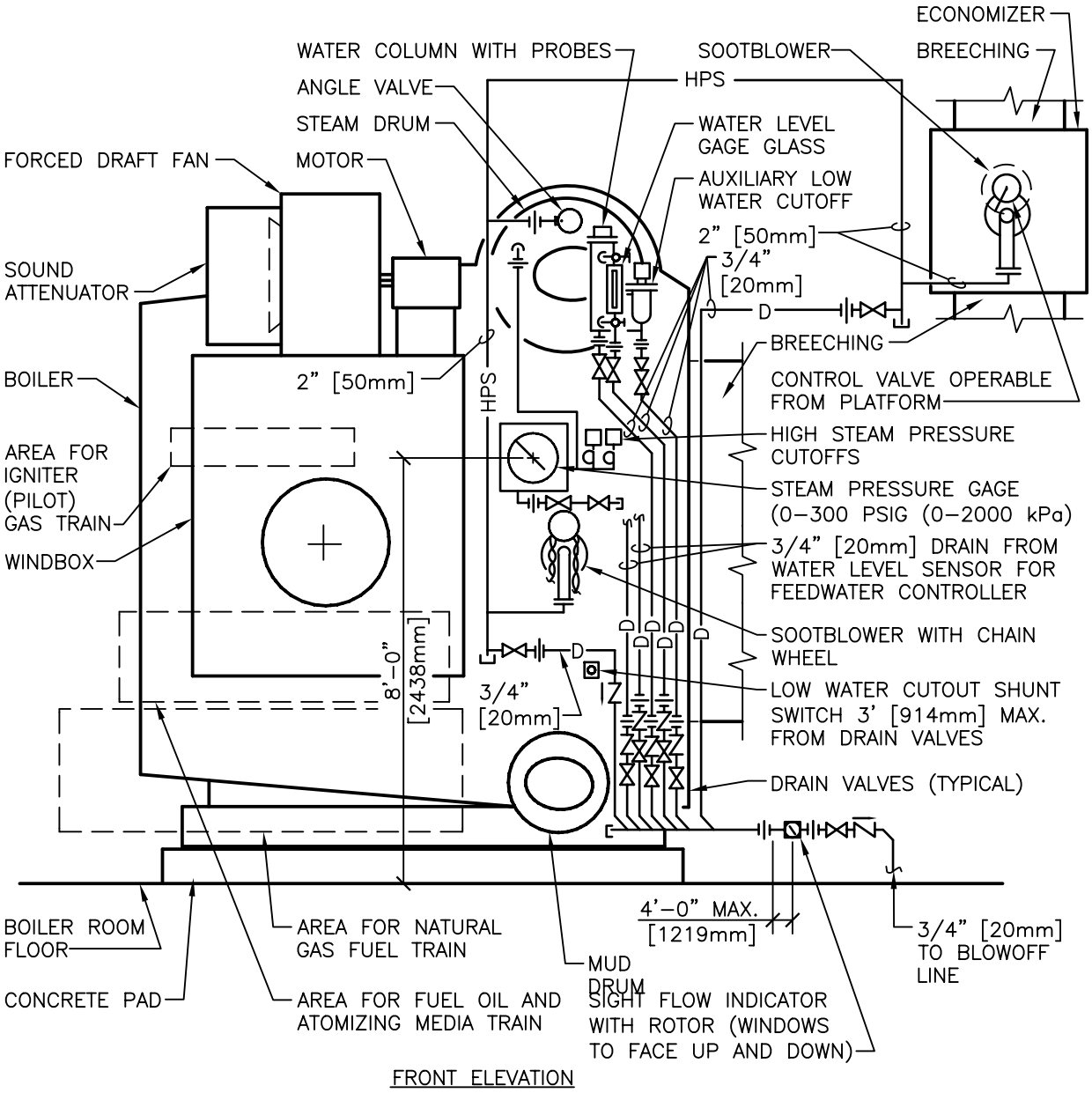
Department of Veterans Affairs

DETAIL TITLE / WATER TUBE BOILER

SCALE :NONE

DATE ISSUED: DECEMBER 2008

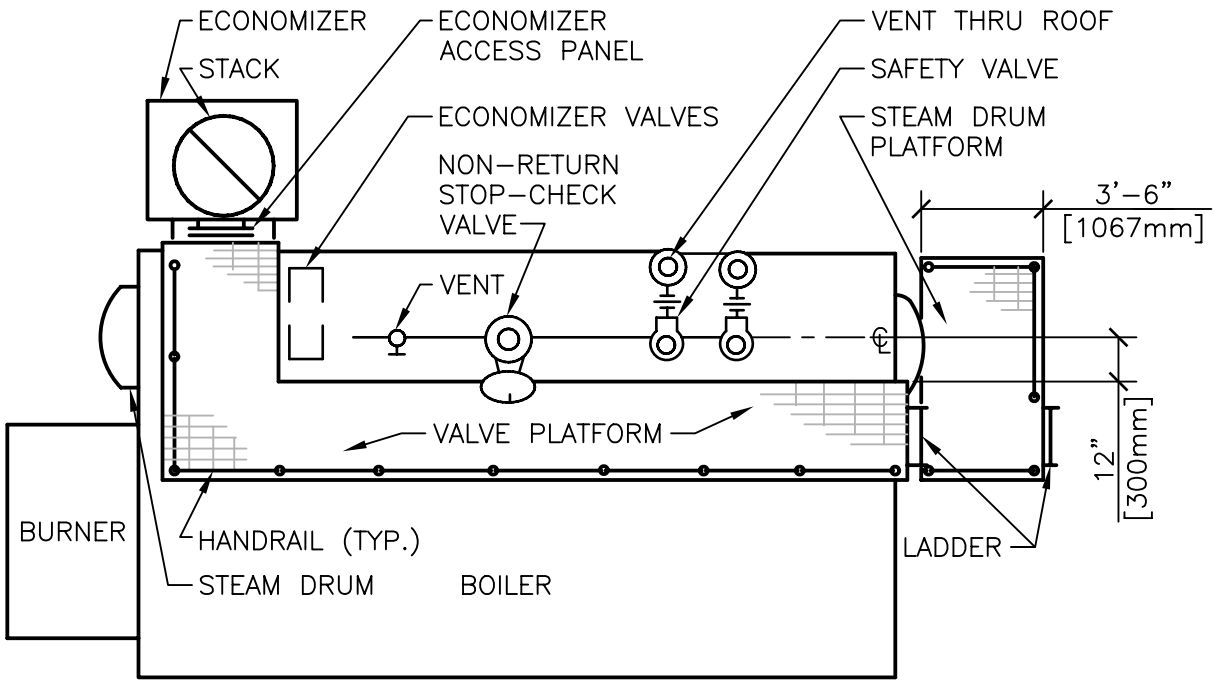
CAD DETAIL NO.: SD235233-01.DWG



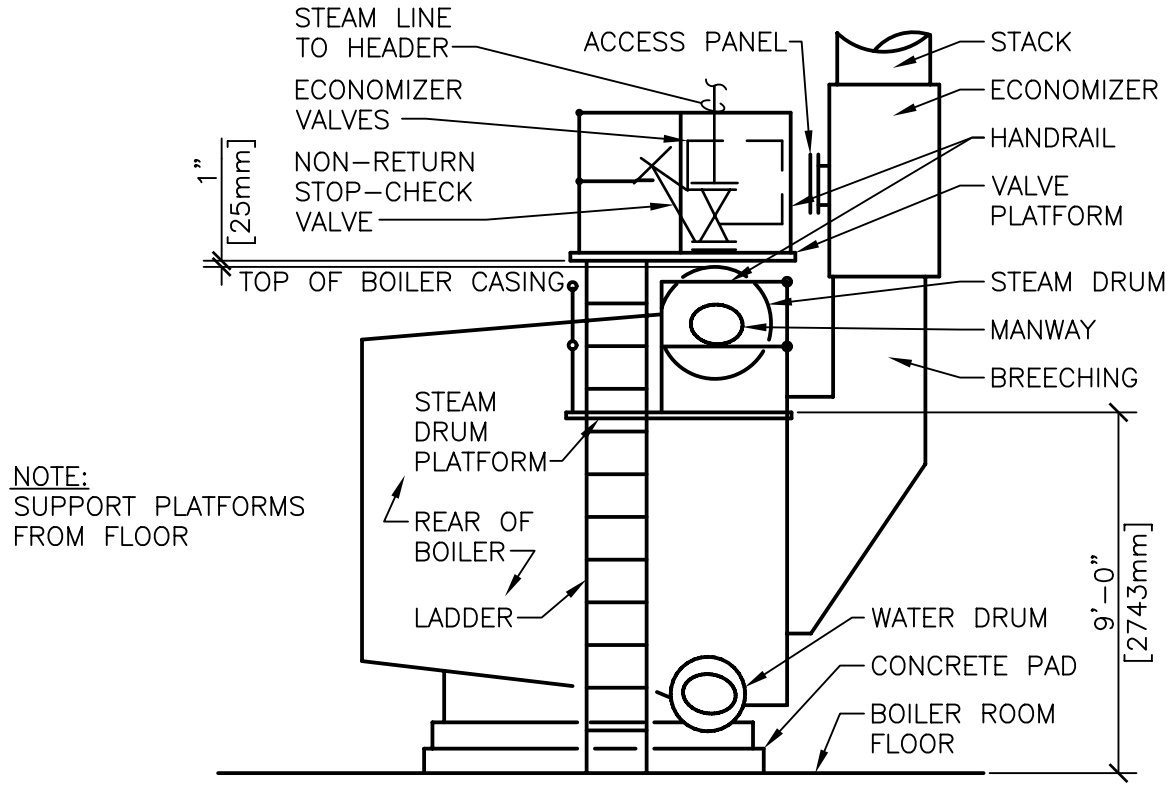
FRONT ELEVATION

WATER TUBE BOILER

NTS



PLAN VIEW



NOTE:
SUPPORT PLATFORMS FROM FLOOR

ELEVATION

ACCESS PLATFORM ARRANGEMENT WATER TUBE BOILER

#

NTS

Department of Veterans Affairs

DETAIL TITLE / ACCESS PLATFORM ARRANGEMENT
WATER TUBE BOILER

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD235233–02.DWG

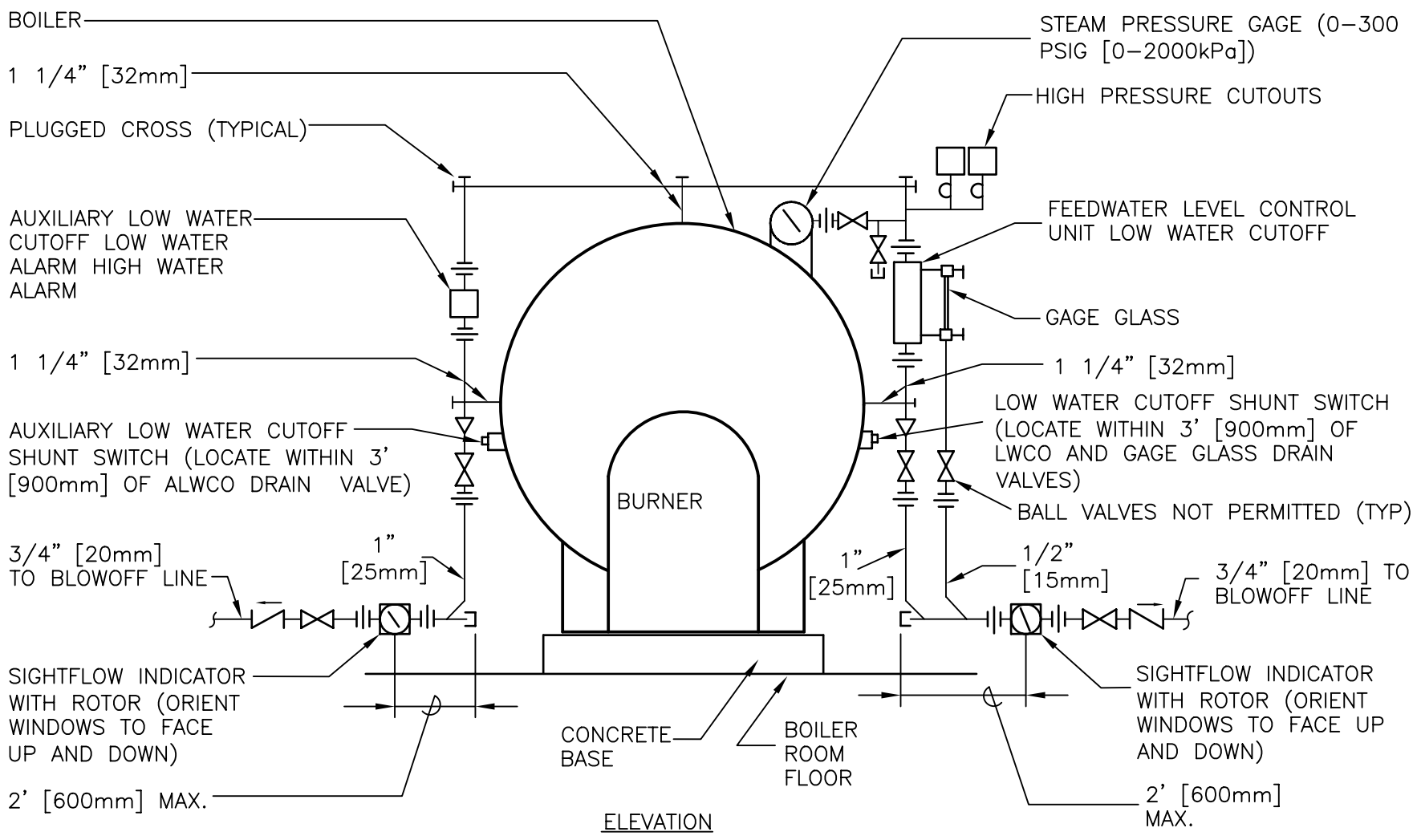
Department of Veterans Affairs

DETAIL TITLE / FIRE TUBE BOILER

SCALE :NONE

DATE ISSUED :DECEMBER 2008

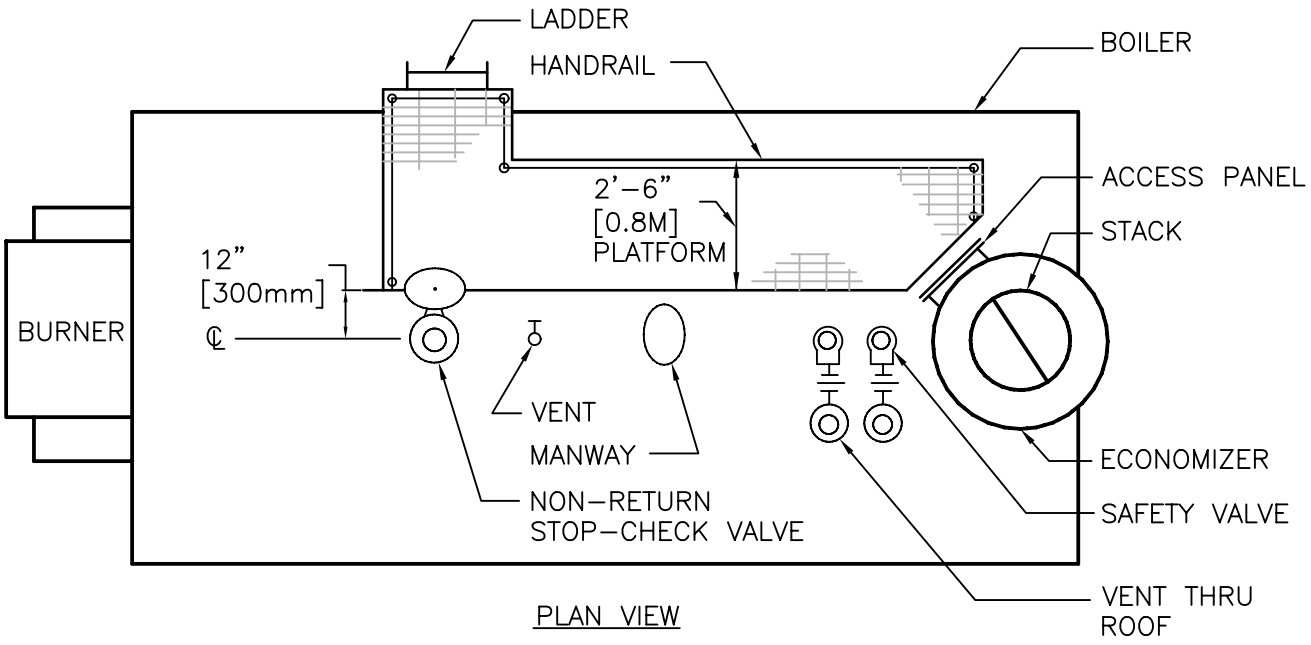
CADD DETAIL NO. : SD235239-01.DWG



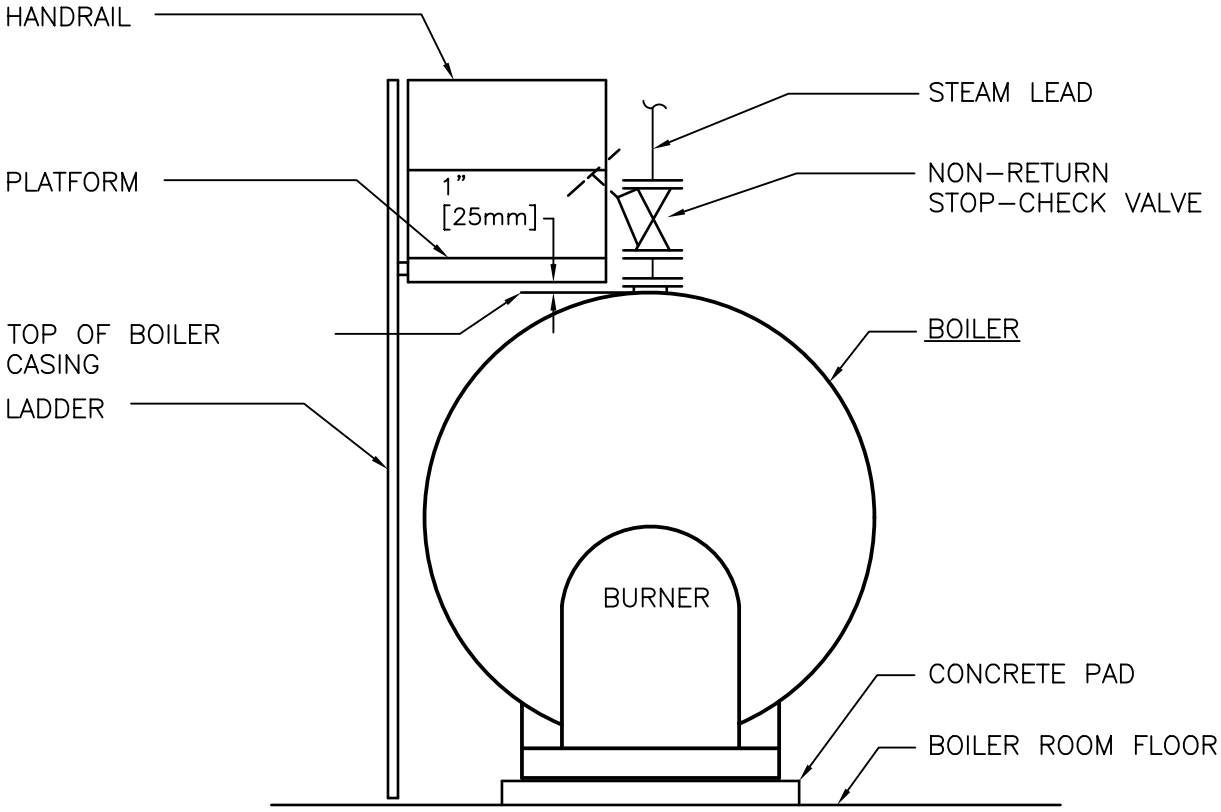
ELEVATION

FIRE TUBE BOILER

NTS



PLAN VIEW



ELEVATION

NOTE: SUPPORT PLATFORM FROM FLOOR OR FROM BOILER IF BOILER MANUFACTURER PROVIDES BOILER ATTACHMENTS AND APPROVES INSTALLATION.

ACCESS PLATFORM ARRANGEMENT

NTS

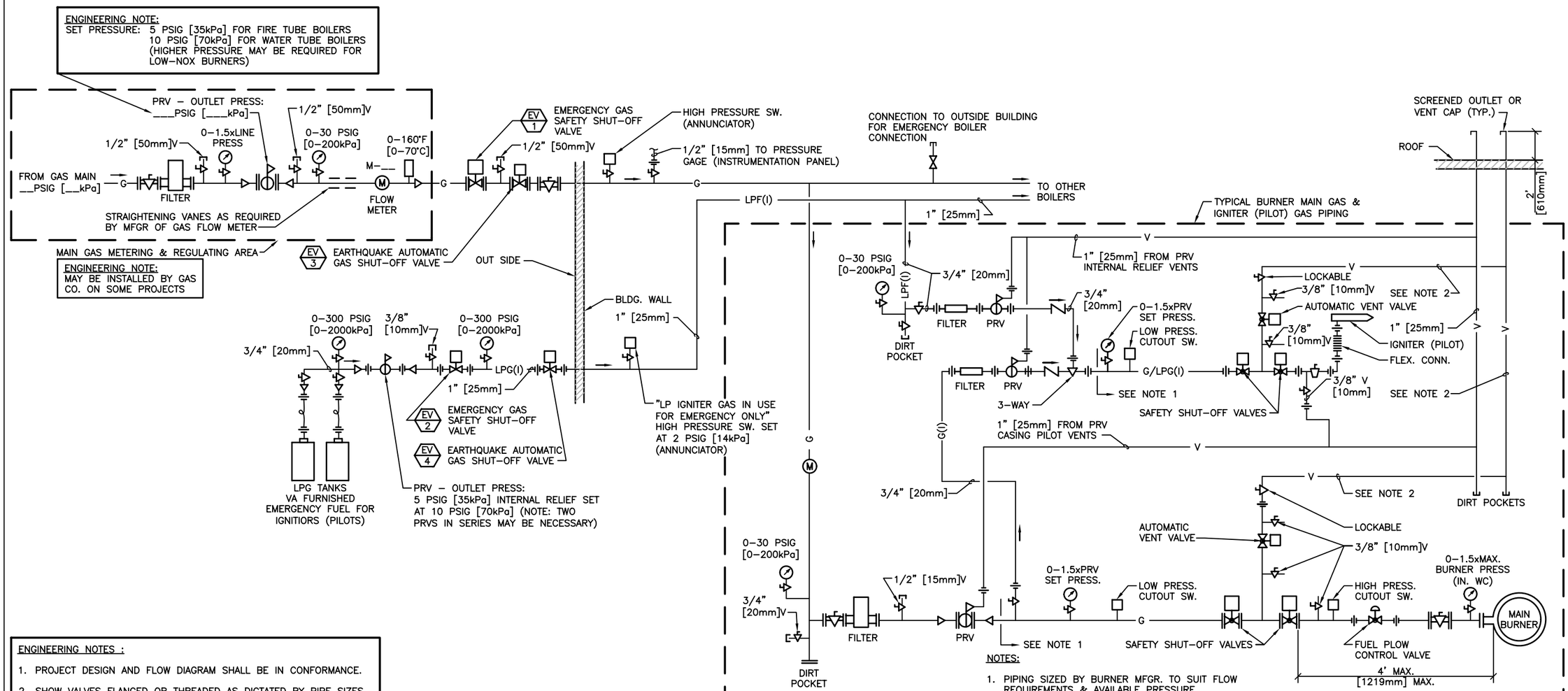
Department of Veterans Affairs

DETAIL TITLE / ACCESS PLATFORM ARRANGEMENT

SCALE :NONE

DATE ISSUED :DECEMBER 2008

CADD DETAIL NO. : SD235239-02.DWG



ENGINEERING NOTES :

1. PROJECT DESIGN AND FLOW DIAGRAM SHALL BE IN CONFORMANCE.
2. SHOW VALVES FLANGED OR THREADED AS DICTATED BY PIPE SIZES.
3. SHOW ALL PIPE SIZES.
4. IN SOME LOCATIONS, IT MY BE NECESSARY TO PROVIDE "FIRM" GAS SERVICE TO THE IGNITERS. COORDINATE THIS WITH THE GAS COMPANY.
5. DELETE "ENGINEERING NOTE" FROM PROJECT DRAWINGS.
6. EARTHQUAKE VALVES REQUIRED IN SEISMIC AREAS ONLY. REFER TO VA PROGRAM GUIDE, "NATURAL DISASTERS NON-STRUCTURAL RESISTIVE DESIGN"

NOTES:

1. PIPING SIZED BY BURNER MFGR. TO SUIT FLOW REQUIREMENTS & AVAILABLE PRESSURE.
2. SIZE AUTOMATIC VENT VALVES & VENT PIPING AS FOLLOWS:

FUEL SSO VALVE SIZE IN. [mm]	VENT SIZE IN. [mm]
1/2-1 1/2 [15-40]	3/4 [20]
2 [50]	1 [25]
2 1/2-3 [65-75]	1 1/4 [32]
4-5 [100-125]	2 [50]
6 [150]	2 1/2 [65]

3. VENT HEADER SAME SIZE AS MAIN BURNER VENT.

NATURAL GAS AND LIQUEFIED PETROLEUM GAS - BURNER AND IGNITER FUEL STANDARD PIPING DIAGRAM

NTS

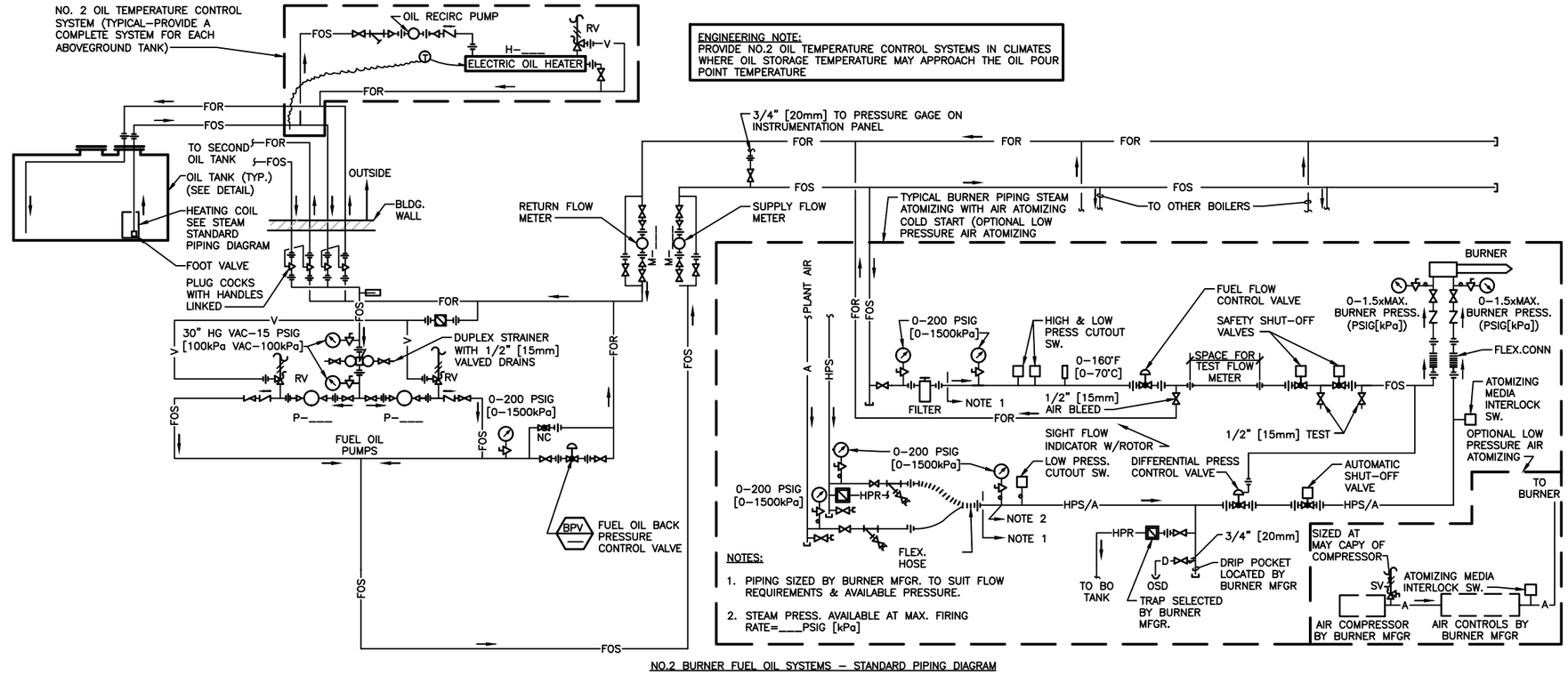
DETAIL TITLE / NATURAL GAS AND LIQUEFIED PETROLEUM GAS - BURNER AND IGNITER FUEL STANDARD PIPING DIAGRAM

SCALE :NONE

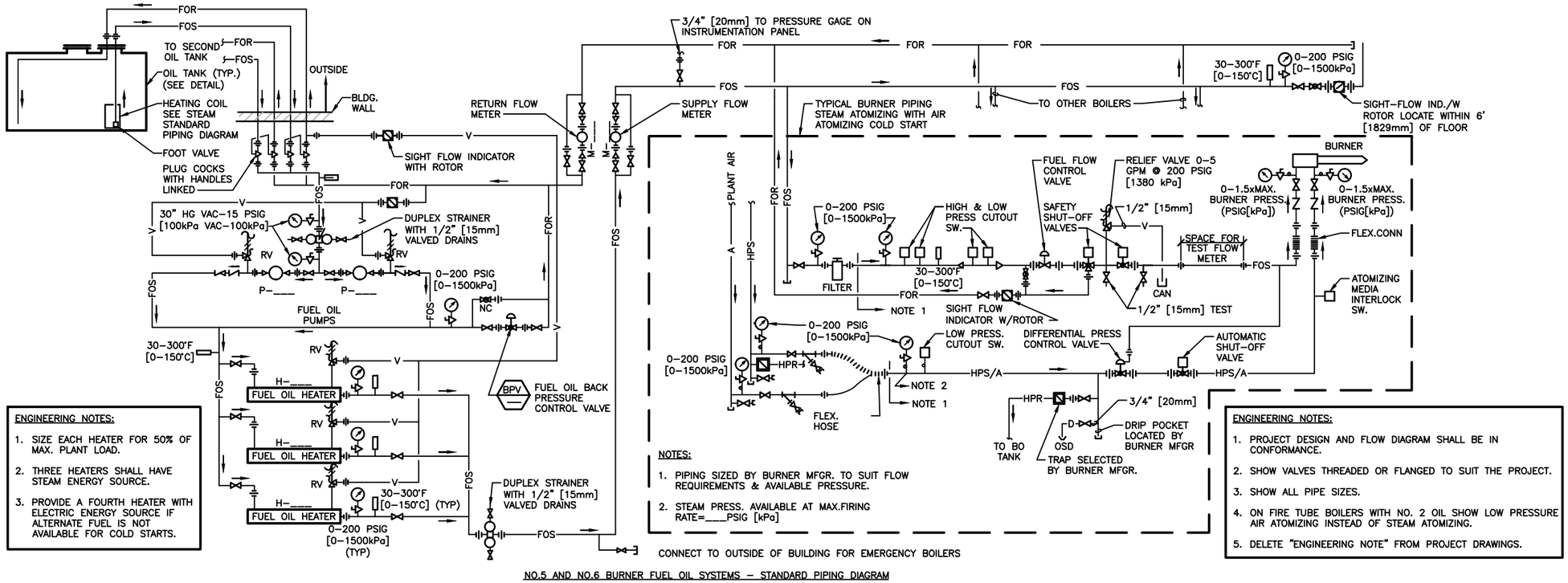
DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD235239-03.DWG

Department of Veterans Affairs



NO.2 BURNER FUEL OIL SYSTEMS – STANDARD PIPING DIAGRAM



NO.5 AND NO.6 BURNER FUEL OIL SYSTEMS – STANDARD PIPING DIAGRAM

NO.2 BURNER FUEL OIL SYSTEMS - STANDARD PIPING DIAGRAM, NO.5 AND NO.6 BURNER FUEL OIL SYSTEMS - STANDARD PIPING DIAGRAM

NTS

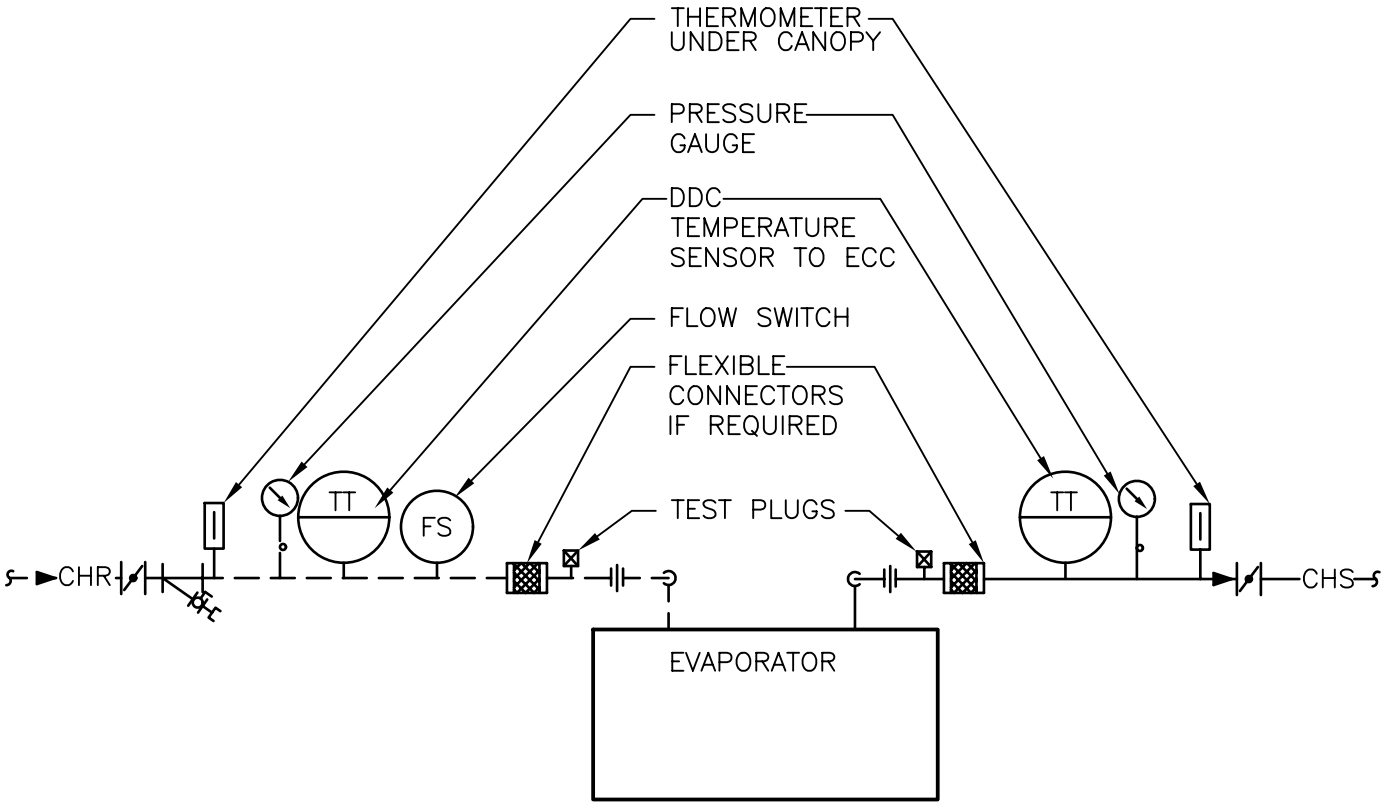
DETAIL TITLE / NO.2 BURNER FUEL OIL SYSTEMS – STANDARD PIPING DIAGRAM
NO.5 AND NO.6 BURNER FUEL OIL SYSTEMS – STANDARD PIPING DIAGRAM

SCALE :NONE

DATE ISSUED: FEBRUARY 2010

CAD DETAIL NO.: SD235239-04.DWG

Department of Veterans Affairs



AIR COOLED CHILLER - PIPING CONNECTIONS

NTS

DESIGNER NOTE:

1. PROVIDE HEAT TRACING WHEN THE EXPOSED PIPING CARRYING CHILLED WATER IS NOT MIXED WITH PROPYLENE CLYCOL. ALL VALVES, STRAINER, FLOW SWITCH, FLEXIBLE CONNECTORS, ETC., SHALL BE WRAPPED WITH ELECTRIC HEAT TRACE CABLE UNDER INSULATION.

2. VERIFY NEED FOR FLEXIBLE CONNECTOR.

3. PROVIDE ALUMINUM JACKETING ON ALL EXPOSED, INSULATED PIPING.

Department of Veterans Affairs

DETAIL TITLE / AIR COOLED CHILLER - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD236400-01.DWG

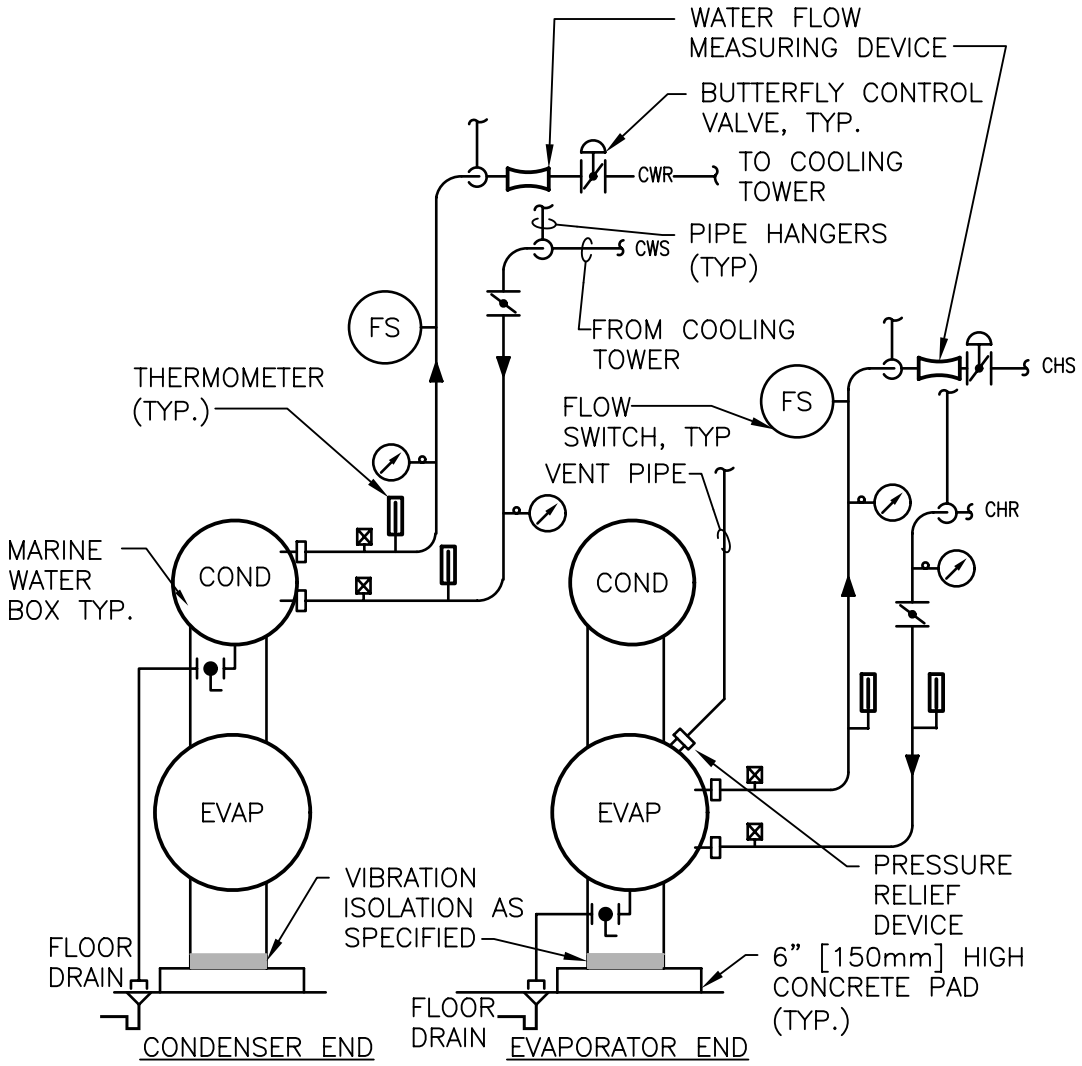
Department of Veterans Affairs

DETAIL TITLE / WATER COOLED CHILLER - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD236400-02.DWG



NOTE:

1. DRAIN ALL LOW POINTS OF SYSTEMS TO NEAREST FLOOR DRAIN.
2. PROVIDE MARINE WATER BOXES FOR BOTH CONDENSER AND EVAPORATOR.
3. COLLECT VENT PIPES FROM ALL REFRIGERANT PRESSURE RELIEF DEVICES AND EXTEND TO EXTERIOR OF BUILDING IN ACCORDANCE WITH ASHRAE STANDARD 15. HEADER SIZE TO EQUAL OR EXCEED TOTAL AREA OF DEVICES CONNECTED TO THE HEADER.
4. PROVIDE MODULATING BUTTERFLY VALVES ON BOTH CHWR & CWR. VALVES CONTROLLED BY ECC.
5. FOR PIPING 6" AND BELOW, MECHANICAL COUPLINGS ARE OPTIONAL. ABOVE 6", WELDED PIPE WITH FLANGES IS THE ONLY APPROVED JOINING METHOD.

WATER COOLED CHILLER - PIPING CONNECTIONS

#

NTS

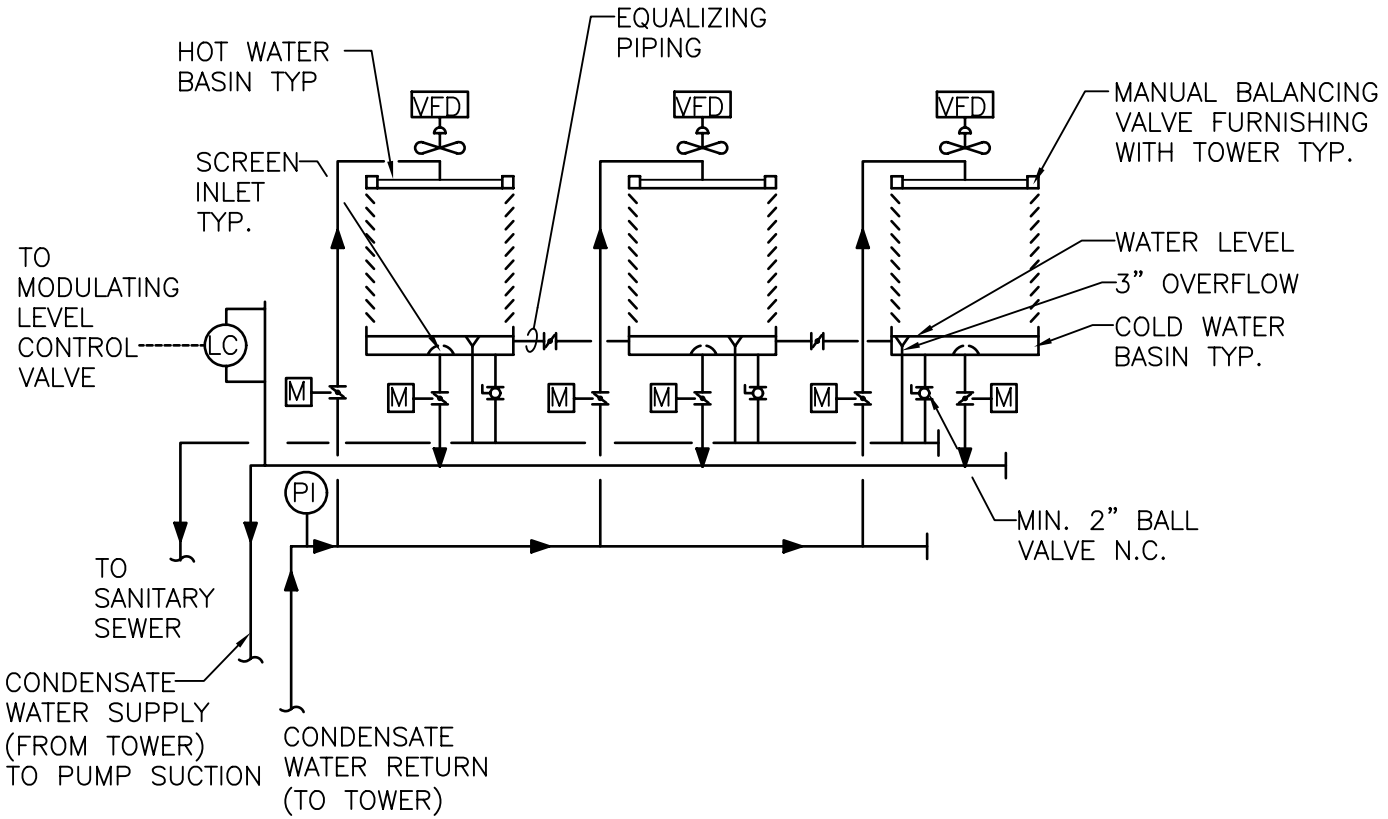
Department of Veterans Affairs

DETAIL TITLE / MULTIPLE CELL COOLING TOWER - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD236500-01.DWG



NOTE:

1. THE BASINS SHALL BE INTERCONNECTED BY FLUMES. EACH CELL SHALL BE PROVIDED WITH ITS OWN SUMP AND ANTI-CAVITATION PLATE.

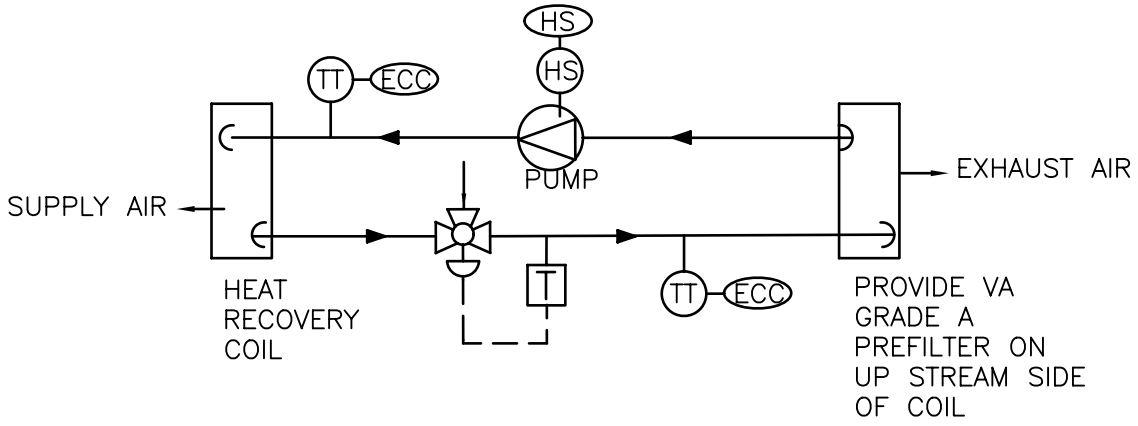
MULTIPLE CELL COOLING TOWER - PIPING CONNECTIONS

#

NTS

DESIGNERS NOTES:

1. IF TOWER IS INSTALLED MORE THAN 5 FT [1500 MM] ABOVE THE ROOF OR GRADE PROVIDE A PLATFORM AROUND THE PERIMETER.
2. PROVIDE ACCESS FOR ALL ELEVATED VALVES AND CONTROL DEVICES AND TO EACH FAN MOTOR.
3. SEE HVAC DESIGN MANUAL.
4. COORDINATE WITH ELECTRICAL ON BASIN HEATER.



NOTES:

1. TO PREVENT ICING ON EXHAUST COIL MAINTAIN TEMPERATURE OF SOLUTION ENTERING EXHAUST AIR COIL $\geq$ 35° F BY MODULATING 3 WAY VALVE.

2. DISCONTINUE HEAT RECOVERY IF OUTSIDE AIR TEMPERATURE $\geq$ BETWEEN 60 TO 80° F (ADJUSTABLE)

3. FOR SYSTEMS WITH WINTER DESIGN CONDITIONS $\leq$ 32° F, PROVIDE APPROPRIATE PROPYLENE GLYCOL SOLUTION.

RUN AROUND HEAT RECOVERY COIL DETAIL

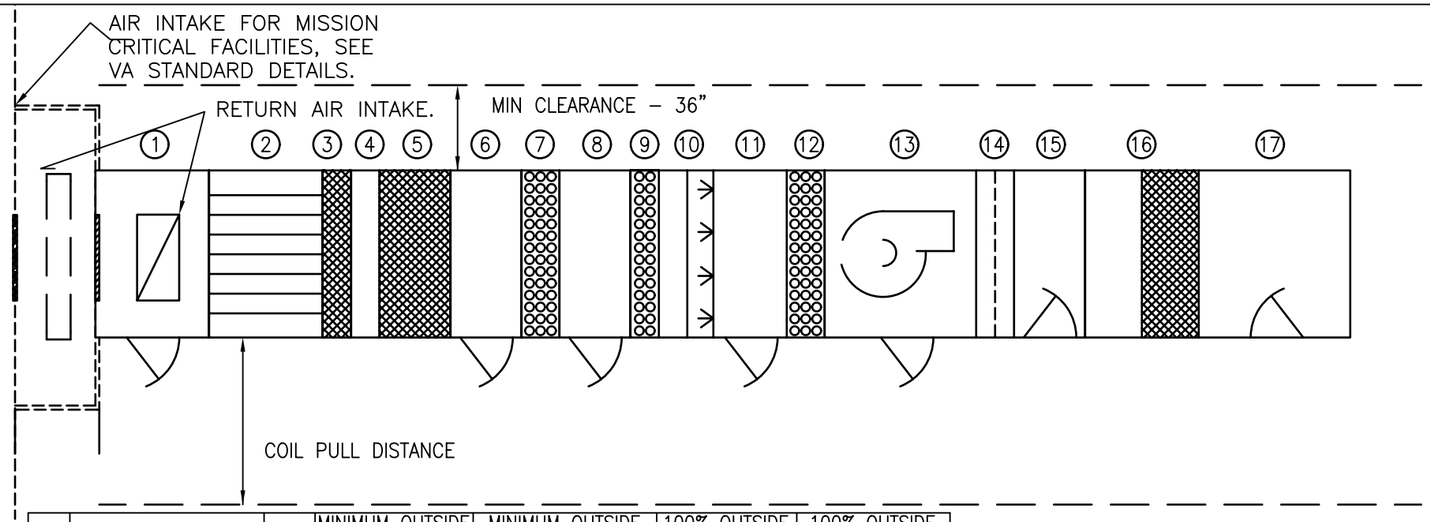
NTS

Department of Veterans Affairs

DETAIL TITLE / RUN AROUND ENERGY RECOVERY DETAIL

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD237200-01.DWG



	AIR HANDLING UNIT	ITEM	MINIMUM OUTSIDE AIR TWO BEDS OF FILTERS VAV	MINIMUM OUTSIDE AIR THREE BEDS OF FILTERS CV	100% OUTSIDE AIR TWO BEDS OF FILTERS CV	100% OUTSIDE AIR THREE BEDS OF FILTERS CV
*	MIXING BOX	1	YES	YES	NO	NO
*	BLENDER SECTION	2	YES	YES	NO	NO
	PRE–FILTERS (SIDE ACCESS)	3	YES	YES	YES	YES
	INSPECTION SECTION, SMALL	4	YES	YES	YES	YES
	AFTER FILTER (SIDE ACCESS)	5	YES	YES	YES	YES
	ACCESS SECTION, MED–LARGE	6	YES	YES	YES	YES
*	HEAT RECOVERY COIL	7	NO	NO	YES	YES
*	ACCESS SECTION, MED–LARGE	8	NO	NO	YES	YES
*	PRE–HEAT COIL	9	YES	YES	YES	YES
*	INSPECTION SECTION,SMALL	10	YES	YES	YES	YES
	HUMIDIFIER	11	YES	YES	YES	YES
	COOLING COIL	12	YES	YES	YES	YES
	FAN	13	YES	YES	YES	YES
*	DIFFUSER PLATE	14	NO	NO	NO	YES
*	ACCESS SECTION,MED–LARGE	15	NO	NO	YES	YES
*	HEPA FILTER	16	NO	NO	NO	YES
*	DISCHARGE PLENUM (VERTICAL)	17	YES	YES	YES	YES
* AS REQUIRED						

NOTE:

1. ACCESS DOORS SHALL BE GASKETED AND HINGED TO OPEN AGAINST FAN OPERATING PRESSURE TO PREVENT AIR LEAKAGE.
2. MINIMUM ACCESS DOOR WIDTH SHALL BE 24" [600mm].
3. ACCESS DOOR HEIGHT SHALL BE DETERMINED BY UNIT CASING BUT NOT TO EXCEED 6'–0" [1800mm].
4. ACCESS DOORS ON FAN SUCTION SHALL OPEN OUTWARD.
5. ACCESS DOORS ON FAN DISCHARGE SIZE SHALL OPEN INWARD.

ACCESS DOOR SWING DETAIL FOR AIR HANDLING UNITS

NTS

DESIGNER'S NOTES:

1. ALL AHU SECTIONS SHOWN IN THIS DETAIL MAY NOT BE APPLICABLE TO EACH AIR HANDLING UNIT INCLUDED IN THE PROJECT.
2. SEE DETAIL FOR AIR INTAKE FOR MISSION CRITICAL FACILITIES.
3. USING THIS FORMAT, DESIGNER SHALL DEVELOP A SIMILAR VIEW OF EACH AHU INCLUDED IN THE PROJECT. SELECTION OF THE AHU SECTIONS SHALL BE APPLICATION SPECIFIC. EACH VIEW SHALL INCLUDE OVERALL DIMENSIONS AND AVAILABLE ACCESS SPACE FOR EACH AIR HANDLING UNIT. NOTE THAT THESE VIEWS DO NOT NEGATE THE NEED TO PROVIDE CROSS–SECTIONS/ELEVATIONS OF THE MECHANICAL ROOMS, SHOWING EQUIPMENT SECTIONS AND DETAILS OF EACH AHU.

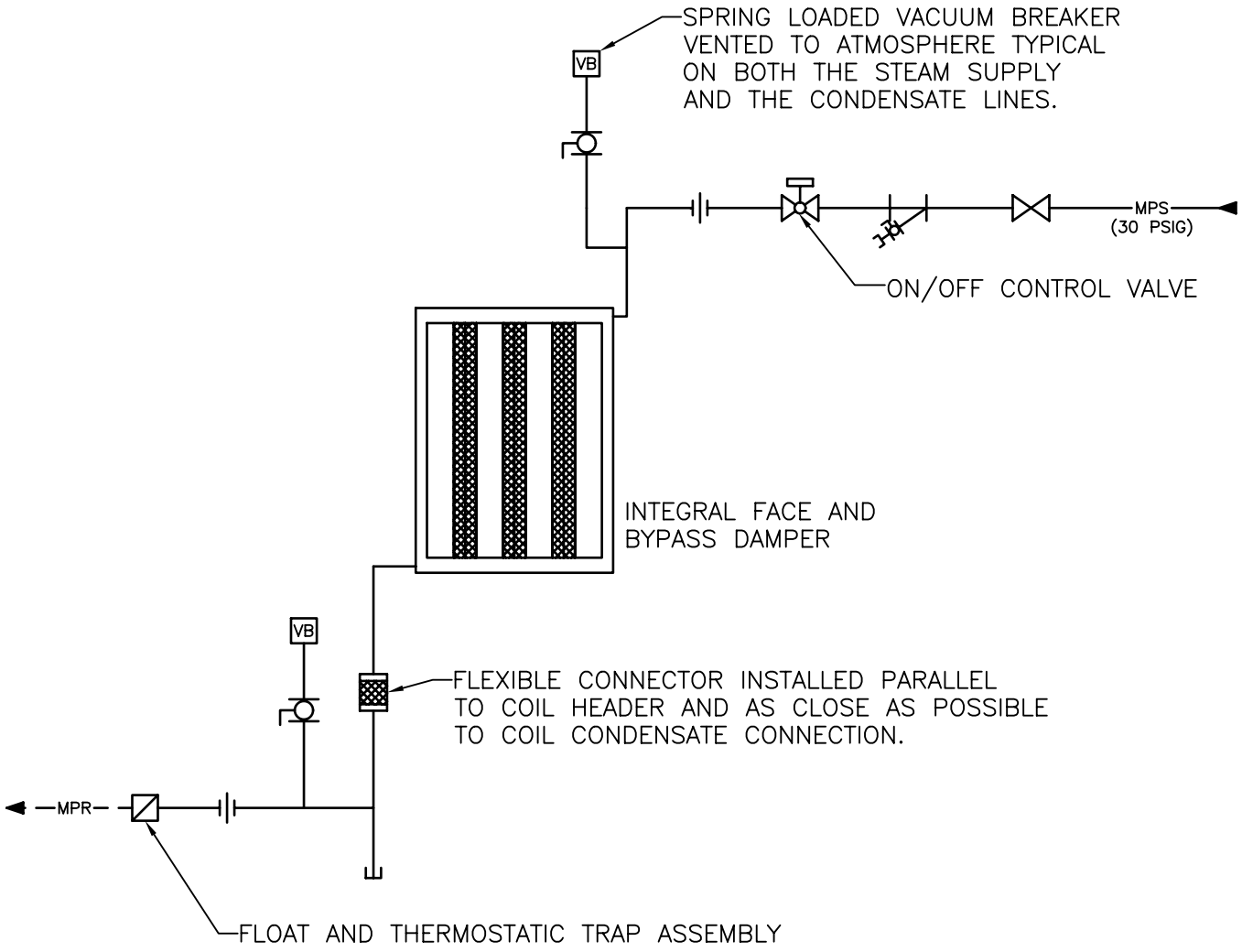
DETAIL TITLE / ACCESS DOOR SWING DETAIL FOR AIR HANDLING UNITS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD237300–01.DWG

Department of Veterans Affairs



INTEGRAL FACE AND BYPASS STEAM COIL DETAIL

#

NTS

DESIGNER'S NOTE:

1. USE THIS DETAIL FOR UNIT MOUNTED PREHEAT COIL.

Department of Veterans Affairs

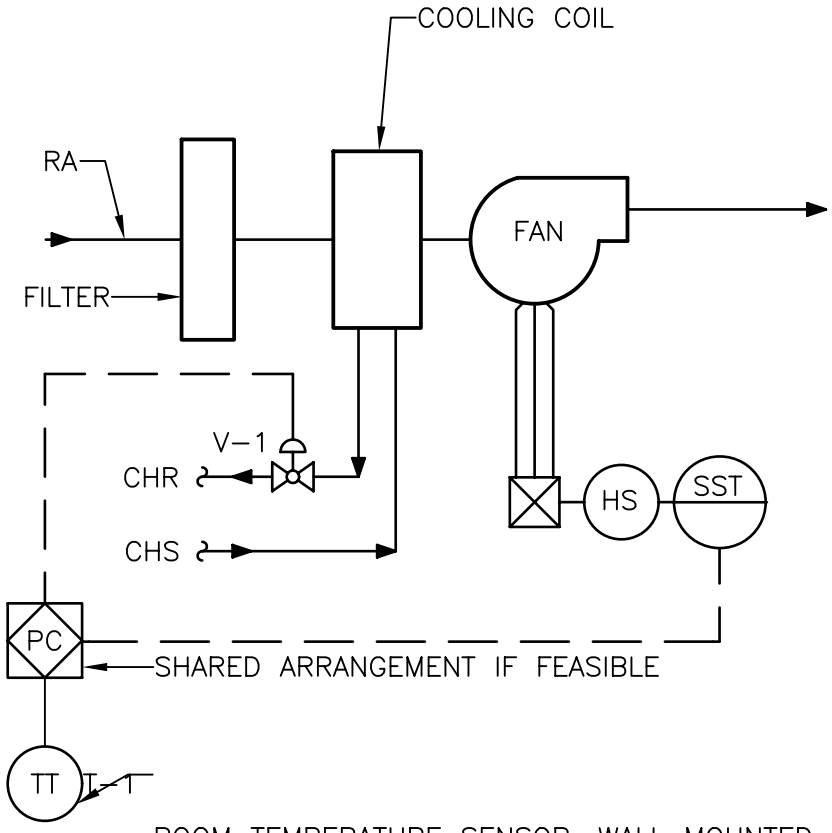
DETAIL TITLE / INTEGRAL FACE AND BYPASS STEAM COIL

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD237300-02.DWG

FAN COIL SEQUENCE OF OPERATION (COOLING ONLY)

1. FAN COIL UNIT SHALL OPERATE ON A SCHEDULE AS SET BY THE DCC.
2. MODULATE V-1 TO MAINTAIN SPACE SET POINT AND FAN SHALL CYCLE W/TEMPERATURE.
3. ALARM IF SPACE TEMPERATURE OUTSIDE OF RANGES.



COOLING ONLY FAN COIL UNIT CONTROLS

#

NTS

DESIGNER'S NOTE

1. MODIFY THE DETAIL IF DCC IS NOT USED.

Department of Veterans Affairs

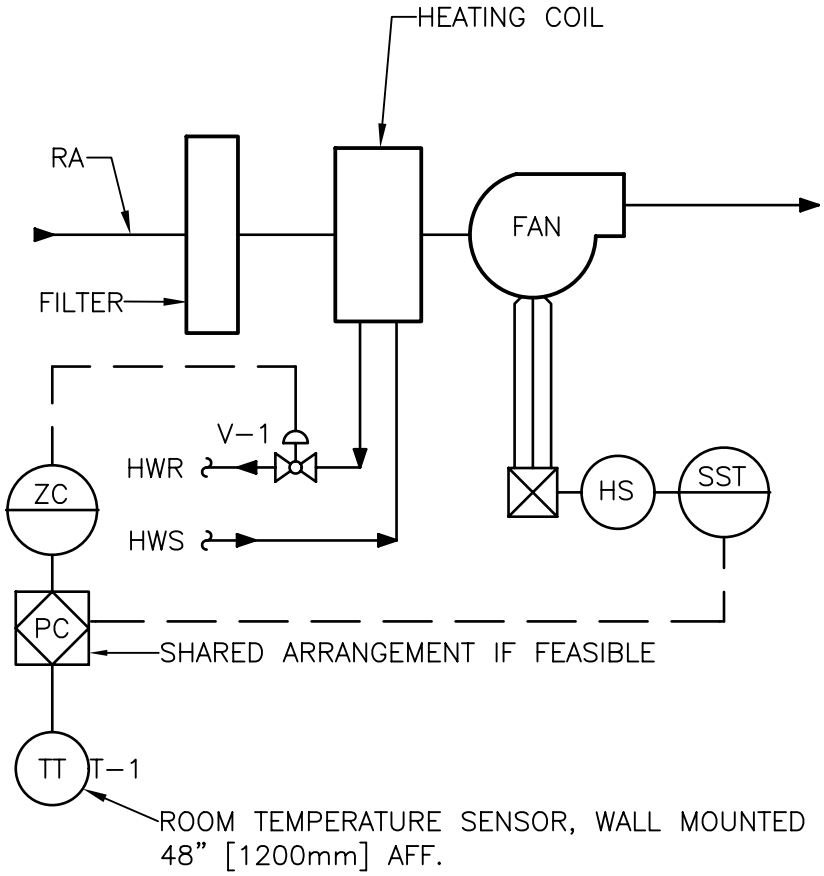
DETAIL TITLE / COOLING ONLY FAN COIL UNIT CONTROLS

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD238200-01.DWG

FAN COIL SEQUENCE OF OPERATION (HEATING ONLY)

1. FAN COIL UNIT SHALL OPERATE ON A SCHEDULE AS SET BY THE DCC.
2. MODULATE V-1 TO MAINTAIN SPACE SET POINT AND FAN SHALL CYCLE W/TEMPERATURE.
3. ALARM IF SPACE TEMPERATURE OUTSIDE OF RANGES.



HEATING ONLY FAN COIL UNIT CONTROLS

NTS

DESIGNER'S NOTE
MODIFY DETAIL IF DCC IS NOT USED.

Department of Veterans Affairs

DETAIL TITLE / HEATING ONLY FAN COIL UNIT CONTROLS

SCALE :NONE

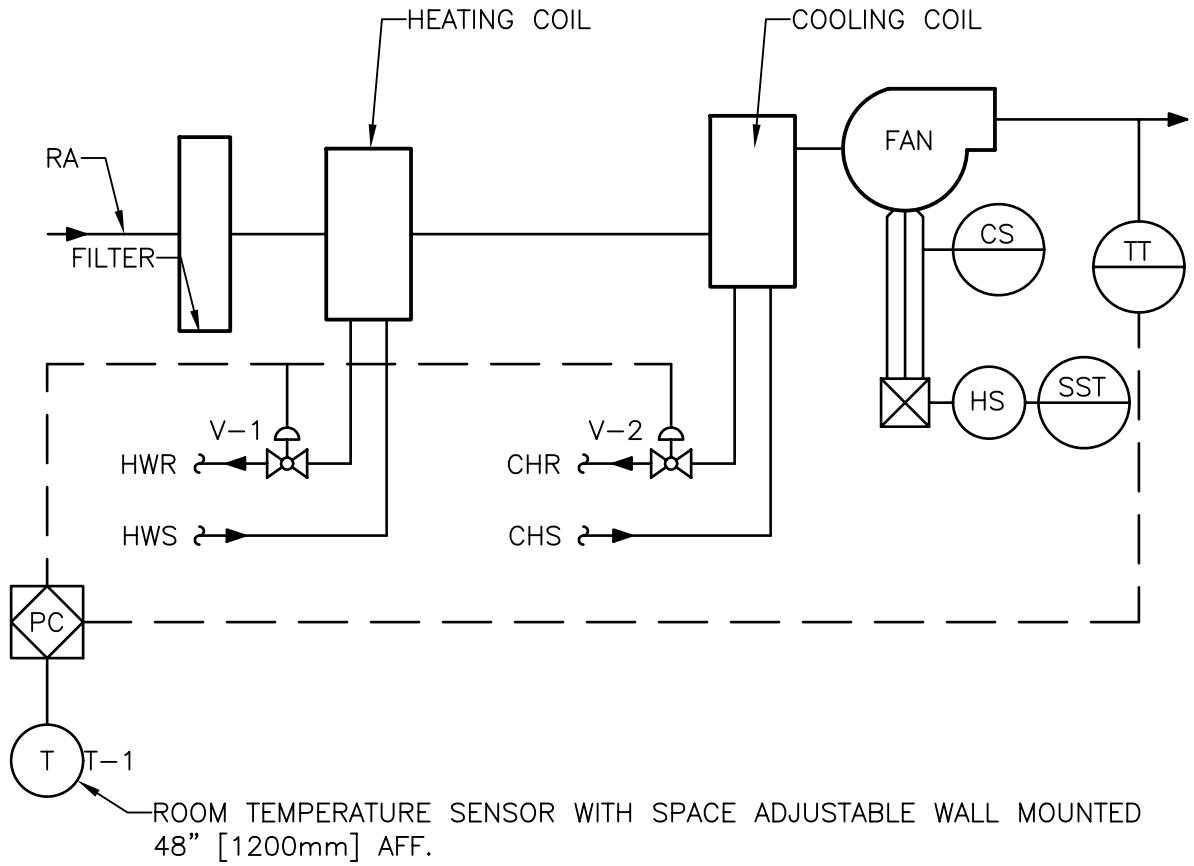
DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD238200-02.DWG

FAN COIL SEQUENCE OF OPERATION (PATIENT ROOMS)

FAN COIL UNIT SHALL OPERATE ON A SCHEDULE AS SET BY THE ECC. FAN SHALL RUN CONTINUOUSLY. FAN STATUS SHALL BE MONITORED AND AN ALARM MESSAGE SHALL BE GENERATED IN THE EVENT THE UNIT FAILS TO RUN. THE ADJUSTABLE ROOM TEMP SET POINT WILL BE 70°–75° WITH 0.5° HEATING/COOLING OFFSETS. VALVE V–1 & V–2 WILL NOT BE OPEN SIMULTANEOUSLY. ROOM OCCUPANT WILL HAVE ABILITY OF ADJUSTING ROOM TEMPERATURE BETWEEN 70°–75°.

FAN COIL SEQUENCE OF OPERATION (NONPATIENT ROOMS)

FAN COIL SHALL OPERATE ON A SCHEDULE AS SET BY ECC. FAN SHALL RUN CONTINUOUSLY IN OCCUPIED MODE. FAN STATUS SHALL BE MONITORED AND AN ALARM MESSAGE SHALL BE GENERATED IN THE EVENT THE UNIT FAILS TO RUN BETWEEN THE RANGE OF 70°–75° SPACE TEMPERATURE BOTH V–1 & V–2 SHALL BE CLOSED. UPON RISE IN TEMPERATURE ABOVE 75° V–2 SHALL MODULATE OPEN TO MAINTAIN 75° F. UPON FALL IN TEMPERATURE BELOW 70° F. HEATING VALVE V–1 SHALL MODULATE TO OPEN TO MAINTAIN 70° F.



FOUR PIPE FAN COIL UNIT CONTROLS

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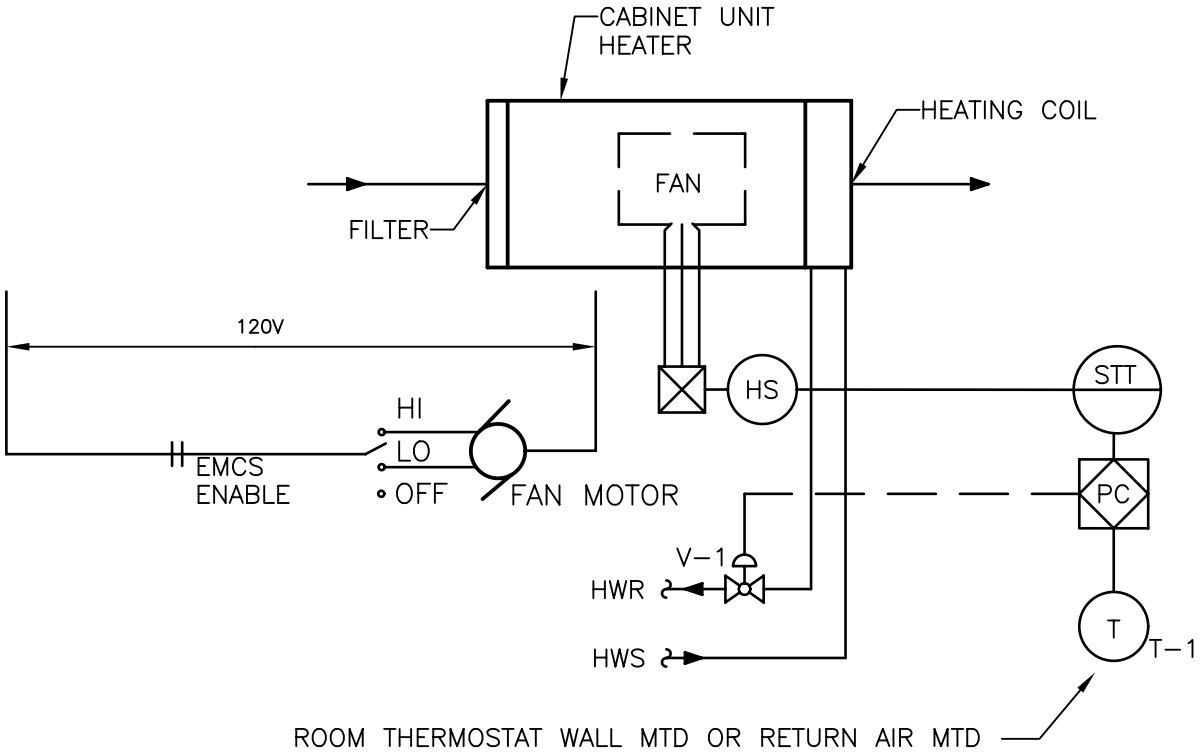
DETAIL TITLE / FOUR PIPE FAN COIL UNIT CONTROLS

SCALE :NONE

DATE ISSUED : DECEMBER 2008 CADD DETAIL NO. : SD238200–03.DWG

HOT WATER CABINET UNIT HEATER SEQUENCE

1. CABINET HEATER SHALL OPERATE ON A SCHEDULE AS SET BY THE ECC. FAN STATUS SHALL BE MONITORED AND AN ALARM MESSAGE GENERATED IN THE EVENT THE UNIT FAILS TO RUN. THE ROOM TEMP SETPOINT WILL BE 74° (ADJ). THE HOT WATER VALVE WILL BE ENABLED AS REQUIRED TO MAINTAIN SPACE TEMP SETPOINT. HI/LO/OFF SWITCH WILL ALLOW LOCAL FAN SPEED ADJUSTMENT.



HOT WATER CABINET UNIT CONTROLS

NTS

DESIGNER'S NOTES:

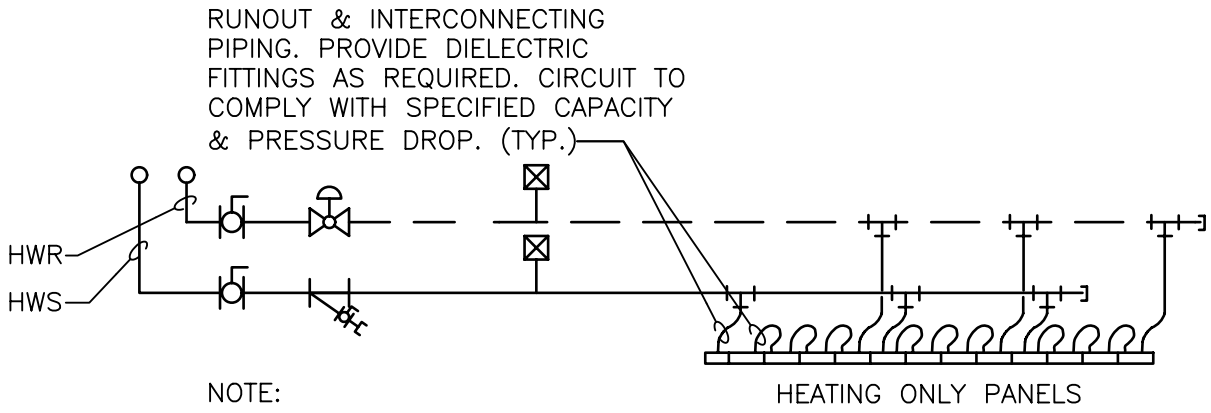
1. CONNECT TO ECC NETWORK IS OPTIONAL.
2. PROVIDE NON-DDC CLOSED LOOP AUTOMATIC TEMPERATURE CONTROLS FOR THE HOT WATER CABINET UNIT HEATER. COORDINATE THE INTERFACE, IF ANY, WITH THE DDC SYSTEM FOR APPLICATIONS SUCH AS ALARM INDICATION WITH PROJECT SCOPE OF WORK.
3. PROVIDE A STEP CONTROL FOR NON-CRITICAL APPLICATIONS. WHEN TEMPERATURE FALLS BELOW SET POINT, THE CABINET UNIT HEATER SHALL BE ENERGIZED AND THE TWO-POSITION, TWO-WAY VALVE SHALL OPEN.

Department of Veterans Affairs

DETAIL TITLE / HOT WATER CABINET UNIT CONTROLS

SCALE :NONE

DATE ISSUED :DECEMBER 2008 CADD DETAIL NO. : SD238200-04.DWG



HYDRONIC RADIANT CEILING PANELS - PIPING CONNECTIONS

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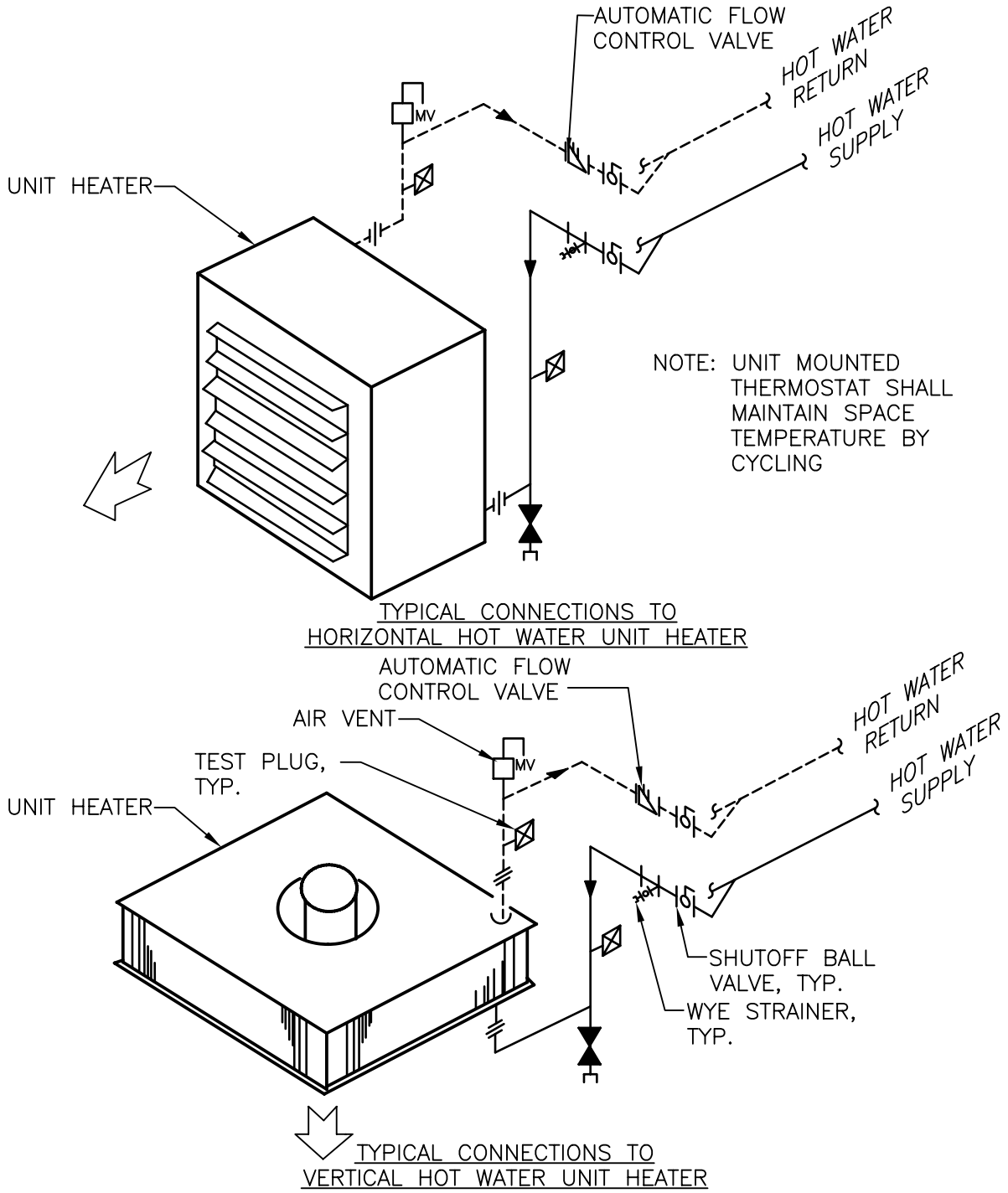
NTS

Department of Veterans Affairs

DETAIL TITLE / HYDRONIC RADIANT CEILING PANELS - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200-05.DWG



UNIT HEATERS (HOT WATER) - PIPING CONNECTIONS

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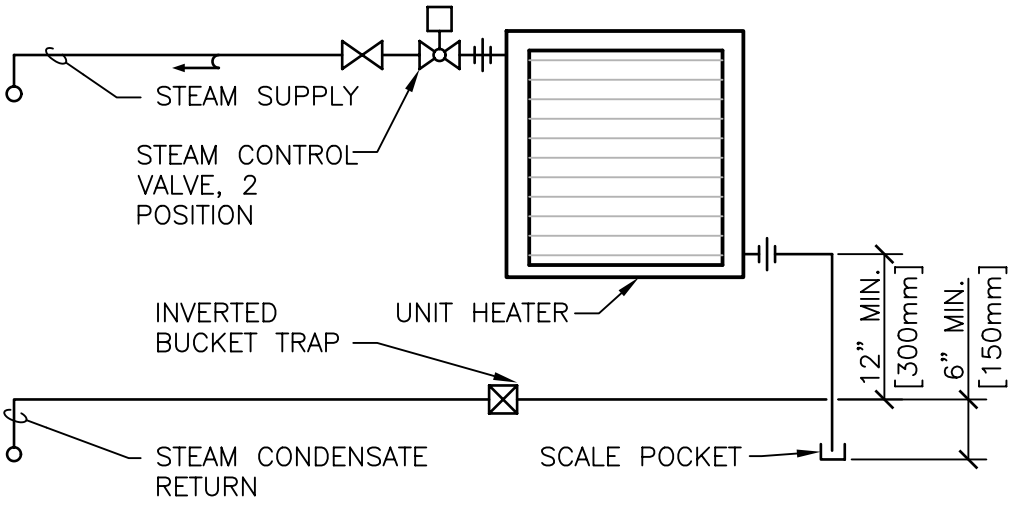
Department of Veterans Affairs

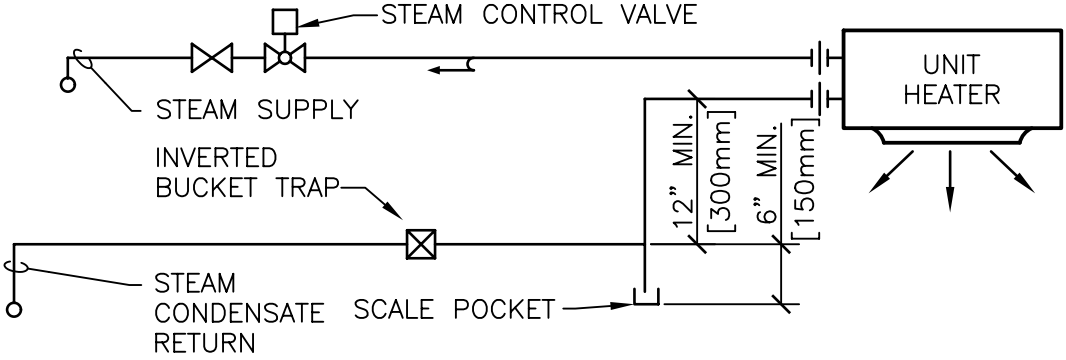
DETAIL TITLE / UNIT HEATERS (HOT WATER) - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200-06.DWG



PIPING CONNECTIONS TO HORIZONTAL TYPE STEAM UNIT HEATER



PIPING CONNECTIONS TO VERTICAL TYPE STEAM UNIT HEATER

NOTES:
1.UNIT MOUNTED THERMOSTAT SHALL MAINTAIN SPACE TEMPERATURE BY CYCLING THE FAN. THE CONTROL VALVE SHALL BE INTERLOCK WITH THE FAN.

UNIT HEATERS (STEAM) PIPING CONNECTIONS

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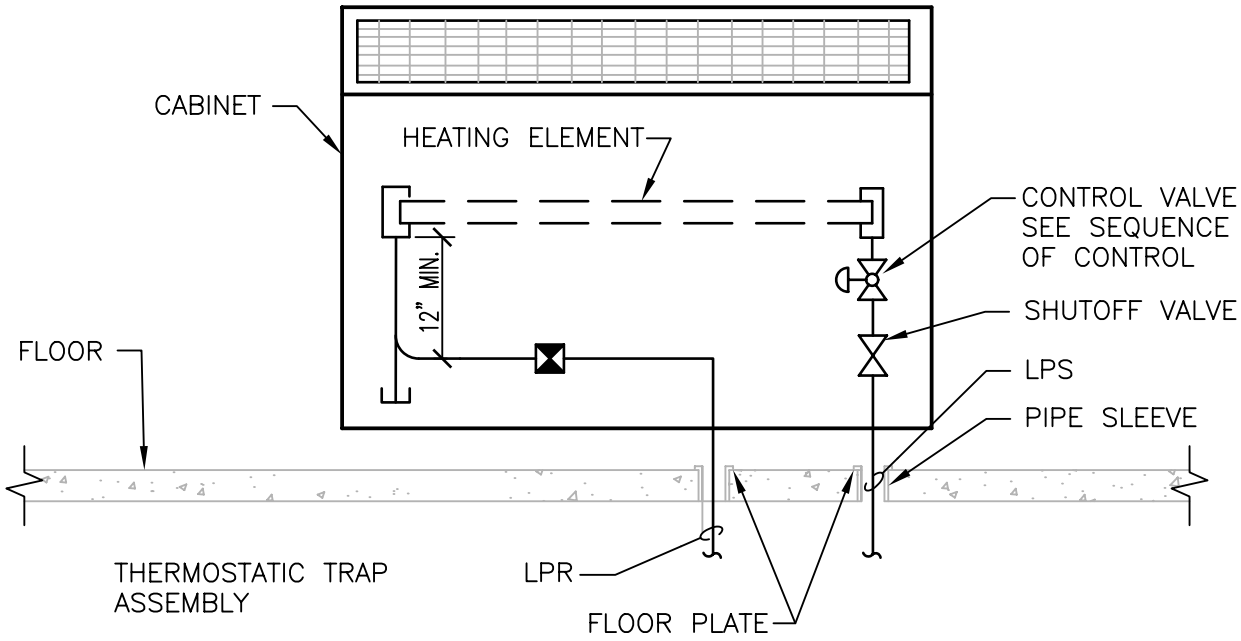
DETAIL TITLE / UNIT HEATERS (STEAM) PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200-07.DWG



CONVECTOR-STEAM PIPING CONNECTION

NTS

DESIGNER'S NOTE:
USE THIS DETAIL WHEN THE CONVECTOR (OR STEAM RADIATOR) IS USED IN CONJUNCTION WITH AN AIR TERMINAL UNIT TO SERVE AN OCCUPY SPACE, REPLACE RADIATOR VALVE WITH A STEAM CONTROL VALVE AND CONTROL SPACE WITH COMMON THERMOSTAT.

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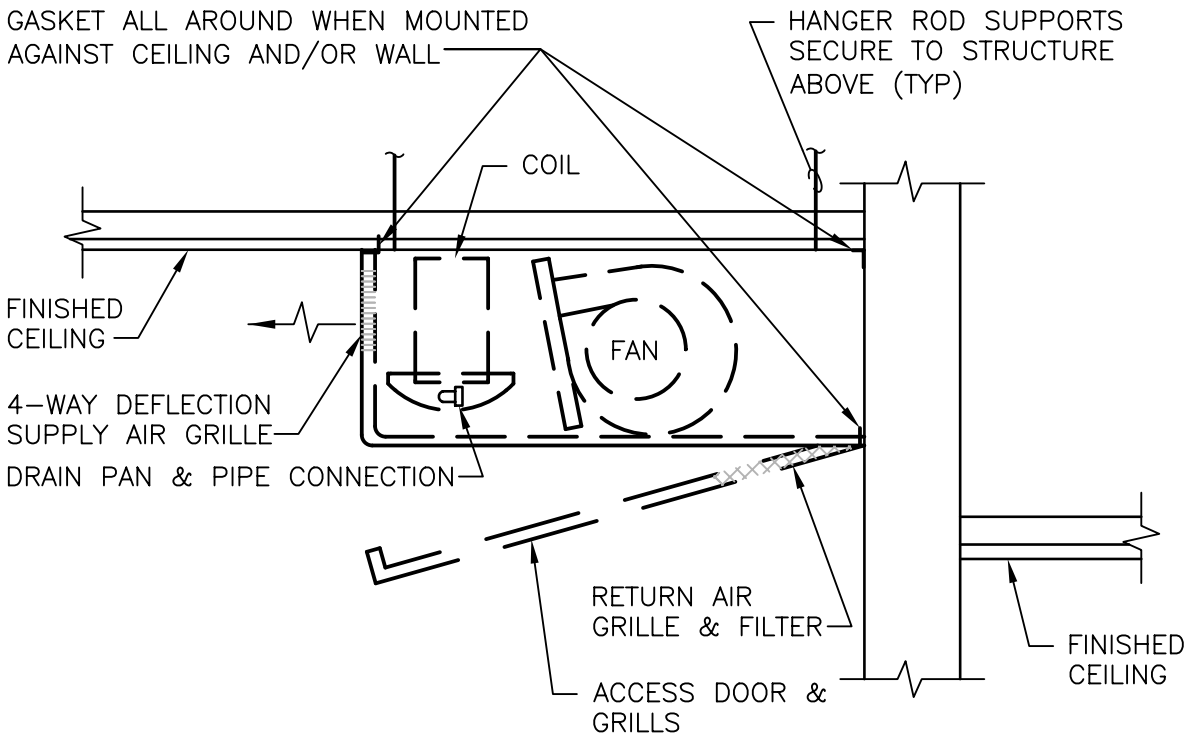
DETAIL TITLE / CONVECTOR-STEAM PIPING CONNECTION

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200-08.DWG



NOTE:
UNLESS OTHERWISE NOTED, ALL UNITS SHALL BE MOUNTED AGAINST FINISHED CEILING.

FAN COIL UNIT - HORIZONTAL EXPOSED

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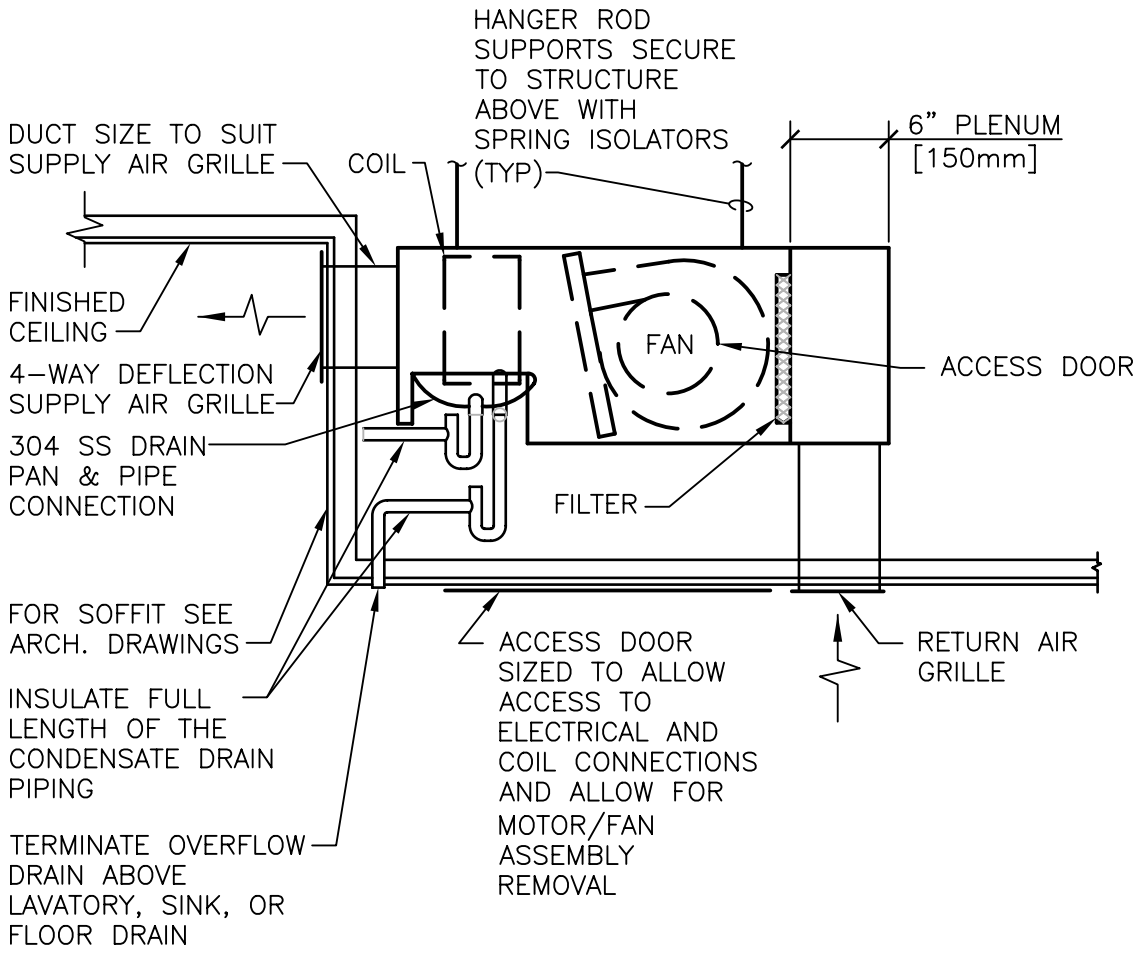
DETAIL TITLE / FAN COIL UNIT – HORIZONTAL EXPOSED

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200–09.DWG



NOTES:

1. SIX INCH [150mm] PLENUM AS SHOWN SHALL BE SUPPLIED BY MANUFACTURER OF FAN COIL UNIT.
2. SEE DETAIL FOR SUPPLY & RETURN PIPING CONNECTIONS.

   PROVIDE ACCESS FOR FILTER REMOVAL.
3. SEE FAN COIL UNIT SCHEDULE FOR PIPE SIZES.
4. SUPPLY & RETURN GRILLES SHALL BE SIZED TO SUIT CONNECTIONS ON FAN COIL UNIT. DUCTWORK SHALL SUIT GRILLES AND FAN COIL UNIT FURNISHED.

FAN COIL UNIT - HORIZONTAL CONCEALED

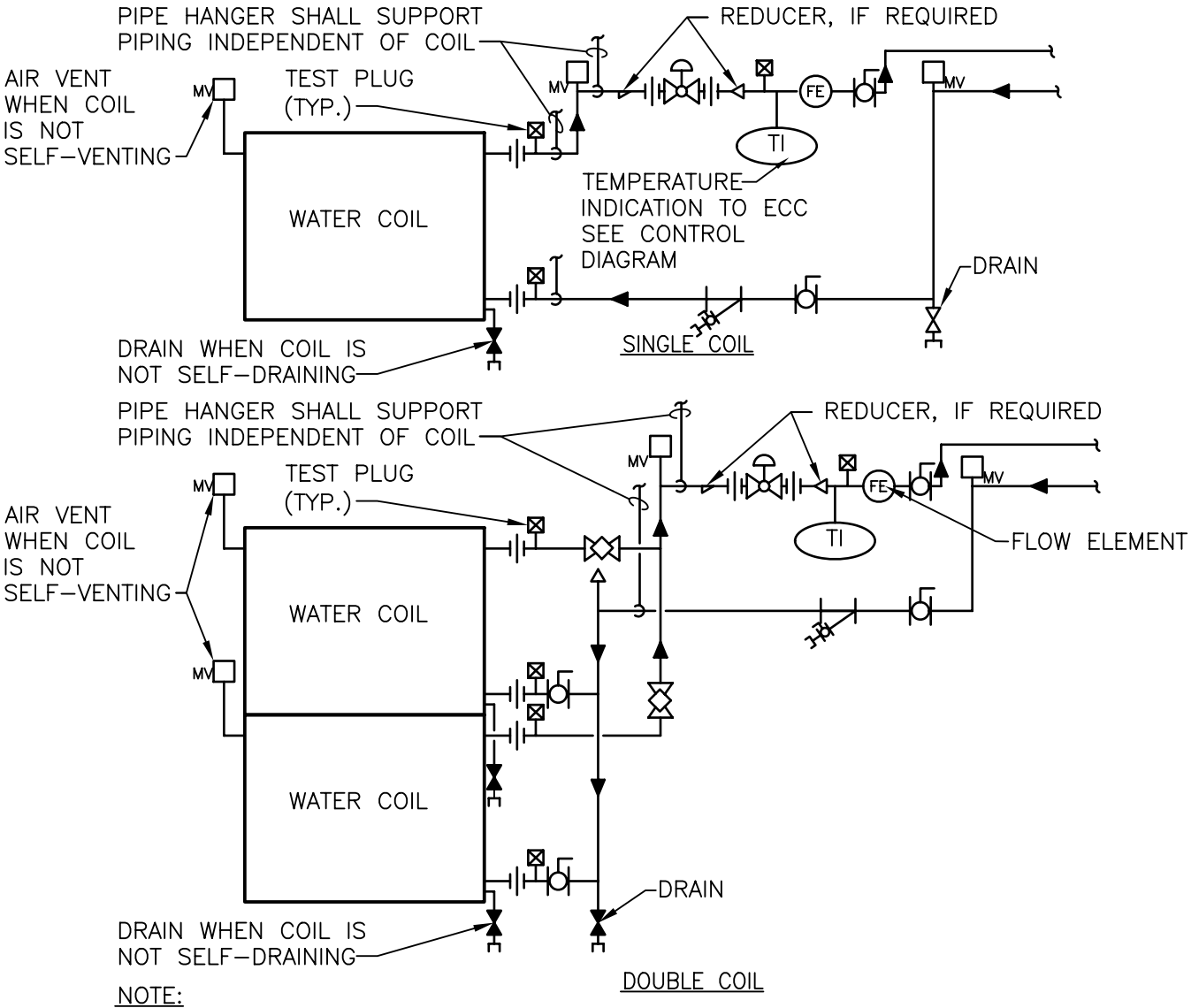
NTS

Department of Veterans Affairs

DETAIL TITLE / FAN COIL UNIT – HORIZONTAL CONCEALED

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238200-10.DWG



NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" [100mm]ø PIPE & SMALLER. TYPE "H-P" FOR 5" [125mm]ø PIPE & LARGER.

2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALES, OR EQUIPMENT.

3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

WATER COILS - PIPING CONNECTIONS

NTS

DESIGNER'S NOTE:
BALANCING VALUES MAY BE OMITTED IF REVERSE PIPING PROVIDED.

Department of Veterans Affairs

DETAIL TITLE / WATER COILS - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008 CAD DETAIL NO.: SD238216-01.DWG

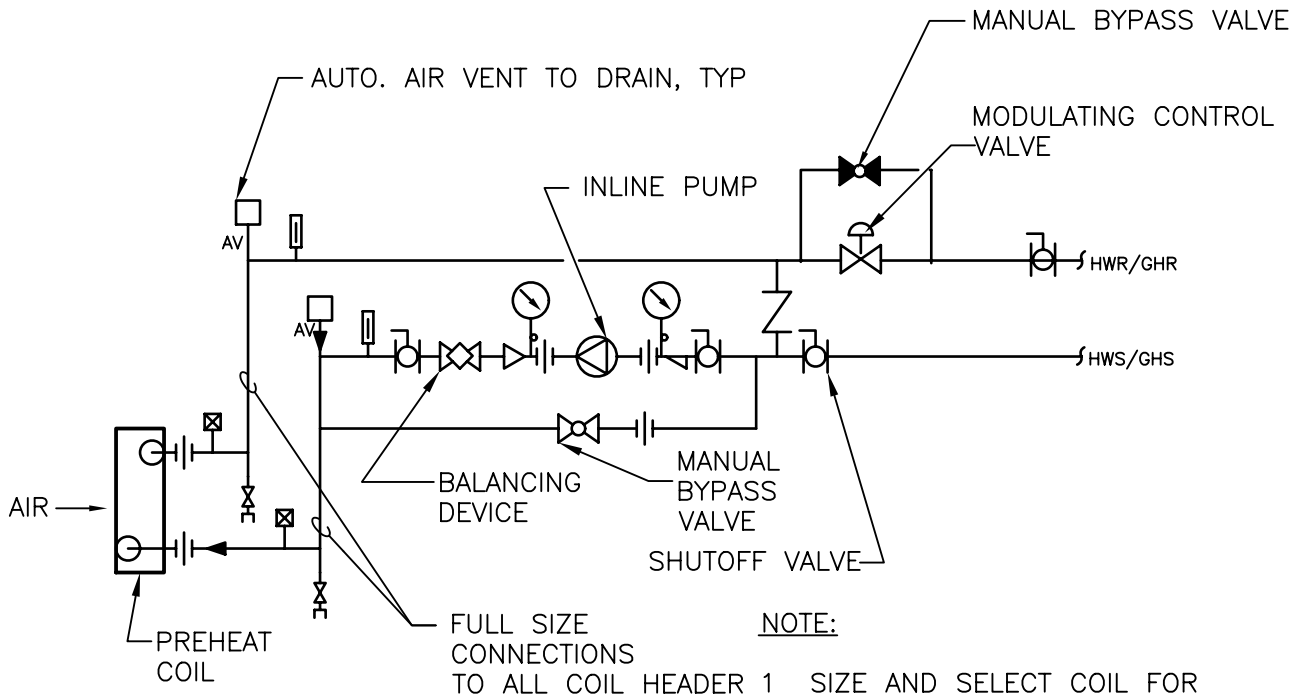
Department of Veterans Affairs

DETAIL TITLE / PREHEAT COIL (HOT WATER) - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD238216-02.DWG



PREHEAT COIL (HOT WATER) - PIPING CONNECTIONS

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DESIGNERS NOTE:

1.COORDINATE WITH HVAC DESIGN MANUAL.

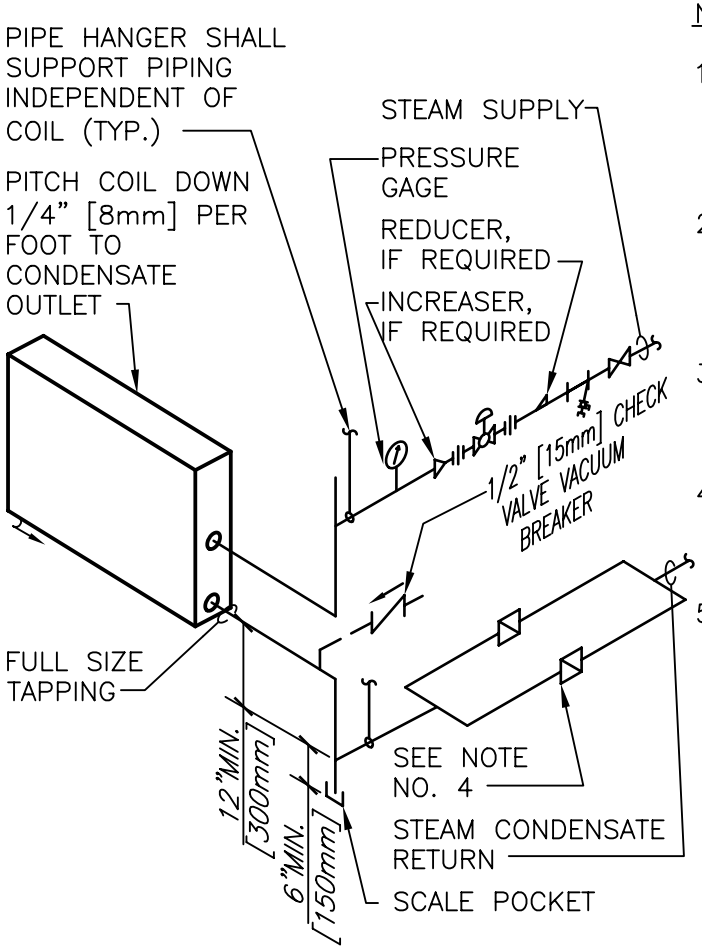
Department of Veterans Affairs

DETAIL TITLE / STEAM COIL - PIPING CONNECTIONS

SCALE :NONE

DATE ISSUED: DECEMBER 2008

CAD DETAIL NO.: SD238216-03.DWG



NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATOR UNITS, THE RUNOUT PIPING FOR CONNECTIONS TO COIL SHALL BE INSTALLED WITH SWING JOINTS TO ALLOW FOR THE VIBRATION.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.
3. TRAP EACH COIL SEPARATELY WHEN INSTALLED IN A BANK OF TWO OR MORE HIGH. ALSO PROVIDE SEPARATE VACUUM BREAKER FOR EACH COIL.
4. TWO TRAP ASSEMBLIES IN PARALLEL ARE SHOWN. TWO TRAPS REQUIRED WHEN CONDENSATE LOAD IS 5,000 LBS/HR [2400 KG/HR] OR GREATER.
5. SUPPLY & RETURN PIPES ARE SHOWN FROM SAME END. REHEAT COIL MAY HAVE SUPPLY & RETURN PIPES FROM OPPOSITE ENDS.

STEAM COIL - PIPING CONNECTIONS

NTS

DESIGNER'S NOTE:

FOR VACUUM RETURN SYSTEMS CONNECT 1/2" [15mm] CHECK VALVE VACUUM BREAKER INTO DISCHARGE SIDE OF TRAP SET. CHANGE F & T TRAP SET TO SHOW PIPING LOCATION CONNECTION.