

AIR TERMINAL UNIT SCHEDULE - AHU 3A-1													
	ATU 3A-1	ATU 3A-2	ATU 3A-3	ATU 3A-4	ATU 3A-5	ATU 3A-6	ATU 3A-7	ATU 3A-8	ATU 3A-9	ATU 3A-10	ATU 3A-11	ATU 3A-12	ATU 3A-13
Model	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E
Unit Size/Inlet	10 Inch	10 Inch	10 Inch	10 Inch	10 Inch	8 Inch	10 Inch	10 Inch	8 Inch	10 Inch	10 Inch	10 Inch	10 Inch
Primary Max Airflow (CFM)	565.0	545.0	545.0	545.0	635.0	330.0	550.0	605.0	245.0	575.0	695.0	605.0	400.0
Primary Min Airflow (CFM)	280.0	280.0	280.0	280.0	340.0	165.0	280.0	305.0	125.0	290.0	350.0	310.0	200.0
Inlet Pressure (in wg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Discharge Pressure (in wg)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Heating Capacity (BTU/hr)	18.37	18.37	18.37	18.37	20.19	11.62	18.37	19.13	7.42	18.68	20.79	19.28	11.88
Reheat Fluid Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	1 Row	2 Rows	2 Rows	2 Rows	1 Row
Heating Coil EAT (F)	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00
Heating Coil LAT (F)	115.74	115.74	115.74	115.74	109.99	120.23	115.74	113.08	109.99	114.65	109.99	112.58	109.99
Htg Airflow (CFM)	280.0	280.0	280.0	280.0	340.0	165.0	280.0	305.0	125.0	290.0	350.0	310.0	200.0
Heating Coil Fluid Flow (gpm)	0.92	0.92	0.92	0.92	0.93	0.61	0.92	0.92	0.83	0.92	0.98	0.92	2.32
Heating Coil EWT (F)	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
Heating Coil LWT (F)	138.71	138.71	138.71	138.71	135.23	140.80	138.71	136.99	161.45	138.00	136.28	136.66	169.44
Min Unit Static Pressure (in wg)	0.153	0.143	0.143	0.143	0.189	0.117	0.145	0.173	0.042	0.158	0.222	0.173	0.049

- NOTES:
- CARRIER MODEL 35E-CCN OR EQUAL.
 - THE CONTRACTOR SHALL COORDINATE INSTALLATION OF DDC CONTROLS WITH THE CONTROLS CONTRACTOR.
 - FULL SIZE SHEET METAL DUCT CONNECTIONS ON INLET AND OUTLET.

AIR TERMINAL UNIT SCHEDULE - AHU 3B-2																		
	ATU 3B-1	ATU 3B-2	ATU 3B-3	ATU 3B-4	ATU 3B-5	ATU 3B-6	ATU 3B-7	ATU 3B-8	ATU 3B-9	ATU 3B-10	ATU 3B-11	ATU 3B-12	ATU 3B-13	ATU 3B-14	ATU 3B-15	ATU 3B-16	ATU 3B-17	ATU 3B-18
Model	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E	35E
Unit Size/Inlet	10 Inch	14 Inch	8 Inch	14 Inch	16 Inch	8 Inch	10 Inch	16 Inch	10 Inch	10 Inch	10 Inch	10 Inch	7 Inch	7 Inch	7 Inch	10 Inch	7 Inch	7 Inch
Primary Max Airflow (CFM)	465.0	1280.0	280.0	1475.0	1700.0	375.0	895.0	1900.0	710.0	825.0	790.0	550.0	190.0	200.0	210.0	875.0	250.0	230.0
Primary Min Airflow (CFM)	340.0	640.0	140.0	750.0	850.0	170.0	450.0	950.0	360.0	420.0	400.0	280.0	100.0	100.0	105.0	430.0	125.0	125.0
Inlet Pressure (in wg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Discharge Pressure (in wg)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Heating Capacity (BTU/hr)	20.19	38.01	12.27	44.54	50.48	11.80	26.73	56.42	21.38	24.94	23.76	18.37	5.94	5.94	6.24	25.54	7.42	
Reheat Fluid Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	2 Rows	1 Row	1 Row	1 Row	2 Rows	1 Row	
Heating Coil EAT (F)	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	
Heating Coil LAT (F)	109.99	109.99	136.15	109.99	109.99	119.28	109.99	109.99	109.99	109.99	109.99	115.74	109.99	109.99	109.99	109.99	109.99	
Htg Airflow (CFM)	340.0	640.0	140.0	750.0	850.0	170.0	450.0	950.0	360.0	420.0	400.0	280.0	100.0	100.0	105.0	430.0	125.0	
Heating Coil Fluid Flow (gpm)	0.93	1.42	1.53	1.88	2.22	0.61	1.62	2.74	1.03	1.40	1.26	0.92	0.38	0.38	0.44	1.47	0.83	
Heating Coil EWT (F)	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	
Heating Coil LWT (F)	135.23	124.90	163.47	131.25	133.13	140.20	145.88	137.51	137.32	143.17	141.28	138.71	147.72	147.72	150.62	144.09	161.45	
Min Unit Static Pressure (in wg)	0.107	0.193	0.087	0.250	0.225	0.114	0.351	0.275	0.231	0.303	0.280	0.145	0.031	0.034	0.037	0.323	0.051	0.044

- NOTES:
- CARRIER MODEL 35E-CCN OR EQUAL.
 - THE CONTRACTOR SHALL COORDINATE INSTALLATION OF DDC CONTROLS WITH THE CONTROLS CONTRACTOR.
 - FULL SIZE SHEET METAL DUCT CONNECTIONS ON INLET AND OUTLET.

EXHAUST - AIR TERMINAL UNIT SCHEDULE - AHU 3A-1																		
	ATU E3A-1	ATU E3A-2	ATU E3A-3	ATU E3A-4	ATU E3A-5	ATU E3A-6	ATU E3A-7	ATU E3A-8	ATU E3A-9	ATU E3A-10	ATU E3A-11							
Model	CEV	CEV	CEV	CEV	CEV	CEV	CEV	CEV	CEV	CEV	CEV							
Unit Size/Inlet	10 Inch	8 Inch	8 Inch	8 Inch	8 Inch	8 Inch	8 Inch	10 Inch	8 Inch	8 Inch	6 Inch							
Primary Max Airflow (CFM)	735	460	460	460	460	485	510	800	335	330	90							
Primary Min Airflow (CFM)	735	460	460	460	460	485	510	800	335	330	90							
Inlet Pressure (in wg)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00							
Discharge Pressure (in wg)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20							

- NOTES:
- PHOENIX CONTROLS MODEL CEV OR EQUAL.
 - THE CONTRACTOR SHALL COORDINATE INSTALLATION OF DDC CONTROLS WITH THE CONTROLS CONTRACTOR.
 - FULL SIZE SHEET METAL DUCT CONNECTIONS ON INLET AND OUTLET.
 - COOLING ONLY NO HOT WATER REQUIRED.

FINAL DESIGN
APPROVED FOR CONSTRUCTION

REV 1 - ADDENDUM 1
7/29/2016
Revisions:
Date

CONSULTANTS:

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AKEA Project No. 110-15

Drawing Title
MECHANICAL EQUIPMENT SCHEDULES

Approved: Project Director

Project Title
RENOVATE 3AB FOR
GASTROENTEROLOGY AND
PULMONARY

Location
GAINESVILLE, FLORIDA

Date
JULY 15, 2016

Checked
STS

Drawn
TJM

Project Number
573-15-102

Building Number
1

Drawing Number
MH601

32 OF 72

Office of
Construction
and Facilities
Management

Department of
Veterans Affairs

three inches = one foot
one and one half inches = one foot
one inch = one foot
one inch = one foot
three quarters inch = one foot
three quarters inch = one foot
one half inch = one foot
one half inch = one foot
three eighths inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one quarter inch = one foot
one eighth inch = one foot
one eighth inch = one foot

LOUVER SCHEDULE								
MARK	MFGR.	MODEL	SERVICE	SIZE (W"xH")	MIN. FREE AREA (SQ. FT.)	AIR FLOW (CFM)	MAX. SP (IN. H ₂ O)	NOTES
AL-1	SEE ARCH.	SEE ARCH.	AHU 3A-1	60X62	13.0	4645	0.25	1 THRU 6
BL-2	SEE ARCH.	SEE ARCH.	AHU 3B-2	60X62	13.0	3205	0.25	1 THRU 6
NOTES : 1. INSECT SCREEN 2. WALL SLEEVE 3. 6" DEEP, DRAINABLE BLADES 4. ALUMINUM CONSTRUCTION 5. COLOR SELECTED BY ARCHITECT 6. BLANK OFF UNUSED PORTION								

EXHAUST FAN SCHEDULE										
MARK	MFGR.	MODEL	SERVICE	AIR FLOW (CFM)	STATIC PRESSURE (IN. H ₂ O)	MOTOR DATA			SONES	NOTES
						W	HP	V/φ		
EF 3A-1	GREENHECK	SWB-216	SECTION 3A	4645	2.0	-	2.73	480/3	21	1 THRU 7
EF 3B-2	GREENHECK	SWB-212	SECTION 3B	3205	2.0	-	2.23	480/3	29	1 THRU 7
NOTES: 1. ROOF MOUNTED EQUIPMENT RAILS. 2. FACTORY DISCONNECT. 3. CONTINUOUS OPERATION. 4. INTEGRAL MOTOR STARTER WITH 24V COIL. 5. LISTED MANUFACTURER IS "BASIS OF DESIGN". 6. ODP BELT DRIVE MOTOR. 7. MOTOR VFD COMPATIBLE.										

AIR DISTRIBUTION DEVICE SCHEDULE												
MARK	TYPE	MANUF.	MODEL	MAX. CFM	FACE SIZE	NECK SIZE	AIR PATTERN	N.C.	MAT'L	FINISH	MOUNTING	COMMENTS
A	SUPPLY	TITUS	TMSA	100	12X12	6"φ	4-WAY	<29	1	1	2	
B	SUPPLY	TITUS	TMSA	210	12X12	8"φ	4-WAY	<29	1	1	2	
C	SUPPLY		TMSA	100	24X24	6"φ	4-WAY	<29	1	1	1	
D	SUPPLY		TMSA	210	24X24	8"φ	4-WAY	<29	1	1	1	
E	SUPPLY		TMSA	320	24X24	10"φ	4-WAY	<29	1	1	1	
F	SUPPLY		TMSA	500	24X24	12"φ	4-WAY	<29	1	1	1	
G	RETURN/EXH.		4FL	1000	24X24	SEE PLAN	-	<29	1	1	1	
H	RETURN/EXH.		4FL	400	12X12	SEE PLAN	-	<29	1	1	1	1
J	SUPPLY		272-FS	<600	18X6	SEE PLAN	-	<29	1	1	2	
K	SUPPLY		272-FS	<400	12X6	SEE PLAN	-	<29	1	1	2	
L	RETURN/EXH.		25RL	350	18X6	SEE PLAN	-	<29	1	1	2	
W	RETURN/EXH.		25RL	250	12X6	SEE PLAN	-	<29	1	1	2	
N	RETURN/EXH.		25RL	910	24X12	SEE PLAN	-	<29	1	1	2	
XR	RETURN	EXISTING	-	-	-	SEE PLAN	-	-	-	-	-	
XS	SUPPLY	EXISTING	-	-	-	SEE PLAN	-	-	-	-	-	
MATERIAL: 1. STEEL FINISH: 1. WHITE ENAMEL MOUNTING: 1. 24" X 24" LAY-IN 2. FLANGE COMMENTS: 1. 24X24 LAY-IN BLANK-OFF PANEL												

HEATING HOT WATER PUMP SCHEDULE												
MARK	MANUFACTURER	MODEL	TYPE	SYSTEM SERVED	FLOW (GPM)	HEAD (FEET)	IMPELLER SIZE (IN.)	PIPE SIZE (IN/OUT)	ELECTRICAL			NOTES
									HP	V/PH	RPM	
HHWP-3-1	BELL & GOSSETT	E-1510	END-SUCTION	HEATING WATER	60	50	6.875	2/1-1/2	2.0	480/3	1750	1, 2, 3
HHWP-3-2	BELL & GOSSETT	E-1510	END-SUCTION	HEATING WATER	60	50	6.875	2/1-1/2	2.0	480/3	1750	1, 2, 3
NOTES : 1. MOTORS RATED FOR VFD USE. 2. FURNISH AND INSTALL VFD. 3. PUMPS TO RUN IN LEAD-LAG CONFIGURATION.												

SHELL & TUBE HEAT EXCHANGER SCHEDULE											
MARK	TYPE	WATER TUBE SIDE					STEAM SHELL SIDE			MODEL AND REMARKS	
		GPM	EWT	LWT	PRESS DROP	CONN SIZE	INLET PRESS.	#s/HR	CONN. SIZE STEAM		CONN SIZE COND.
HX-1	STEAM TO LIQUID	60	160	180	0.29	2"	15 PSIG	620.1	2"	1"	ITT BELL & GOSSETT QSU 6 3-2

HOT WATER SYSTEM ACCESSORIES SCHEDULE			
EQUIPMENT	DESCRIPTION	SERVING	MODEL AND REMARKS
ET-3-1	BLADDER EXPANSION TANK	HEATING WATER	ITT BELL & GOSSETT B--- 20 GALLON VERTICAL FLOOR MOUNTED
AS-3-1	CENTRIFUGAL TYPE SEPARATOR W/ 2" CONNECTIONS	HEATING WATER	ITT BELL & GOSSETT RL-2" - 50 GPM
CP-1 COMMENTS: 1. ISOLATE ALL PIPING CONNECTIONS WITH UNIONS AND SHUT OFF VALVES 2. ROUTE 1 1/4" VENT TO OUTSIDE WITH TURN DOWN ELBOW 3. PROVIDE INLET SUCTION STRAINER WITH PRESSURE GAUGES 4. PROVIDE DISCHARGE CHECK AAND SHUT VALVES AND PRESSURE GAUGES 5. PROVIDE GAUGE GLASS WITH SHUT OFF VALVE AND PROTECTIVE ROD GUARDS 6. FLOAT SWITCHES WITH STAINLESS STEEL FLOAT AND ROD 7. PROVIDE WELL TANK THERMOMETER 8. UNIT SHALL BE MOUNTED ON 4" CONC. HOUSEKEEPING PAD 9. UNIT SHALL BE PROVIDED WITH MAGNETIC STARTER			

REV 1 - ADDENDUM 1
Revisions:

7/29/2016
Date

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AKEA Project No. 110-15

Drawing Title
MECHANICAL EQUIPMENT SCHEDULES

Approved: Project Director

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RENOVATE 3AB FOR
GASTROENTEROLOGY AND
PULMONARY

Location
GAINESVILLE, FLORIDA

Date
JULY 15, 2016

Checked
STS


Drawn
TJM

Project Number
573-15-102

Building Number
1

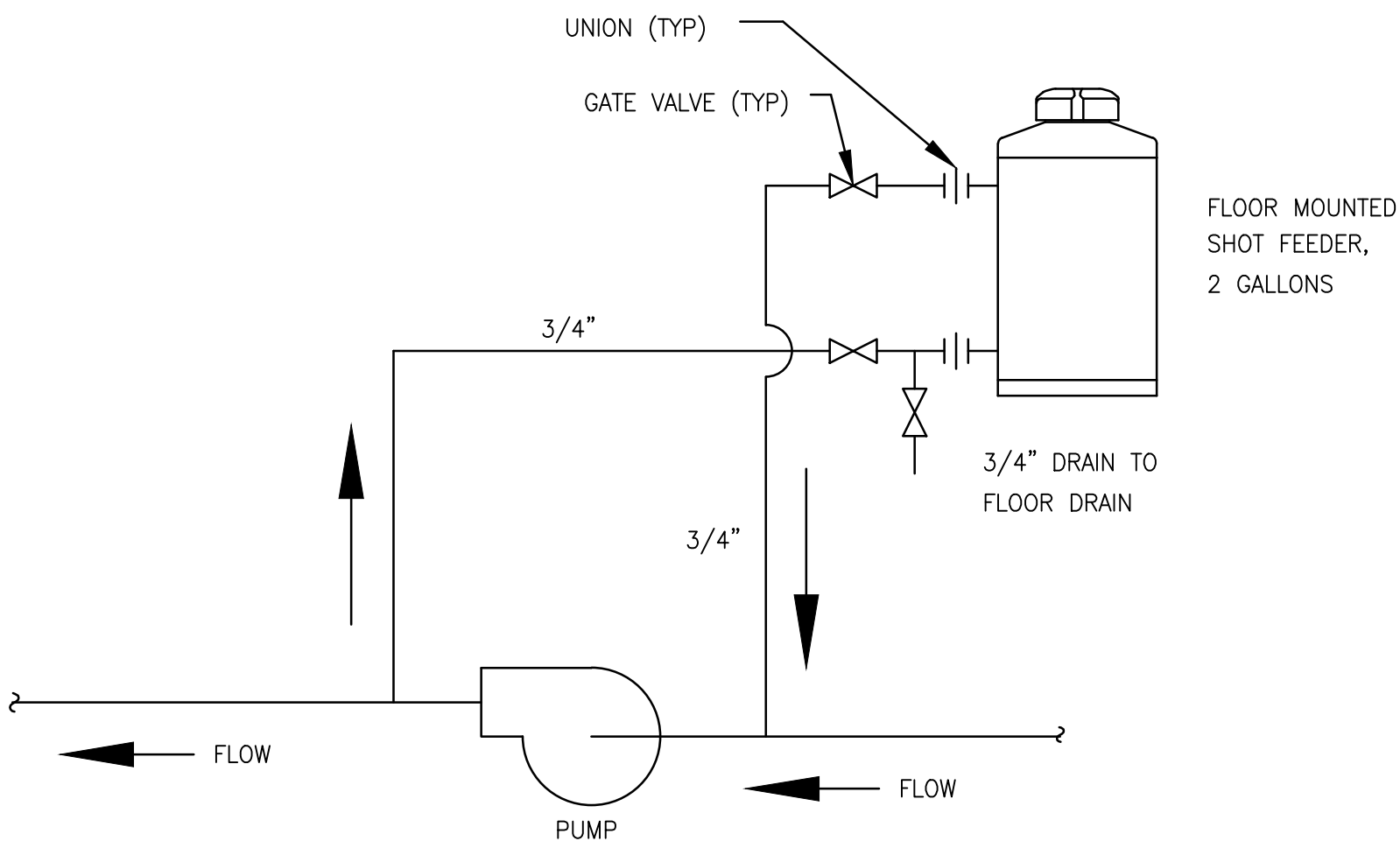
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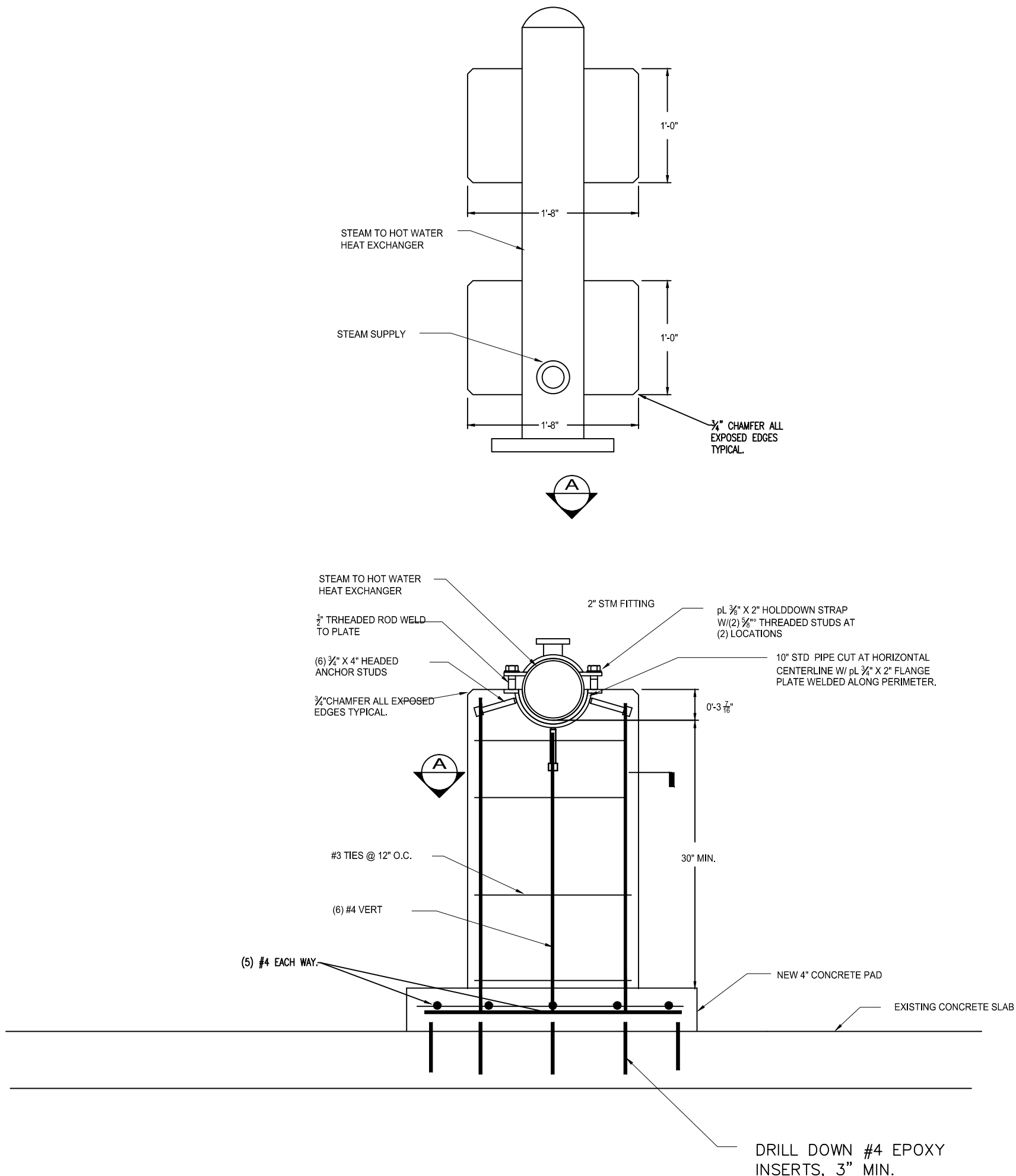
Office of
Construction
and Facilities
Management


FINAL DESIGN
APPROVED FOR CONSTRUCTION

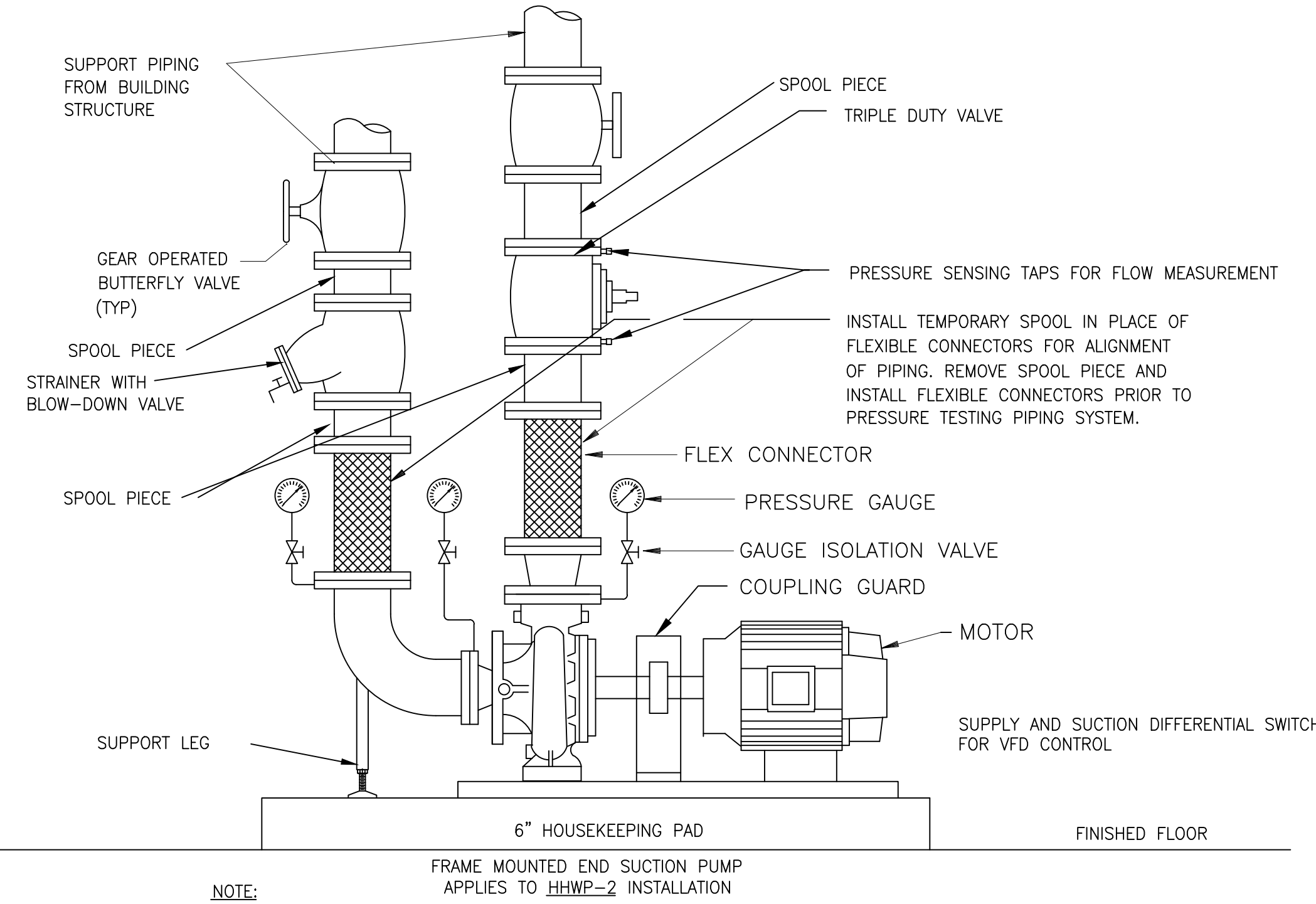
one eighth inch = one foot
one quarter inch = one foot
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one half inch = one foot
three quarters inch = one foot
one inch = one foot
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two inches = one foot
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ninety nine inches = one foot
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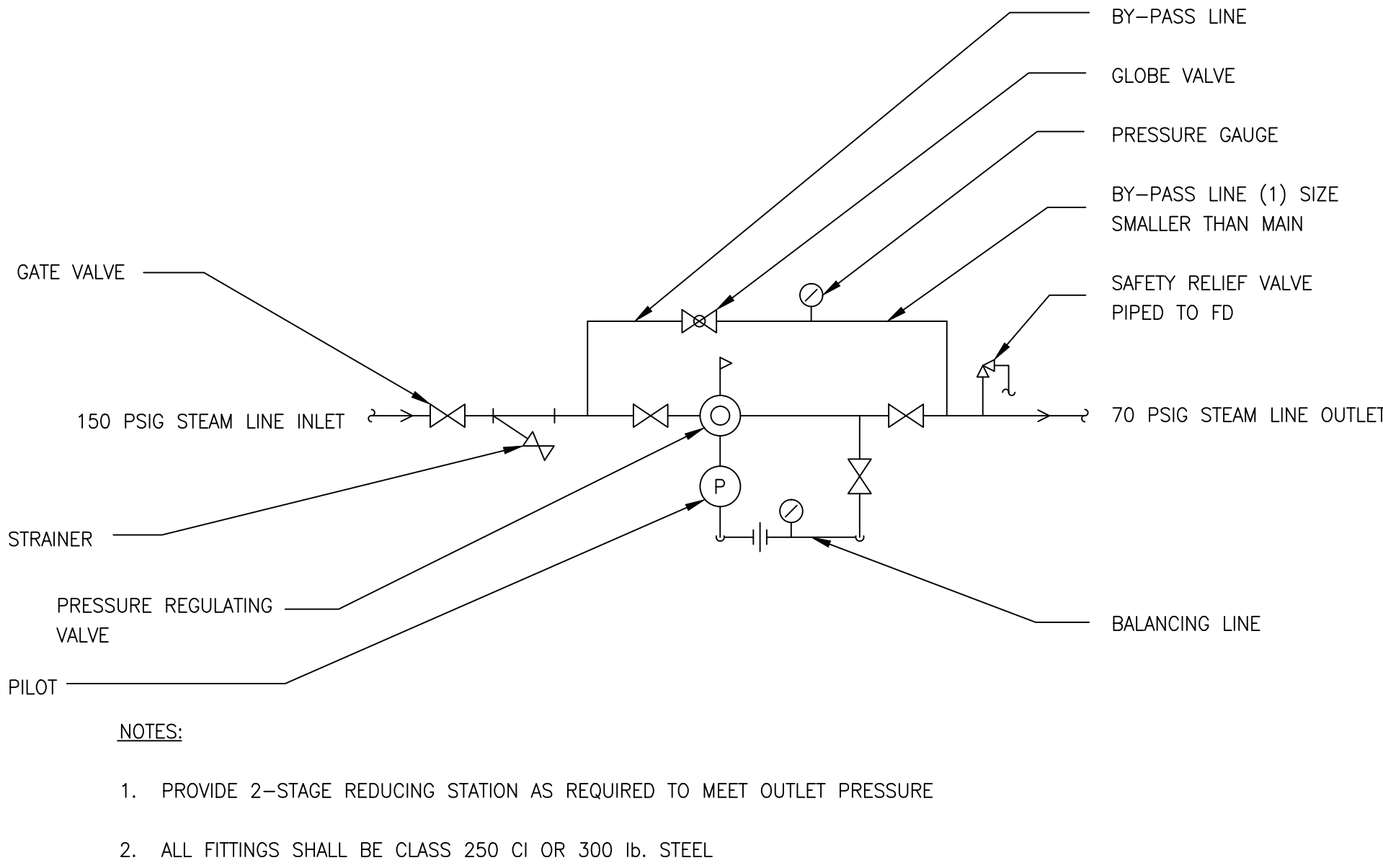
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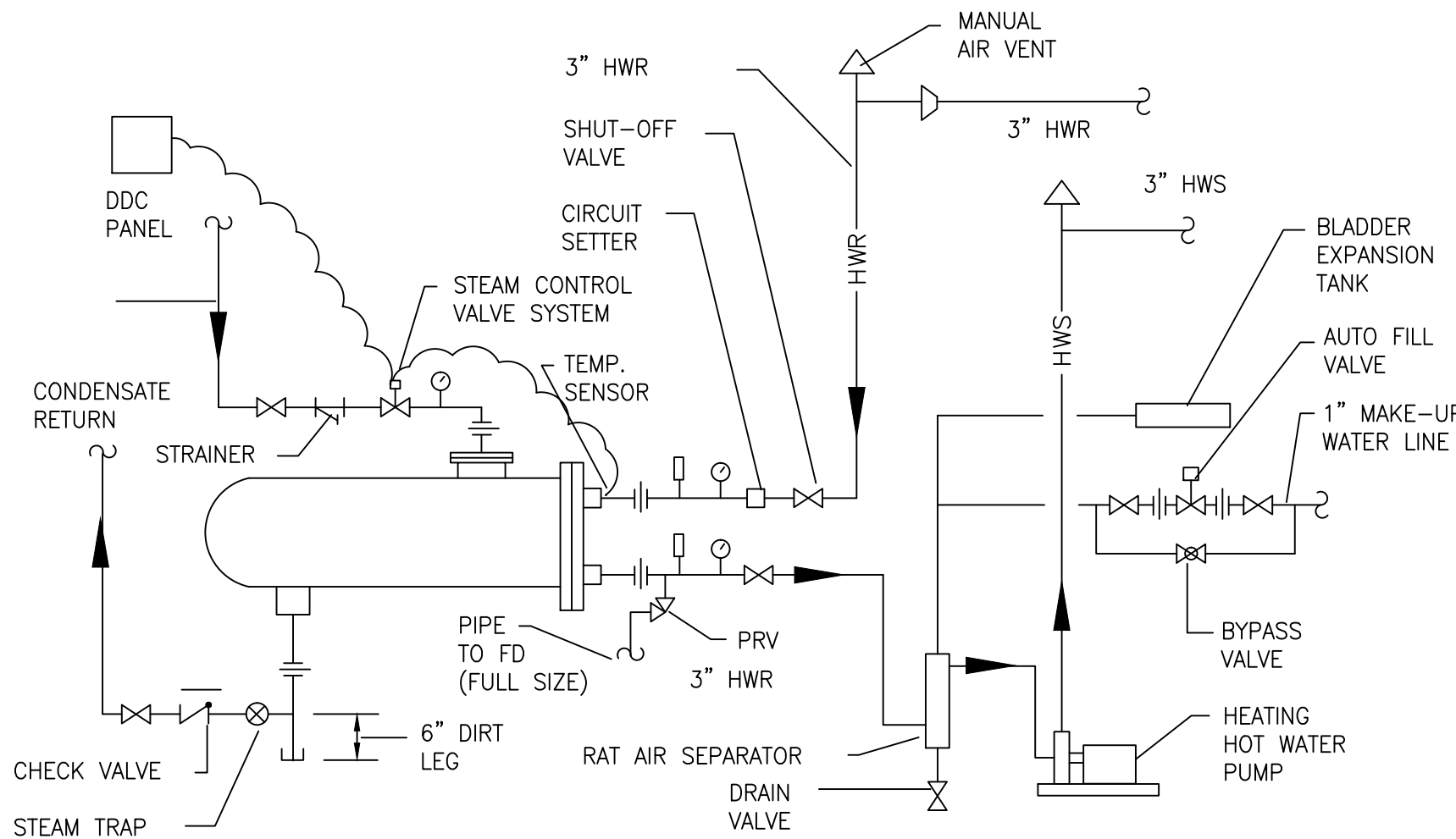
STEAM TO HOT WATER HEAT EXCHANGER
SUPPORT DETAIL
NO SCALE



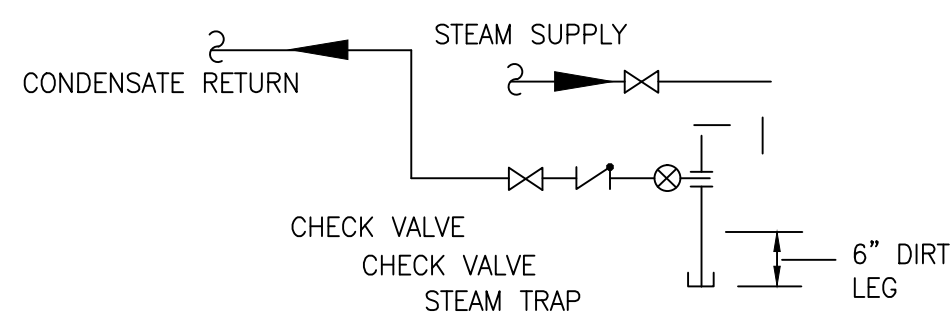
END SUCTION WATER PUMP DETAIL
SCALE: SCALE



STEAM PRESSURE REDUCING STATION
NO SCALE



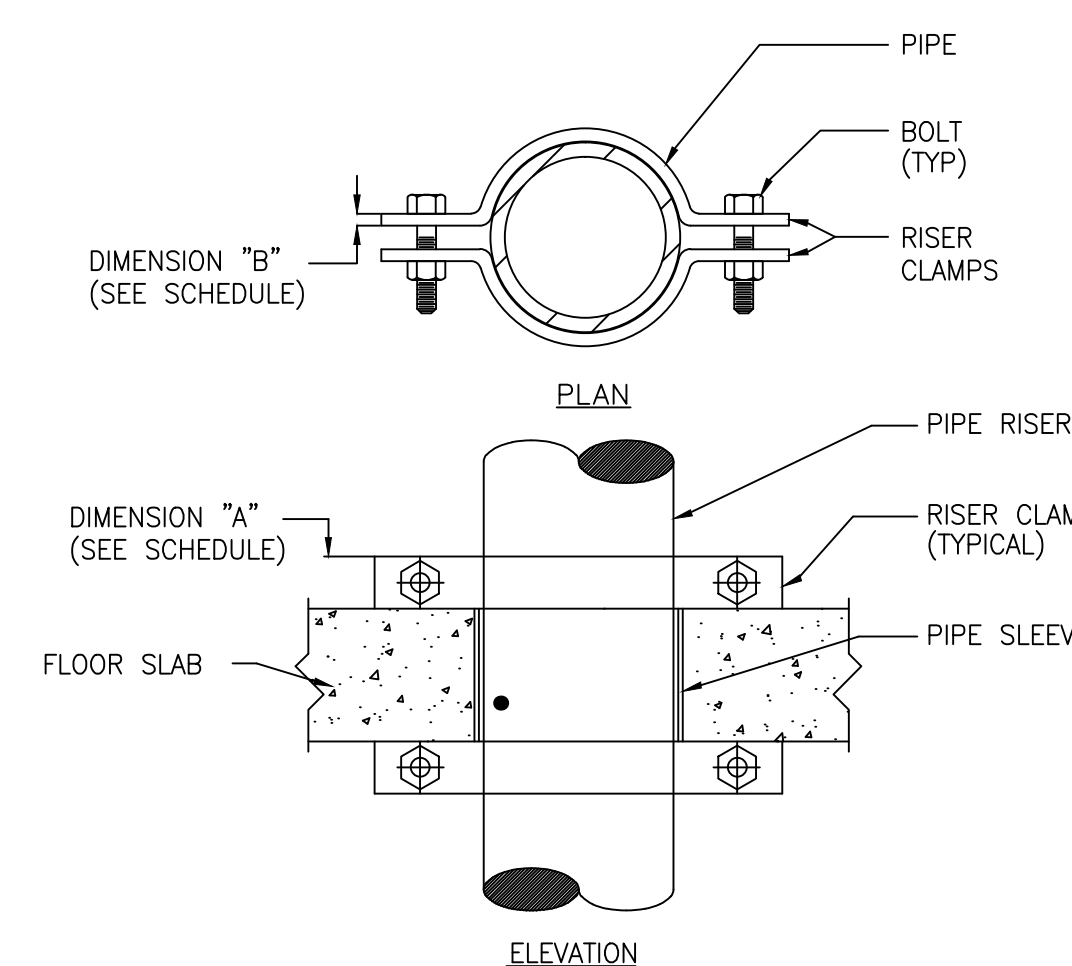
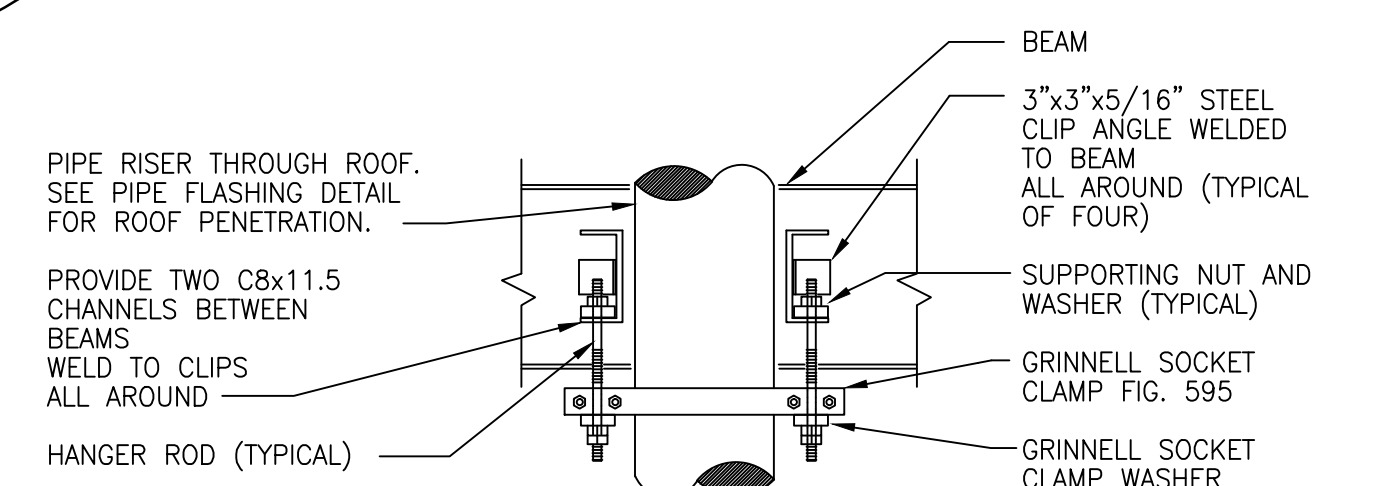
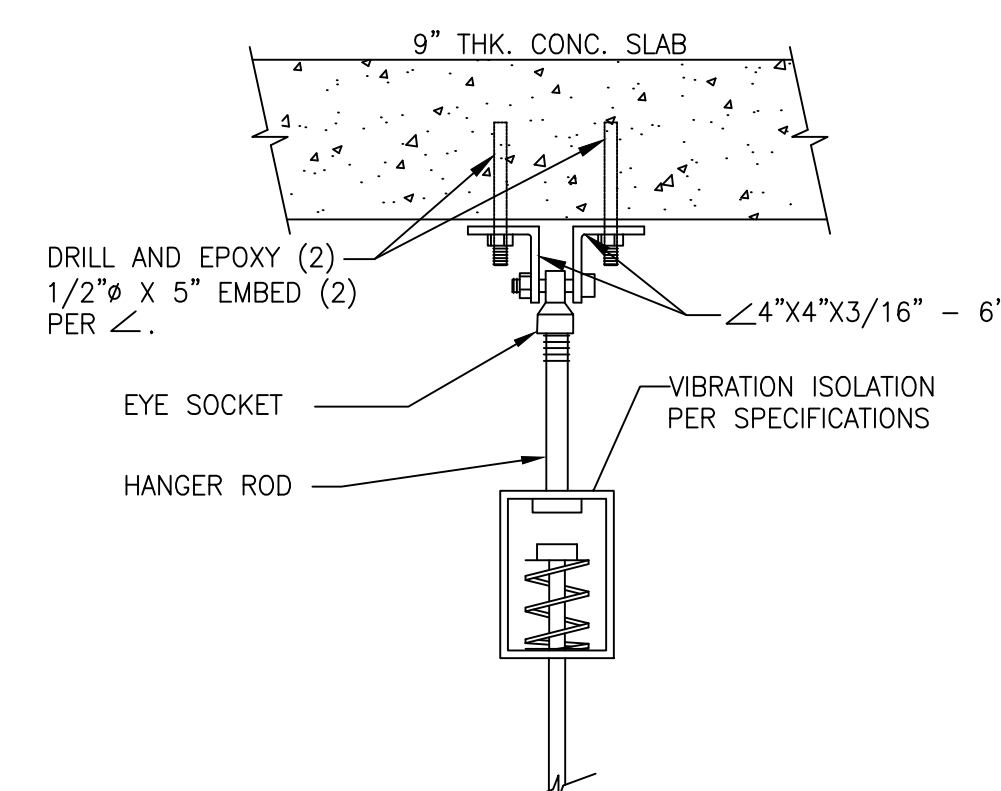
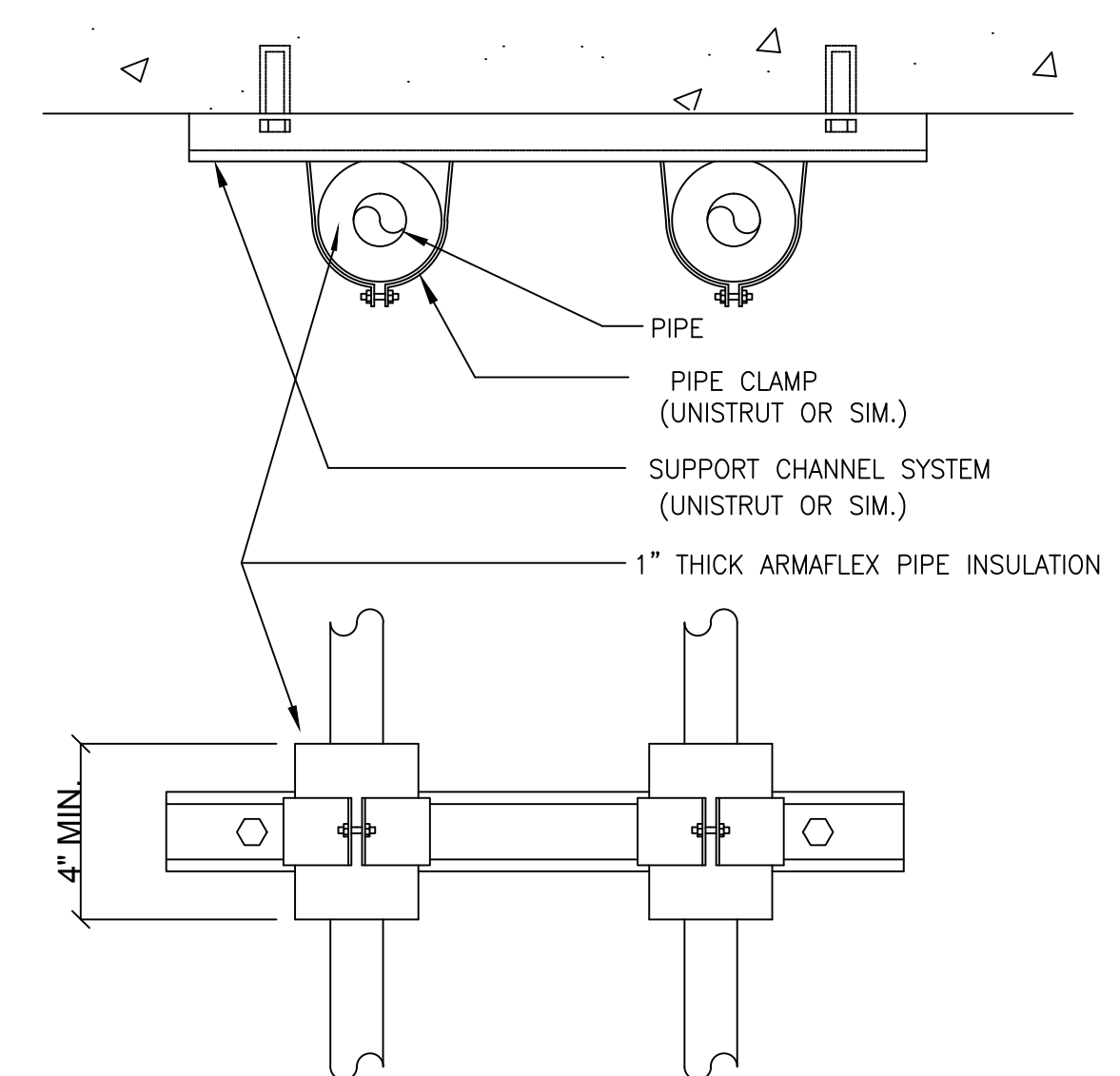
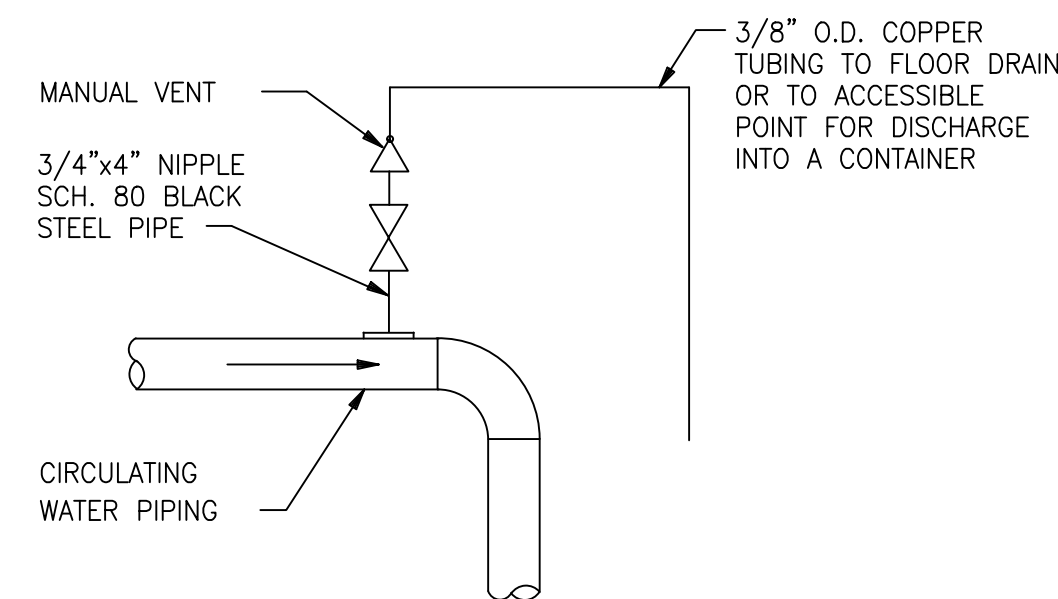
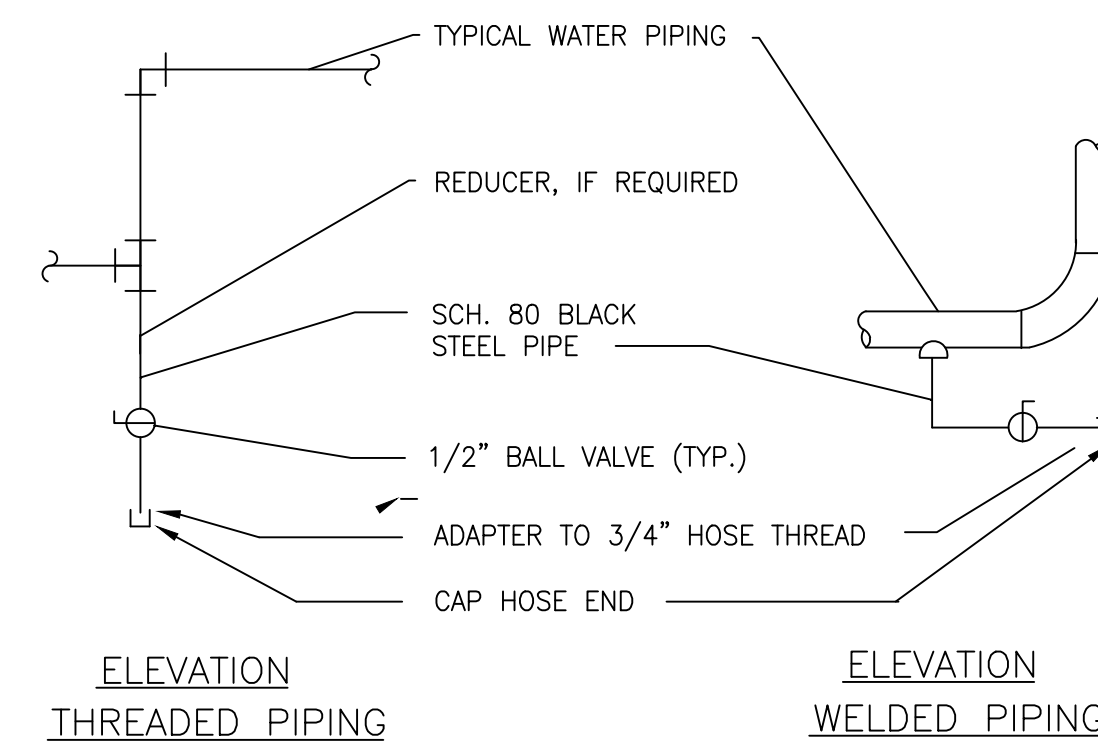
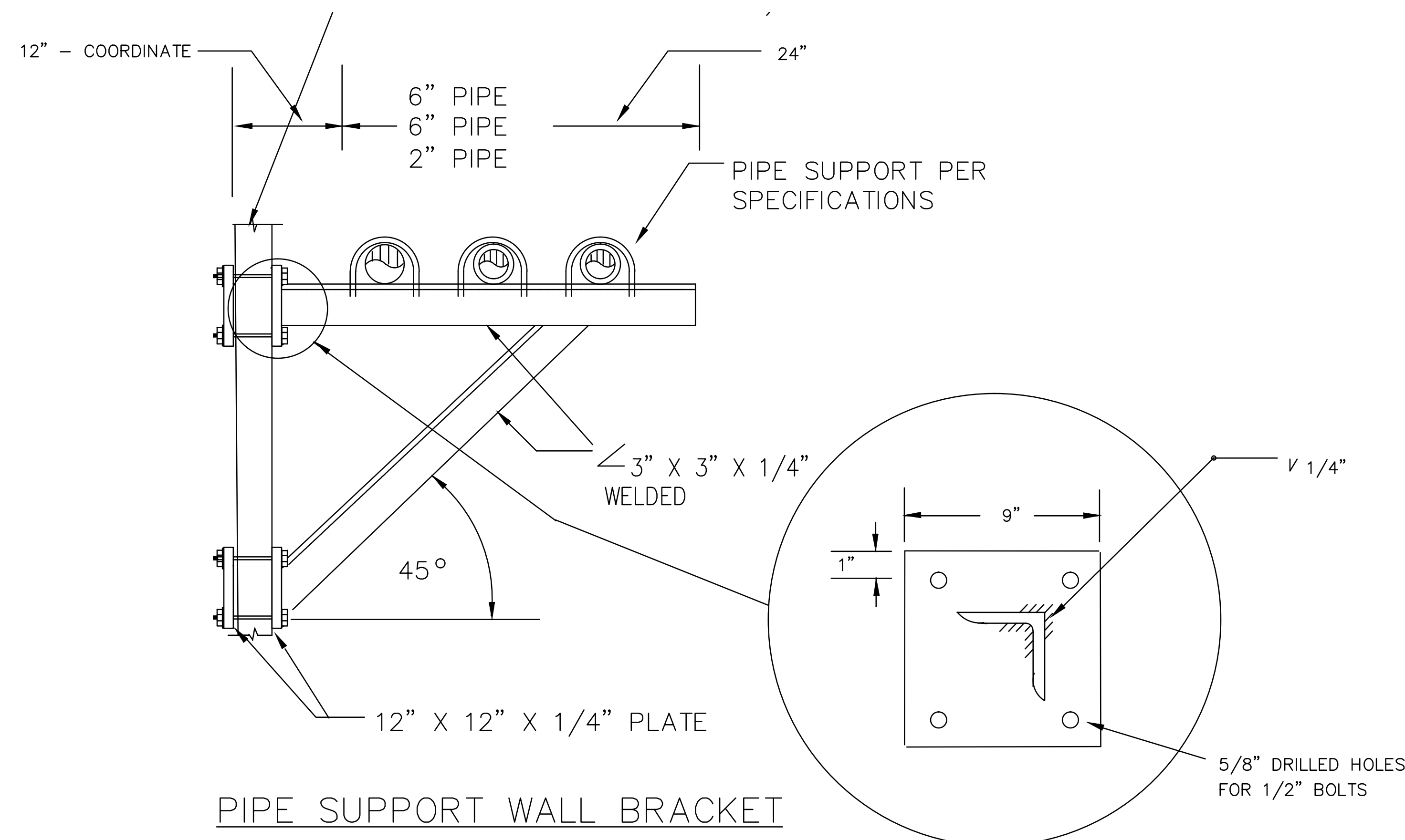
STEAM TO HOT WATER
HEAT EXCHANGER (HX) DETAIL



END OF MAIN DRIP
NO SCALE

FINAL DESIGN
APPROVED FOR CONSTRUCTION

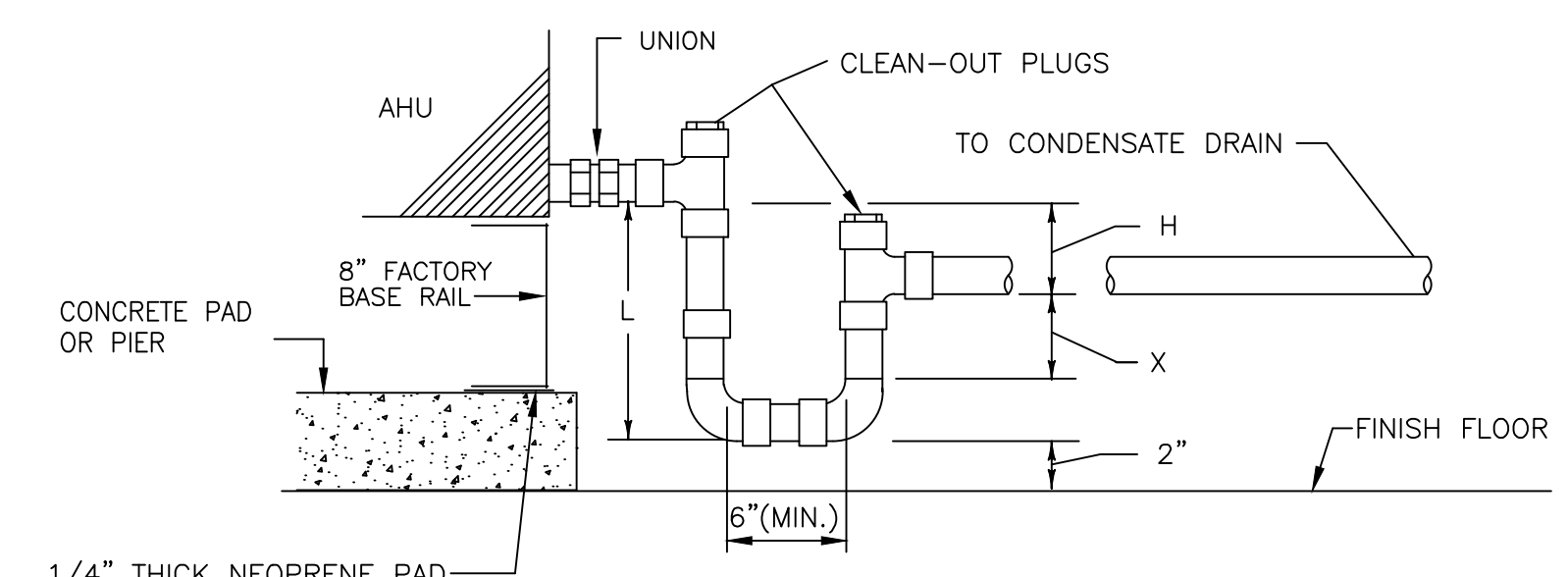
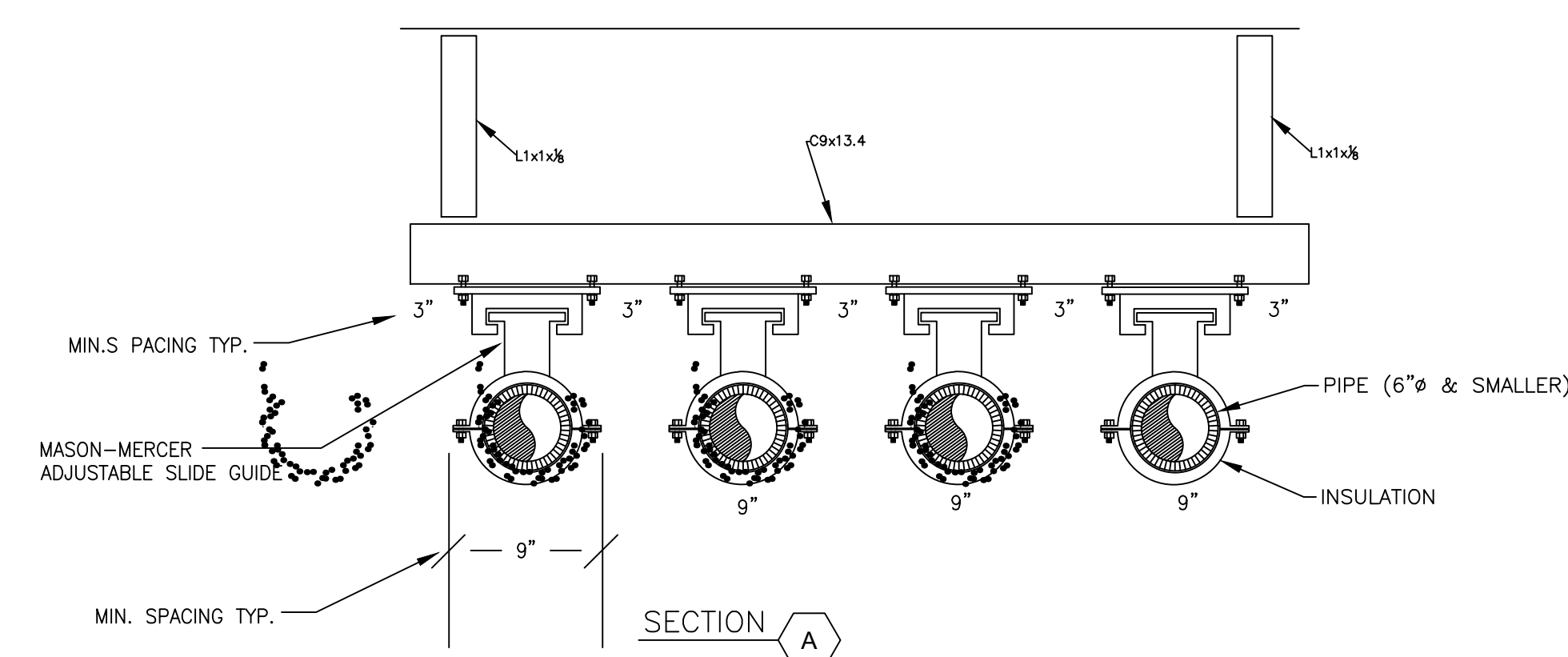
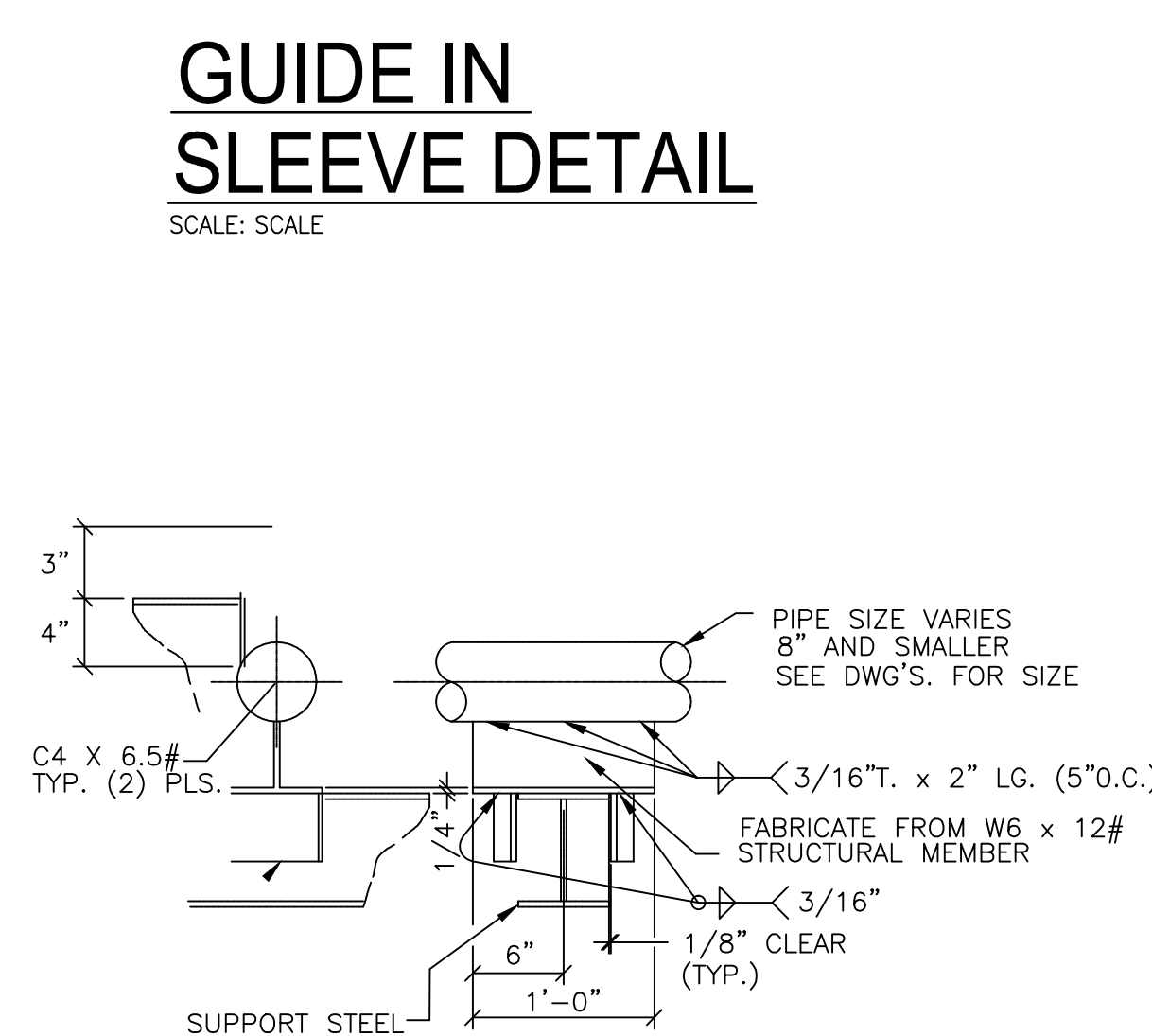
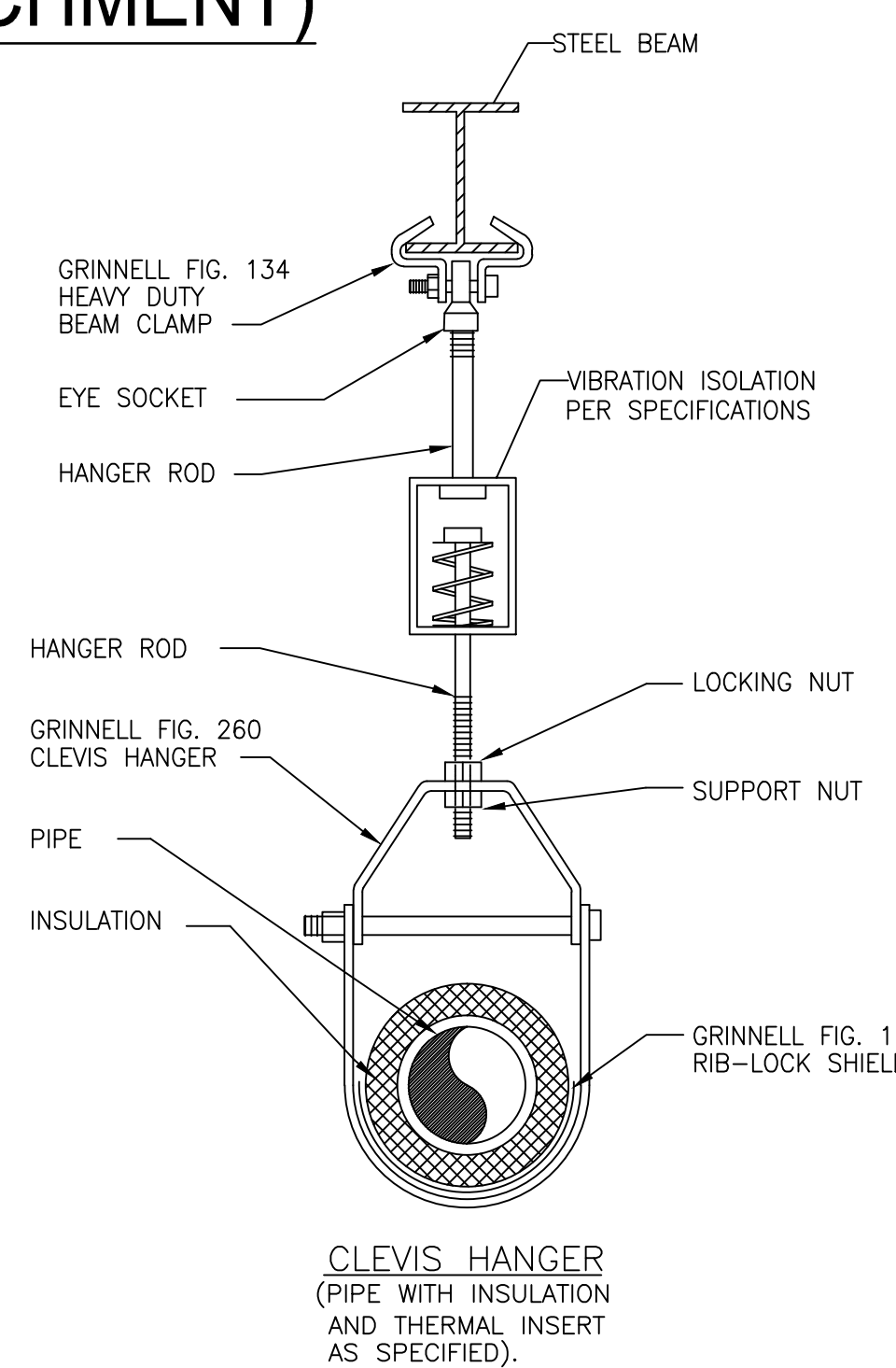
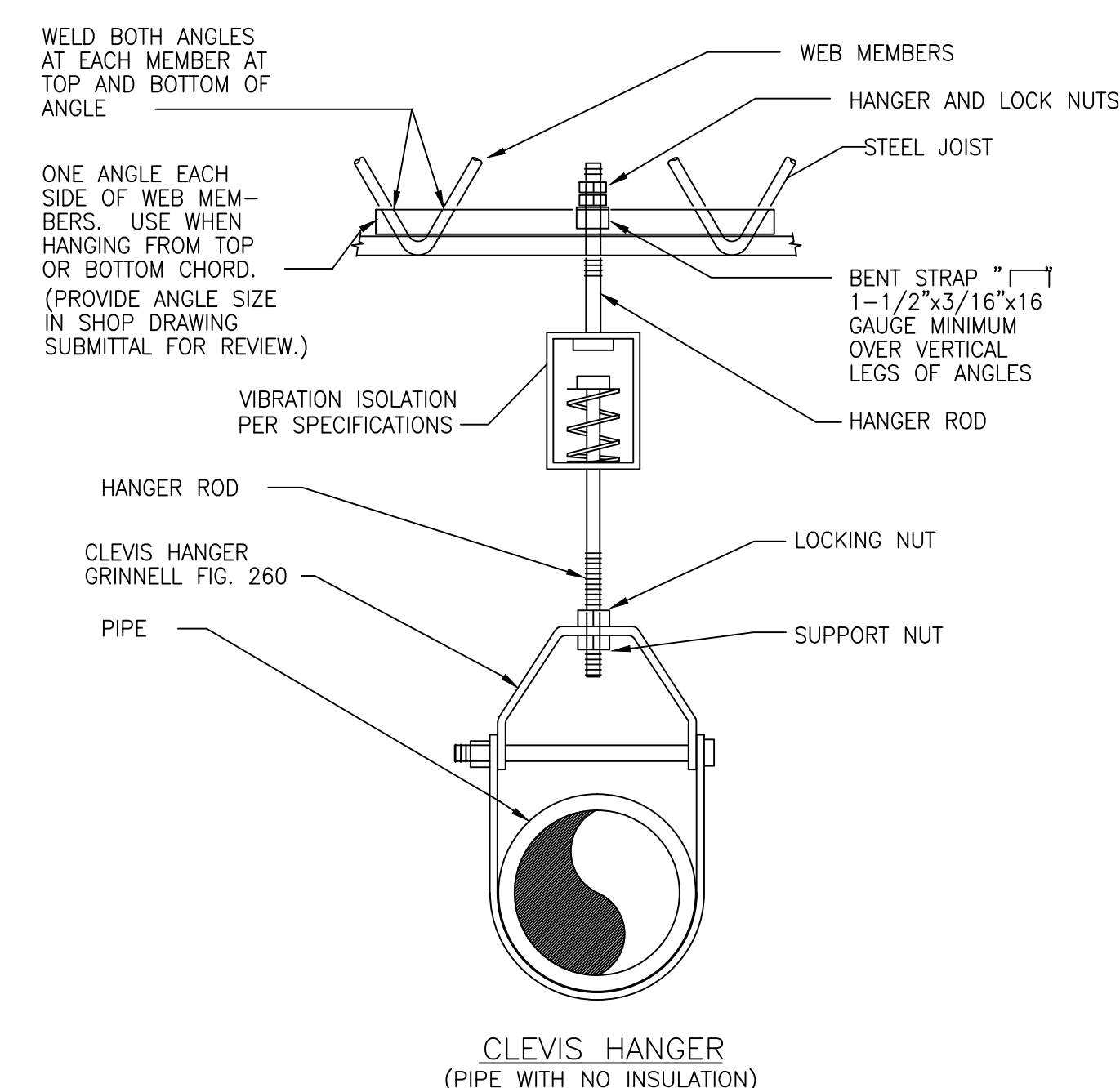
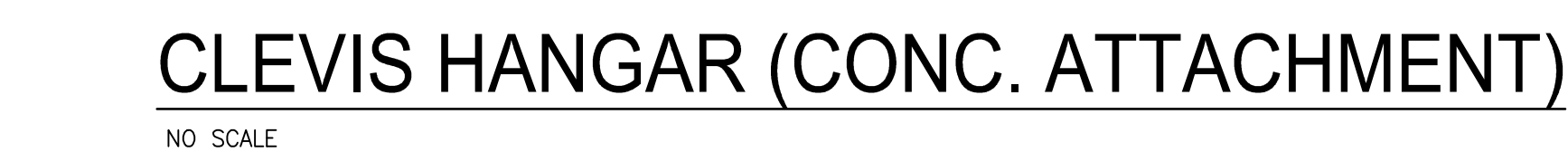
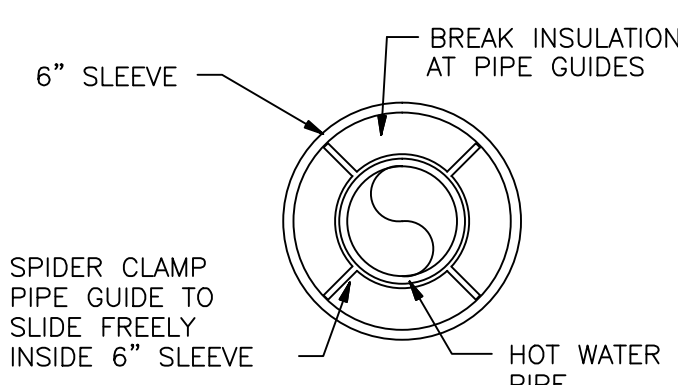
CONSULTANTS:		ENGINEER-OF-RECORD STEPHEN T. STEFFE	FL P.E. NO. 70349	ARCHITECT/ENGINEERS: AKEA Design, Inc. 3603 NW 98th Street, Suite B Gainesville, FL 32606 Phone: (352) 474-6124 Fax: (352) 474-6324 COA: FL #29578 AKEA Project No. 110-15	Drawing Title HVAC DETAILS	Project Title RENOVATE 3AB FOR GASTROENTEROLOGY AND PULMONARY	Project Number 573-15-102	Office of Construction and Facilities Management
					Approved: Project Director	Location GAINESVILLE, FLORIDA	Building Number 1	
						Date JULY 15, 2016	Checked STS	
						Drawn TJM	Drawing Number MH700	
Revisions:		Date					34 OF 72	



ANCHORS FOR RISERS		
PIPE SIZE	BOLT DIA.	RISER CLAMP DIMENSIONS A x B
1/2" THRU 1"	3/8"	1-1/4" x 3/16"
1-1/4" THRU 3"	3/8"	1-1/4" x 1/4"
4"	1/2"	1-1/2" x 3/16"
5" AND 6"	1/2"	2" x 1/4"

NOTE:

PIPE RISER ANCHORS SHALL BE REQUIRED IN TOP AND BOTTOM OF VERTICAL PIPE RUNS LOCATED IN SHAFT SPACES TO SECURE PIPES IN PLACE.



NOTES:

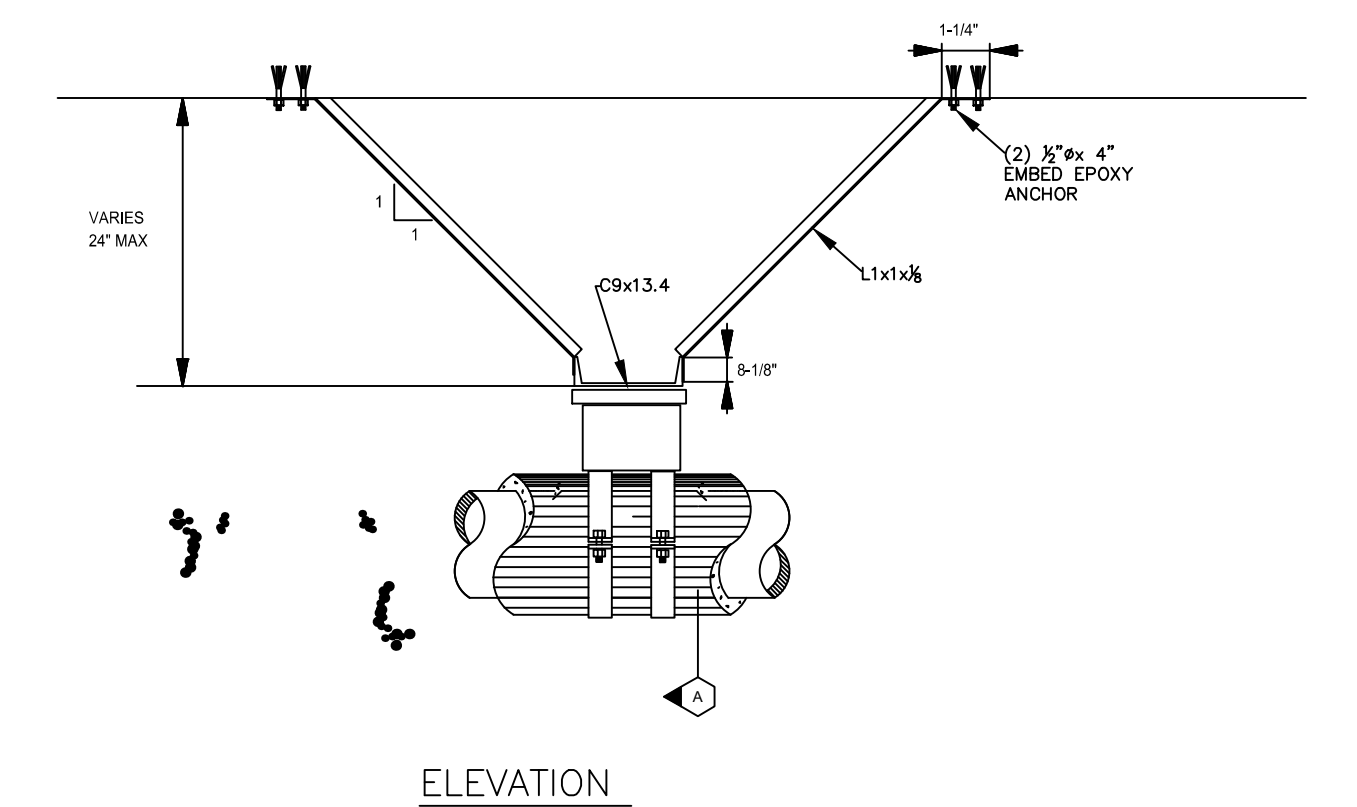
1. CONDENSATE DRAIN SHALL BE PIPED FULL SIZE OF UNIT CONNECTION.
2. EXTERNALLY ISOLATED UNIT SHOWN, INTERNAL ISOLATORS SIMILAR, WITH NEOPRENE PAD BETWEEN UNIT BASE RAIL AND CONCRETE PAD.
3. COORDINATE HEIGHT OF CONCRETE PAD TO PROVIDE MINIMUM TRAP DIMENSIONS INDICATED.
4. CONDENSATE PANS SHALL BE INSTALLED WITH ADEQUATE PITCH TO ENSURE POSITIVE DRAINAGE OF ACCUMULATED CONDENSATE.

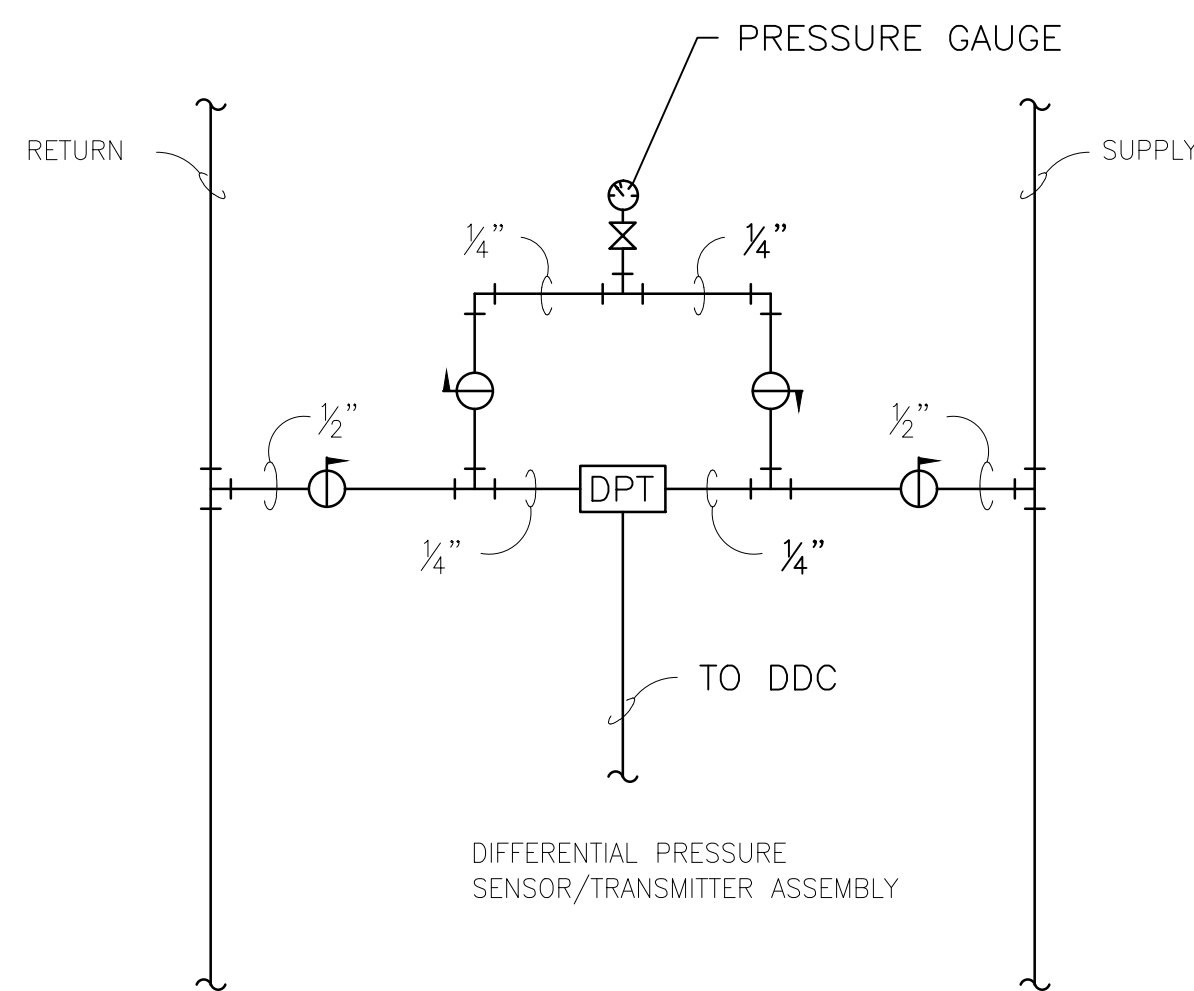
BLOW THRU AHU P-TRAP

POSITIVE STATIC PRESSURE	NEGATIVE STATIC PRESSURE
X = AT LEAST 1"	X = 1/2 "H"
H = AT LEAST 1-1/2" PLUS SCH. FAN STATIC PRESSURE	H = AT LEAST 1" PLUS SCH. FAN STATIC PRESSURE

$$L = X + H + (1.5 \times \text{PIPE DIAMETER}) + \text{INSULATION THICKNESS.}$$

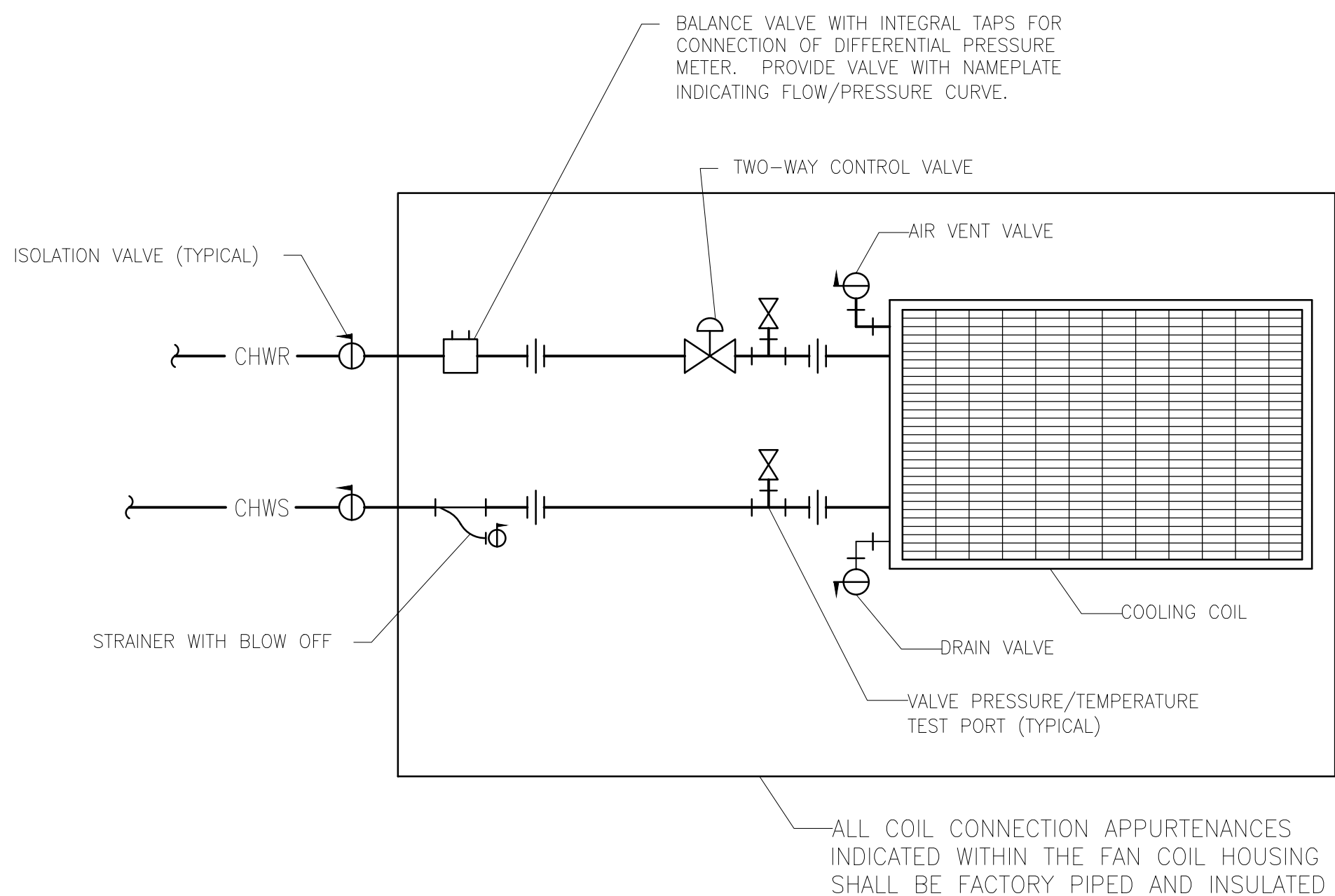
AHU CONDENSATE DRAIN DETAIL





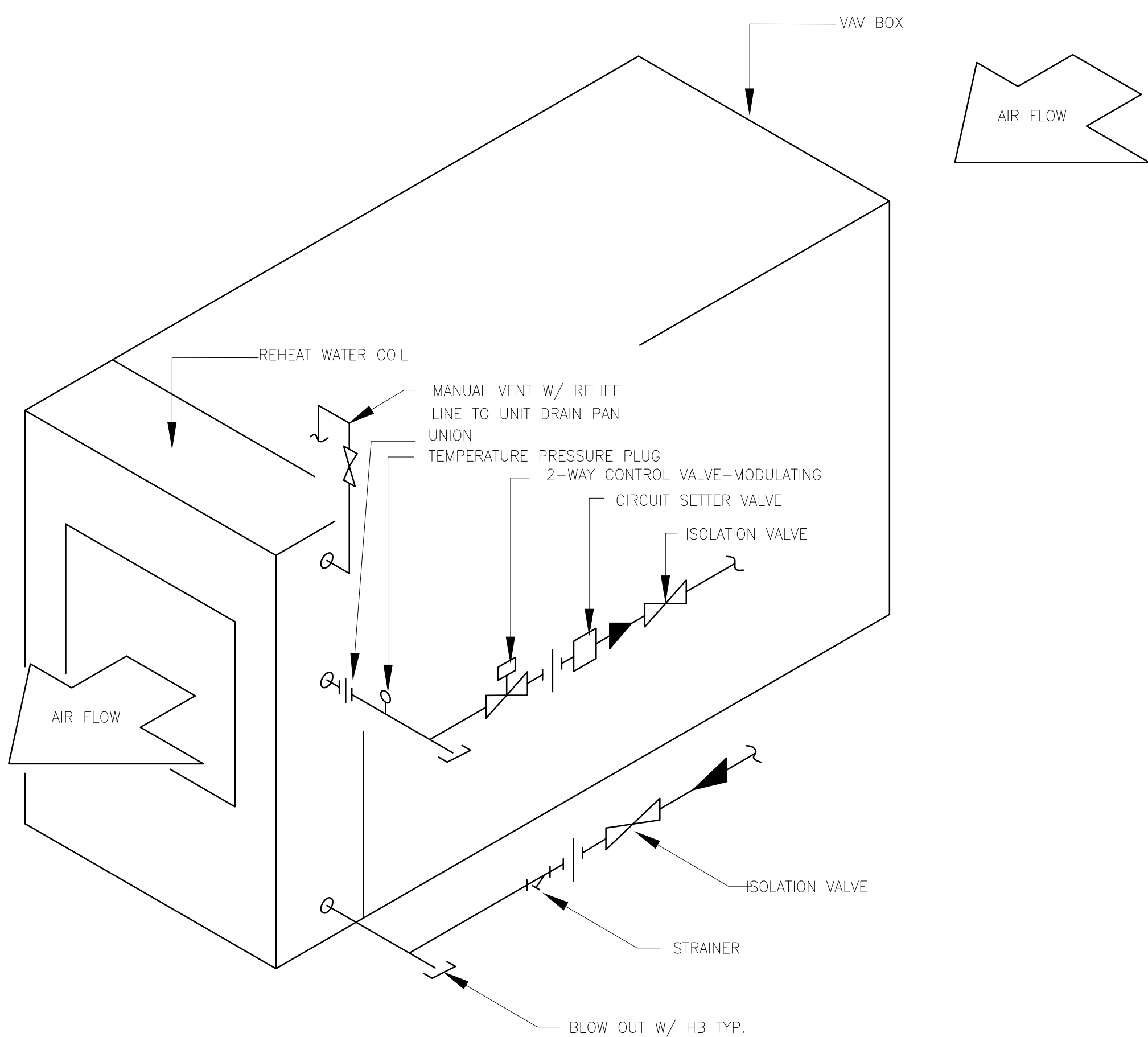
DIFFERENTIAL PRESSURE SENSING STATION ASSEMBLY

NO SCALE



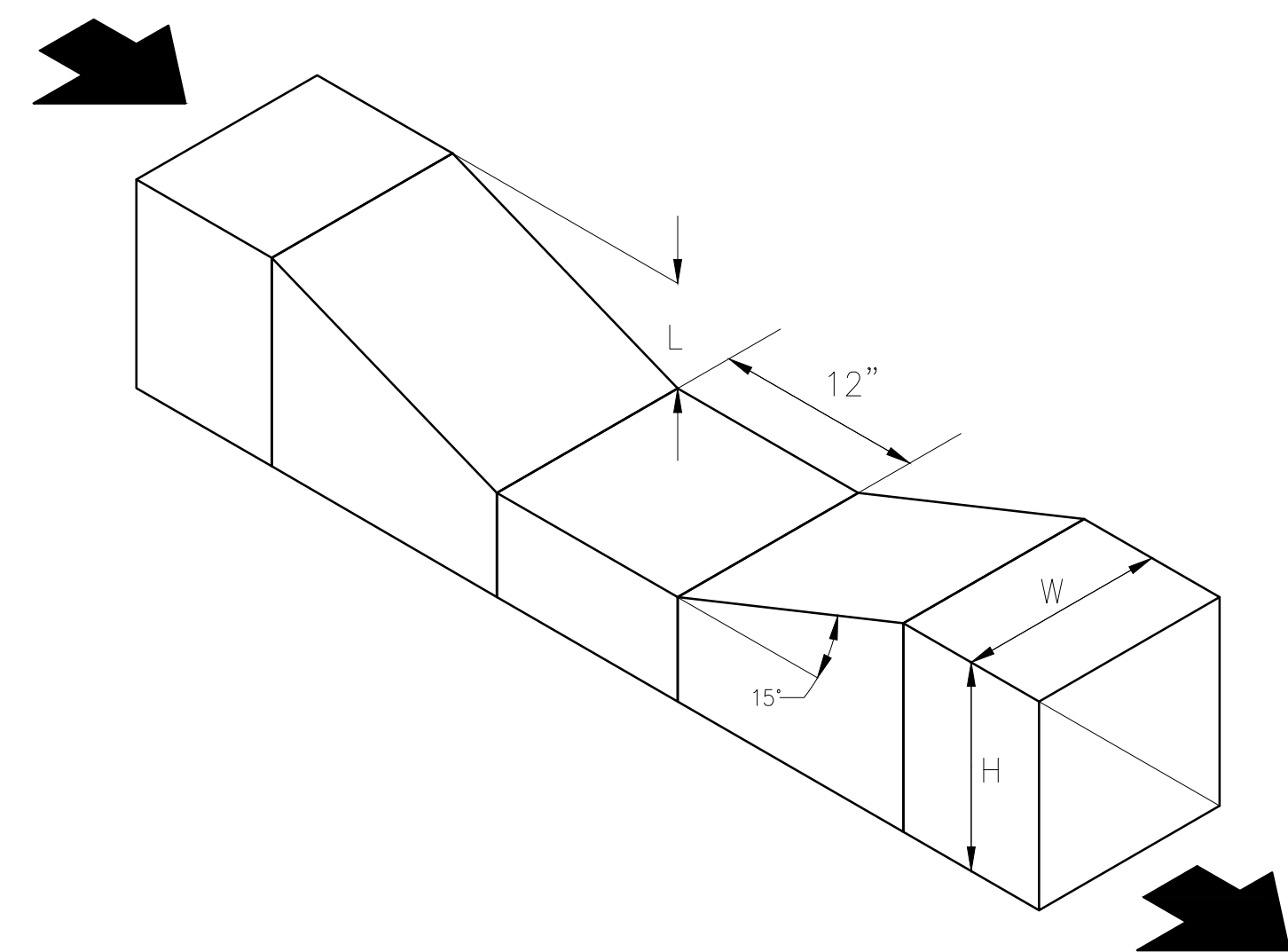
AIR HANDLING UNIT COOLING COIL PIPING DETAIL

NO SCALE



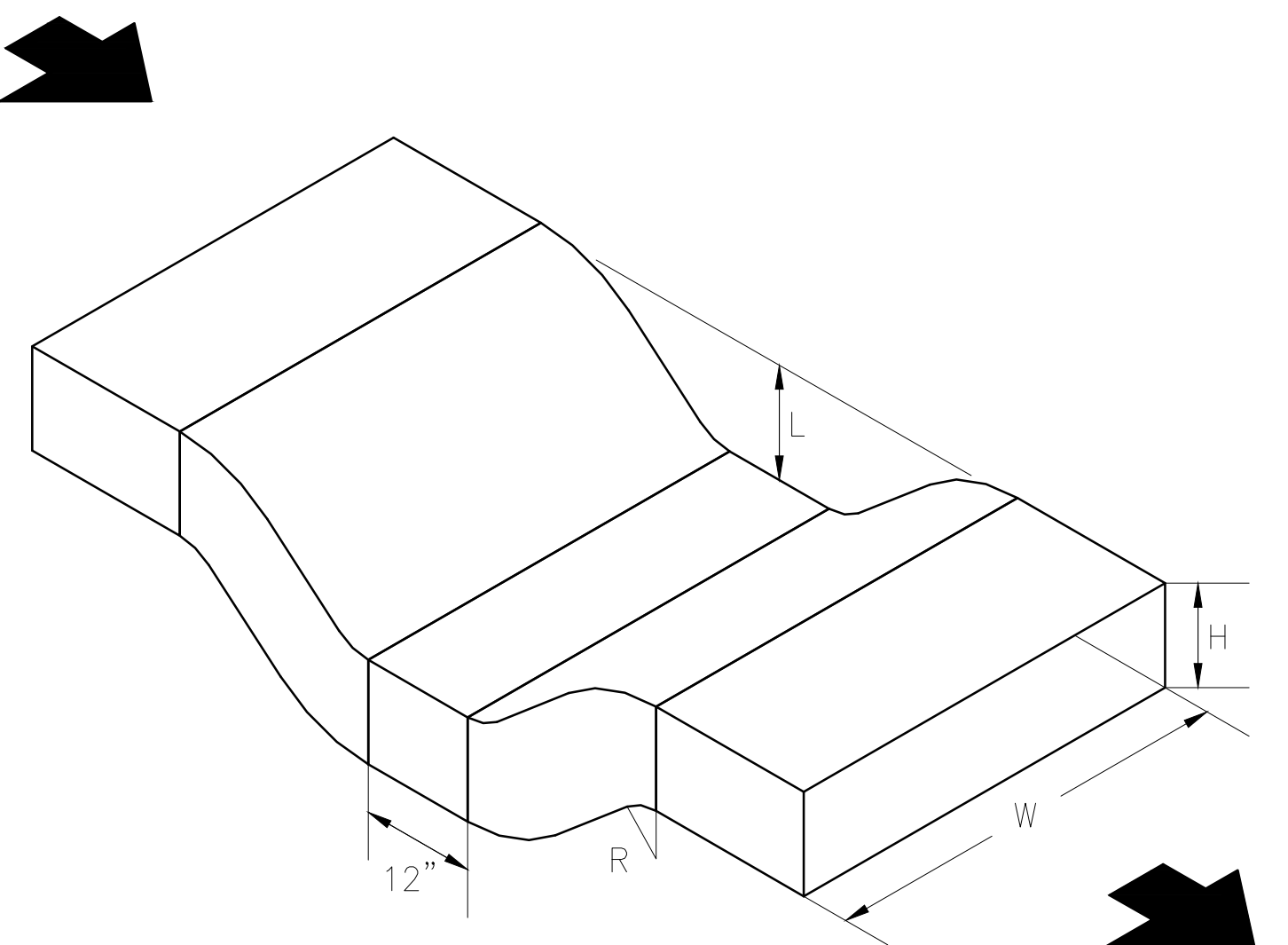
VAV BOX REHEAT COIL DETAIL

NO SCALE



DUCT AVOIDANCE DEPRESSION DETAIL

N.T.S.

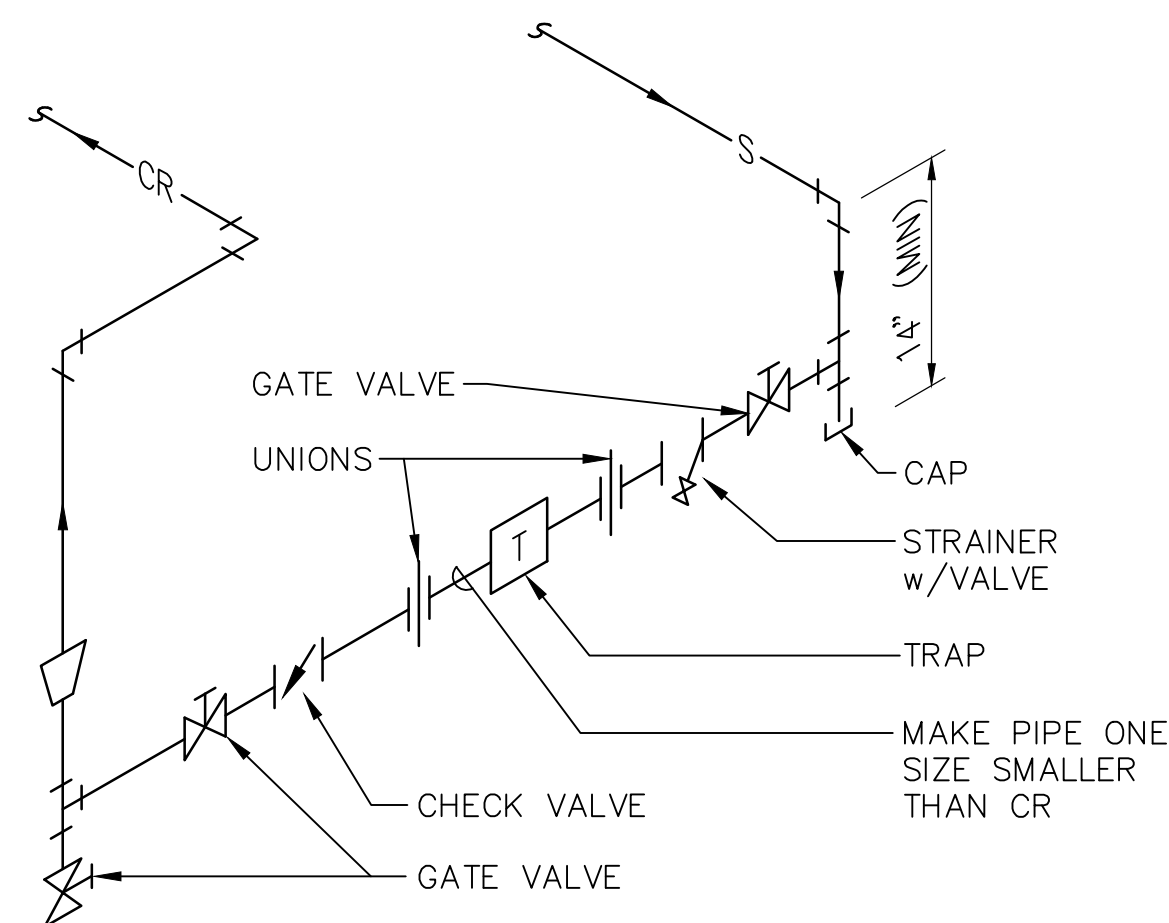


DUCT AVOIDANCE DEPRESSION DETAIL

N.T.S.

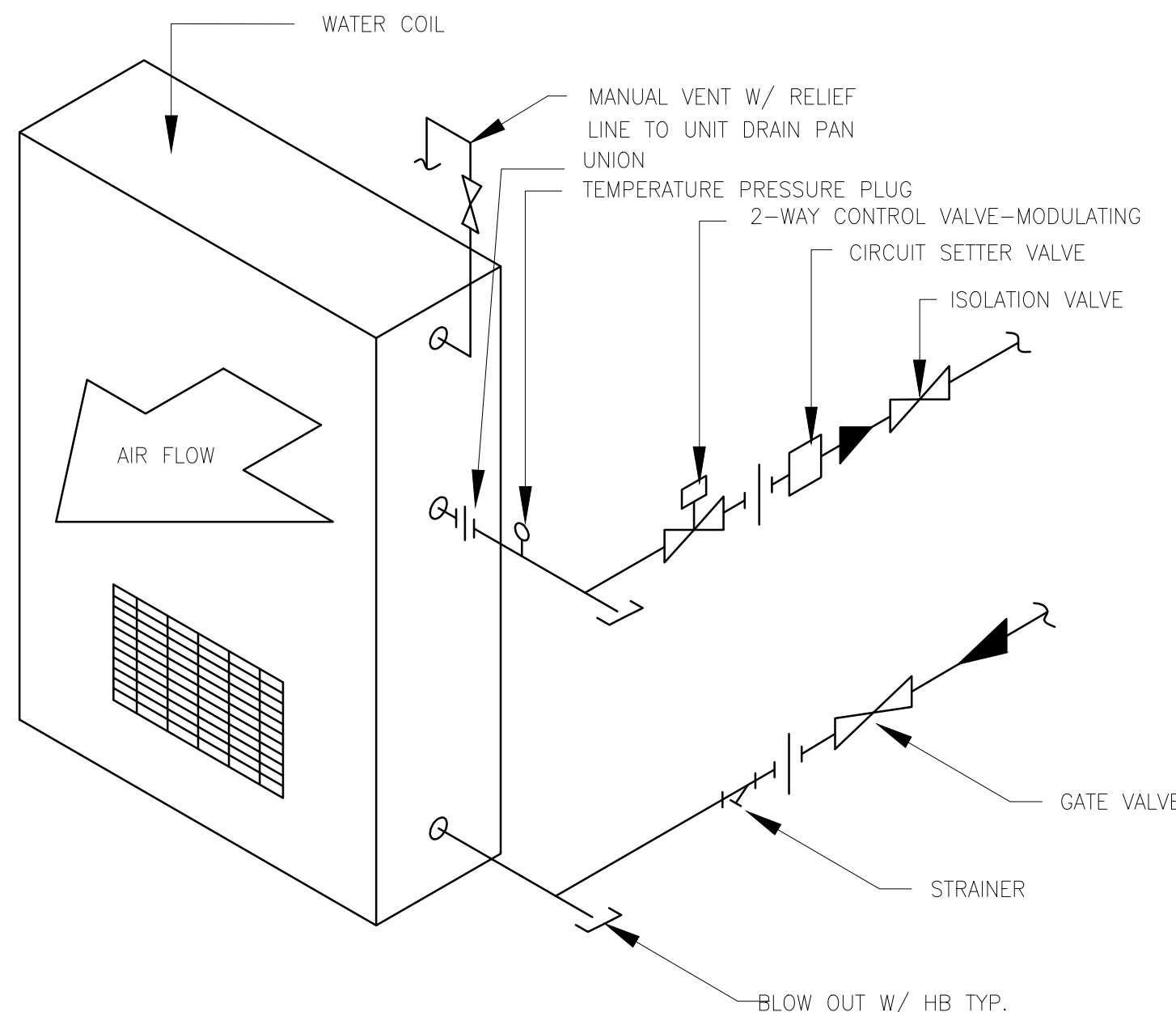
COEFFICIENT C				
W/H	L/H			
	0.125	0.15	0.25	0.30
1.0	0.26	0.30	0.33	0.35
0.4	0.10	0.14	0.22	0.30

COEFFICIENT C					
VELOCITY FPM (M/S)	800 (4)	1200 (6)	1600 (8)	2000 (10)	2400 (12)
C	0.18	0.22	0.24	0.25	0.26



END OF MAIN STEAM TRAP DETAIL

NO SCALE



HOT WATER COIL DETAIL

NO SCALE

Revisions:		Date:		CONSULTANTS:		ENGINEER-OF-RECORD STEPHEN T. STEFFE FL P.E. NO. 70349		ARCHITECT/ENGINEERS: AKEA Design, Inc. 3603 NW 98th Street, Suite B Gainesville, FL 32606 Phone: (352) 474-6124 Fax: (352) 474-6324 COA: FL #29578 AKEA Project No. 110-15		Drawing Title HVAC DETAILS		Project Title RENOVATE 3AB FOR GASTROENTEROLOGY AND PULMONARY		Project Number 573-15-102		Office of Construction and Facilities Management Department of Veterans Affairs	
								Approved: Project Director		Location GAINESVILLE, FLORIDA		Building Number 1					
										Date JULY 15, 2016		Checked STS		Drawn TJM			
														Drawing Number MH702		36 OF 72	

three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot

A

CD

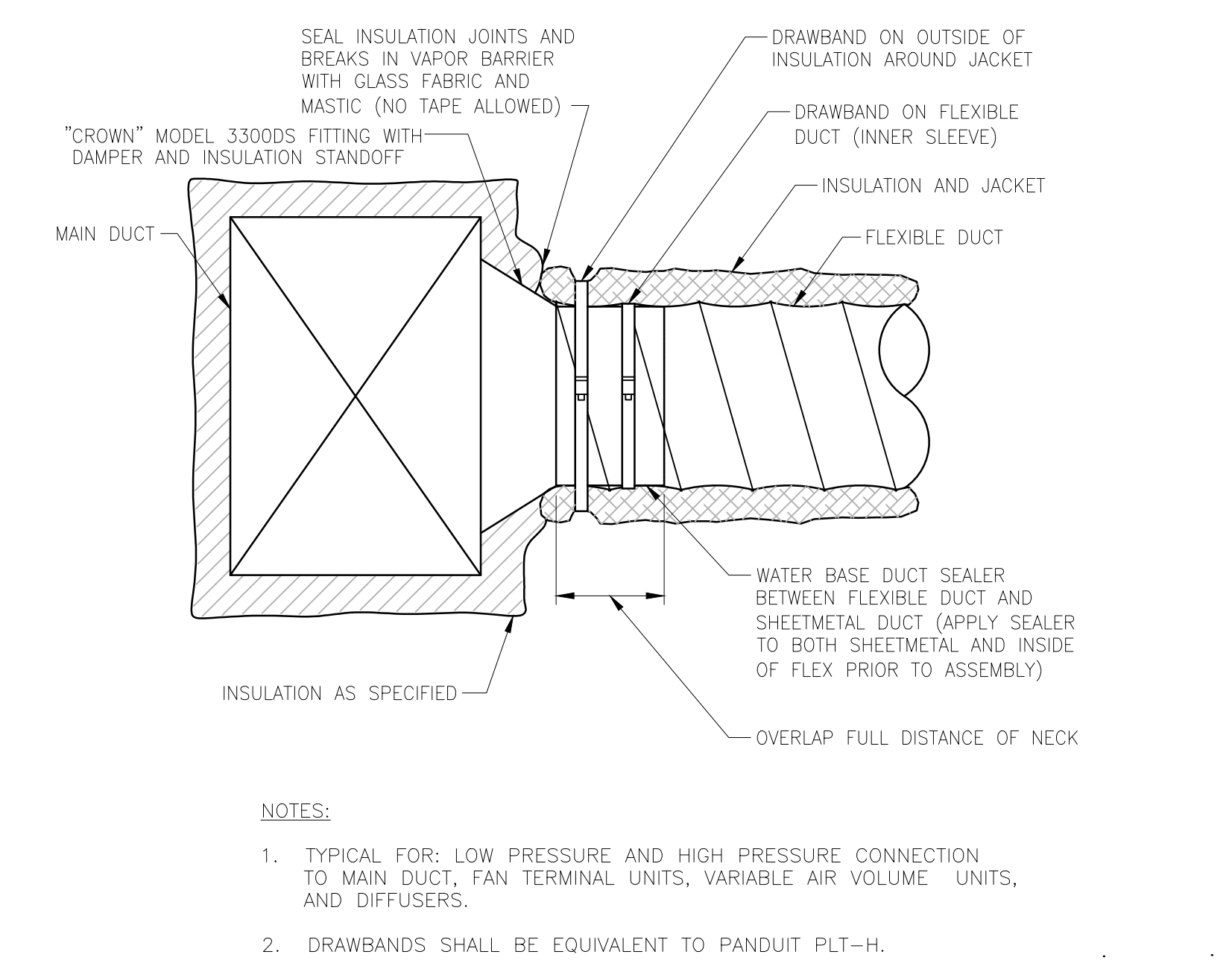
C

D

F

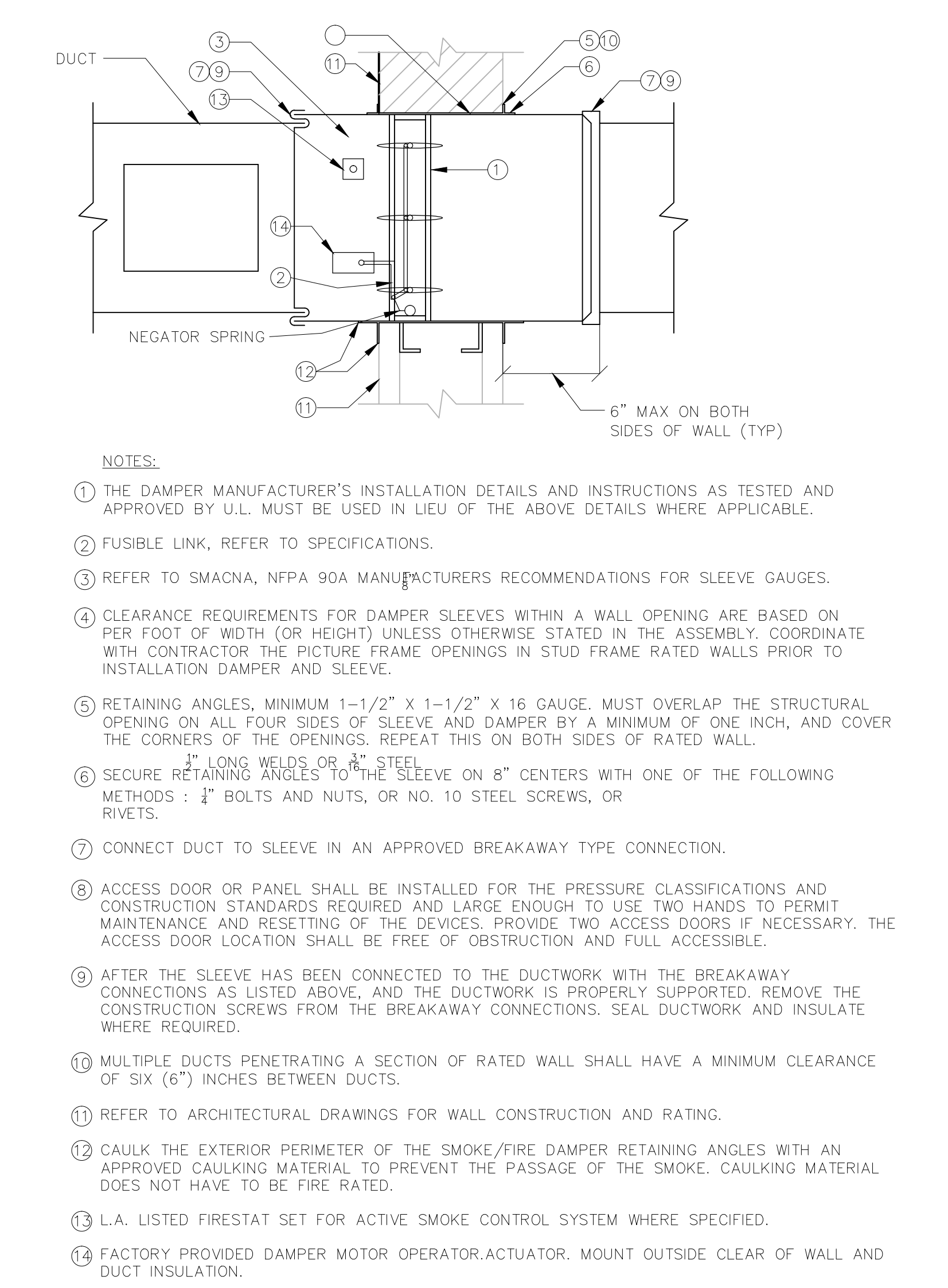
F

F



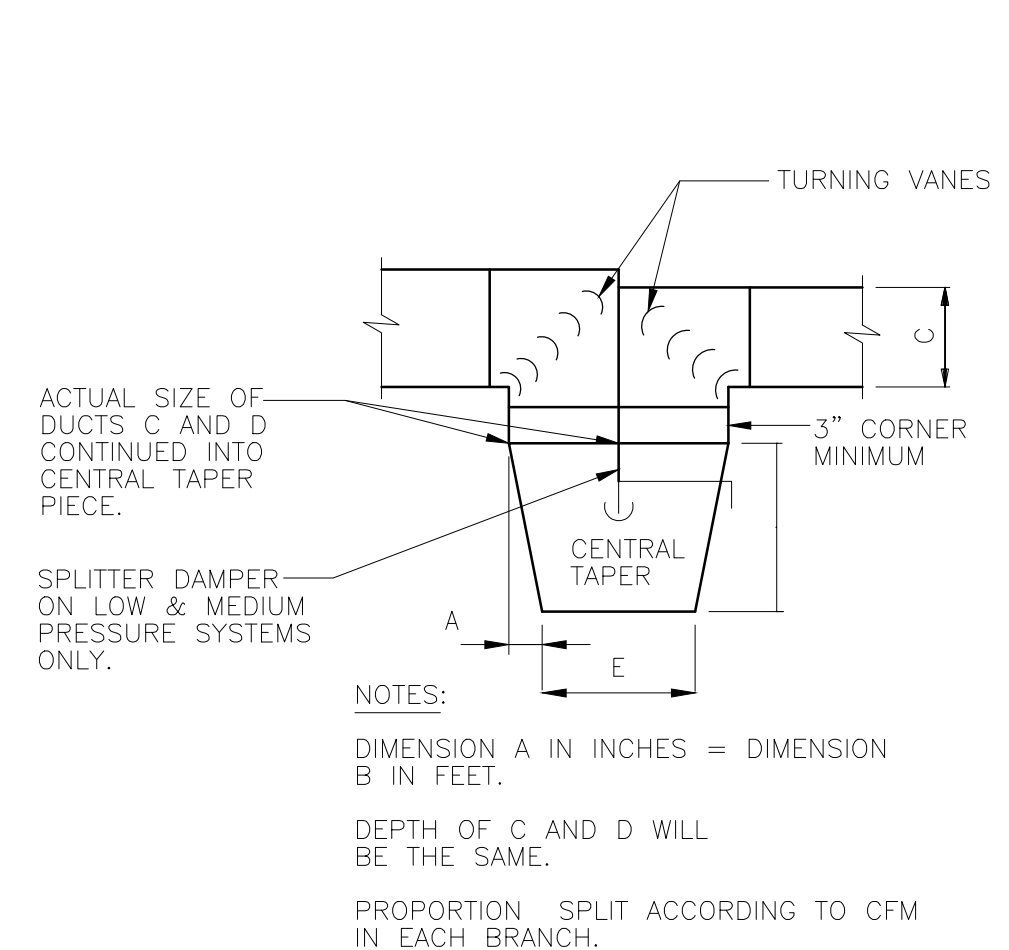
FLEXIBLE DUCT TERMINATION DETAIL

NO SCALE



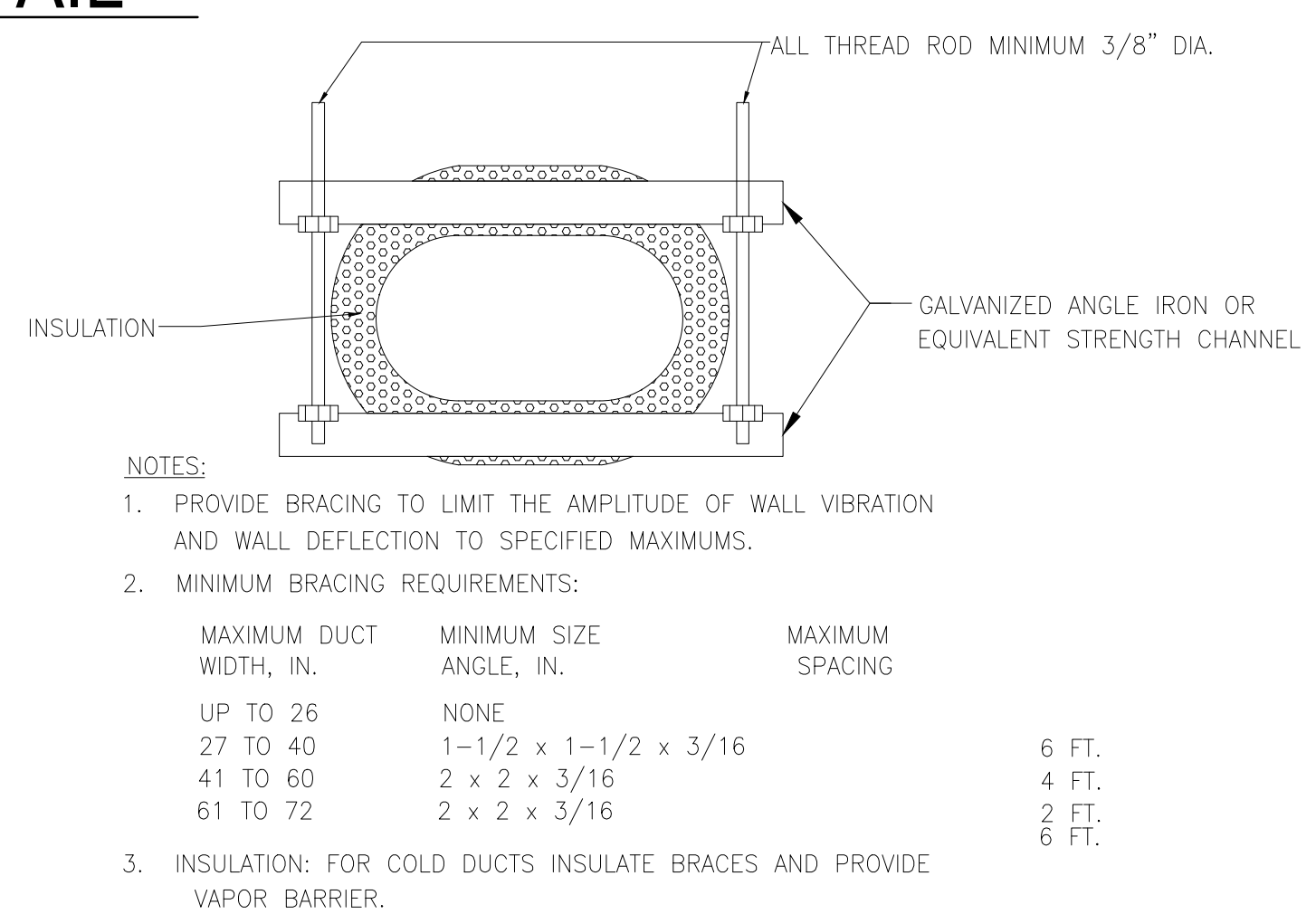
SMOKE-DAMPER-IN-WALL-DETAIL

NO SCALE



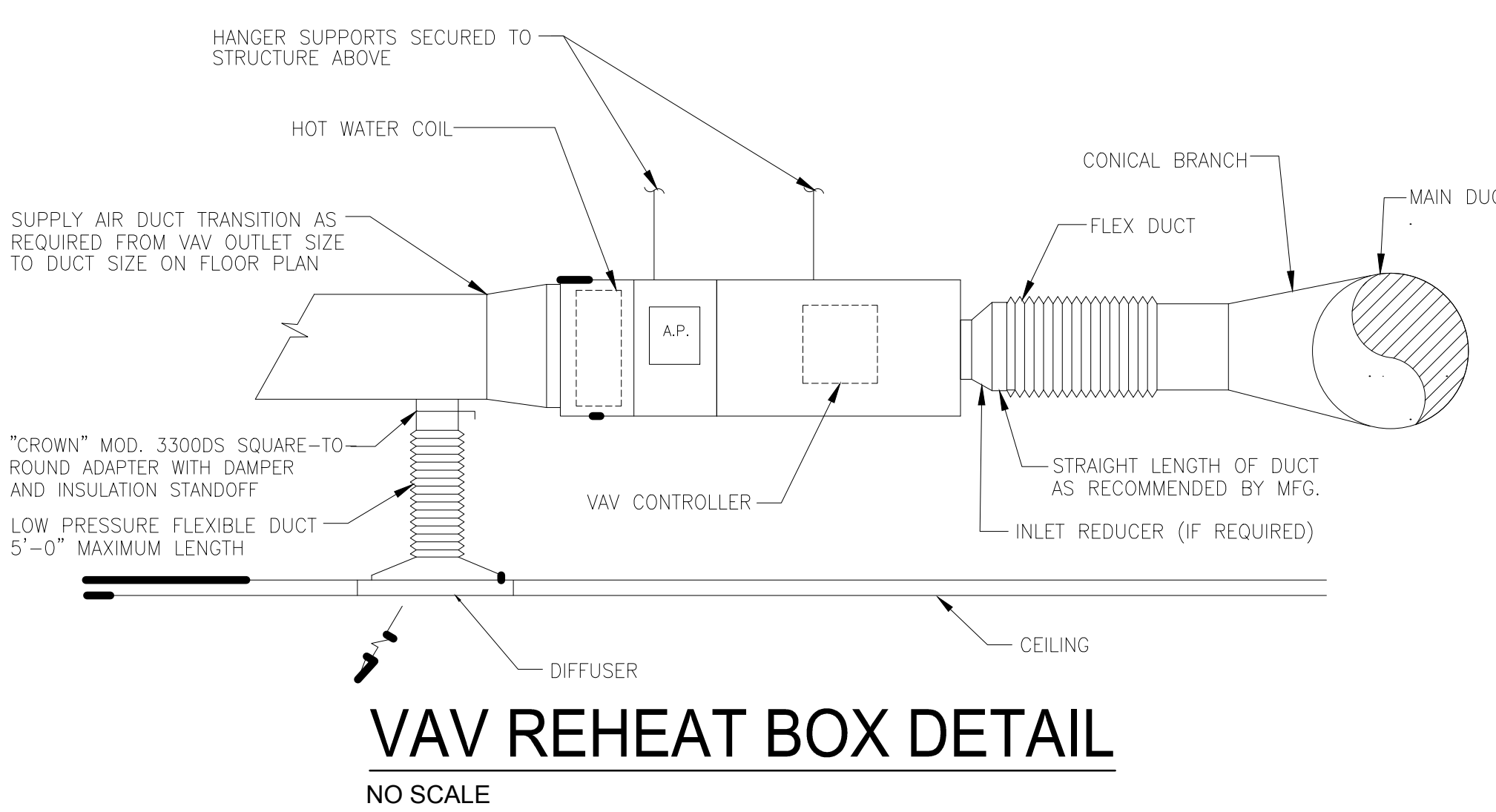
SPLITTER DETAIL

NO SCALE



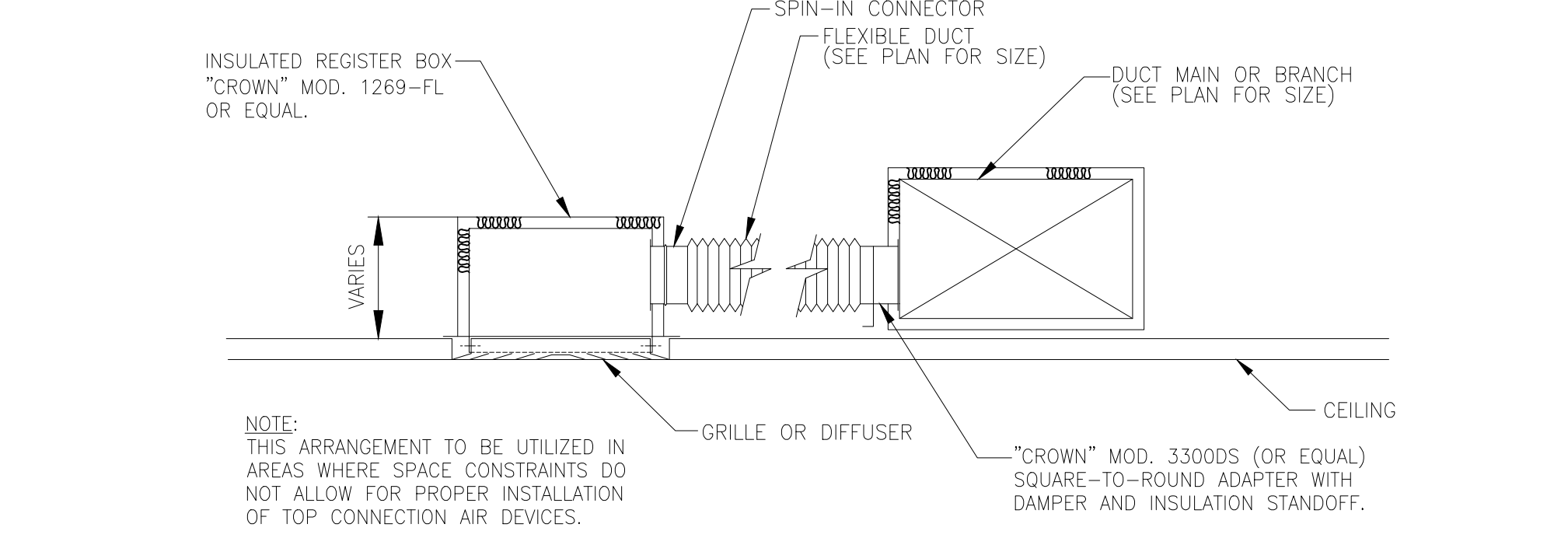
FLAT OVAL DUCT HANGERS/REINFORCMENT

NO SCALE



VAV REHEAT BOX DETAIL

NO SCALE

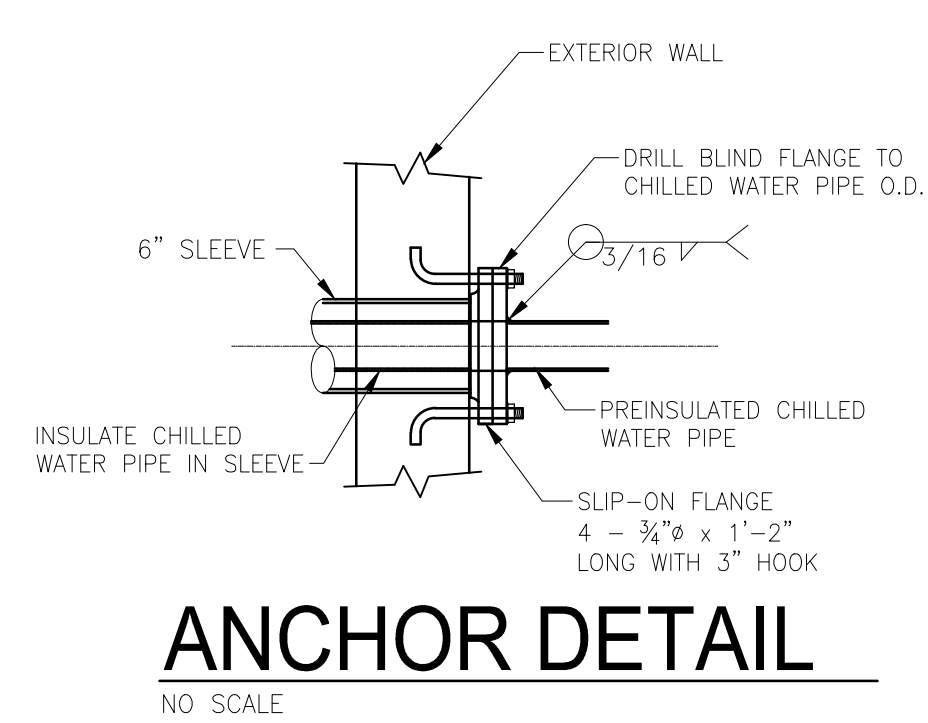
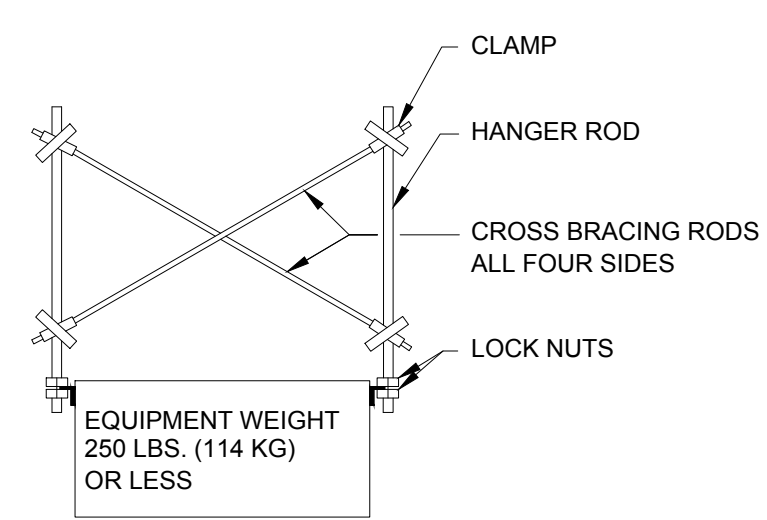


CEILING-MOUNTED AIR DEVICE

NOT TO SCALE

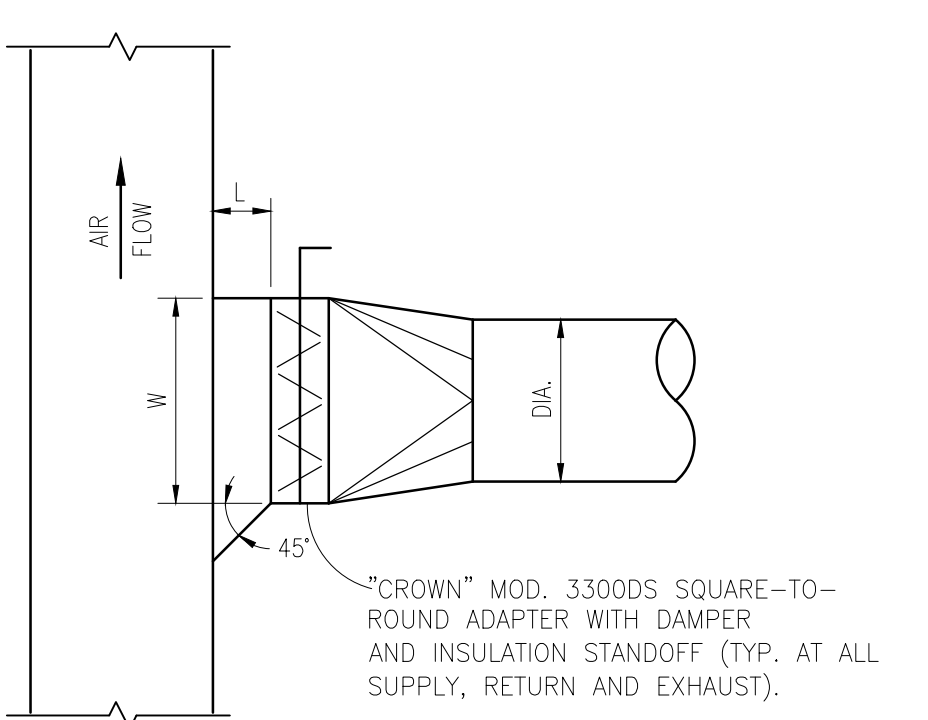
SEISMIC BRACING FOR LIGHT SUSPENDED EQUIPMENT

NO SCALE



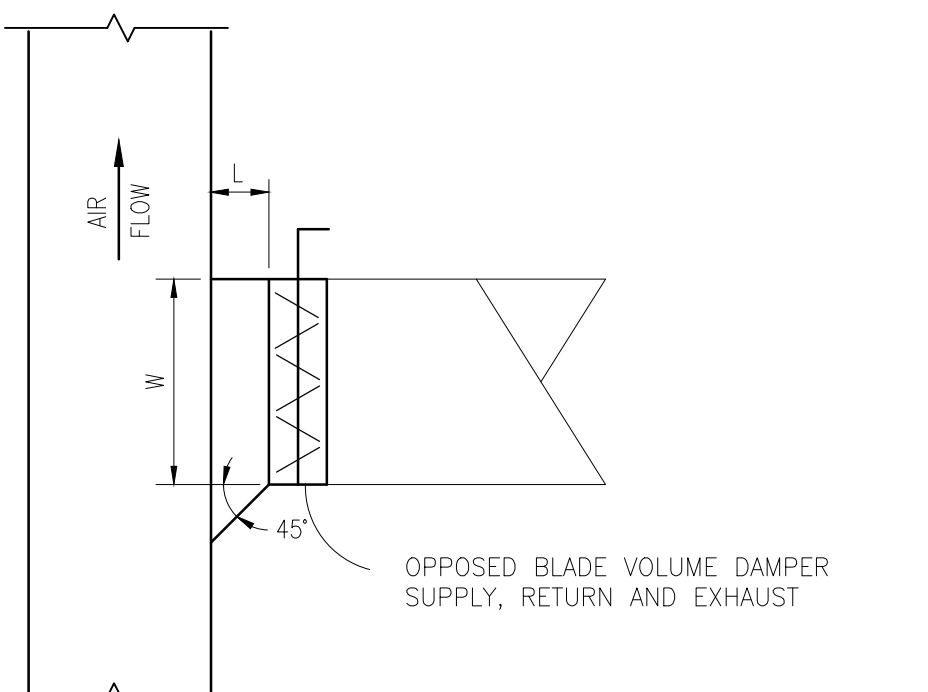
ANCHOR DETAIL

NO SCALE



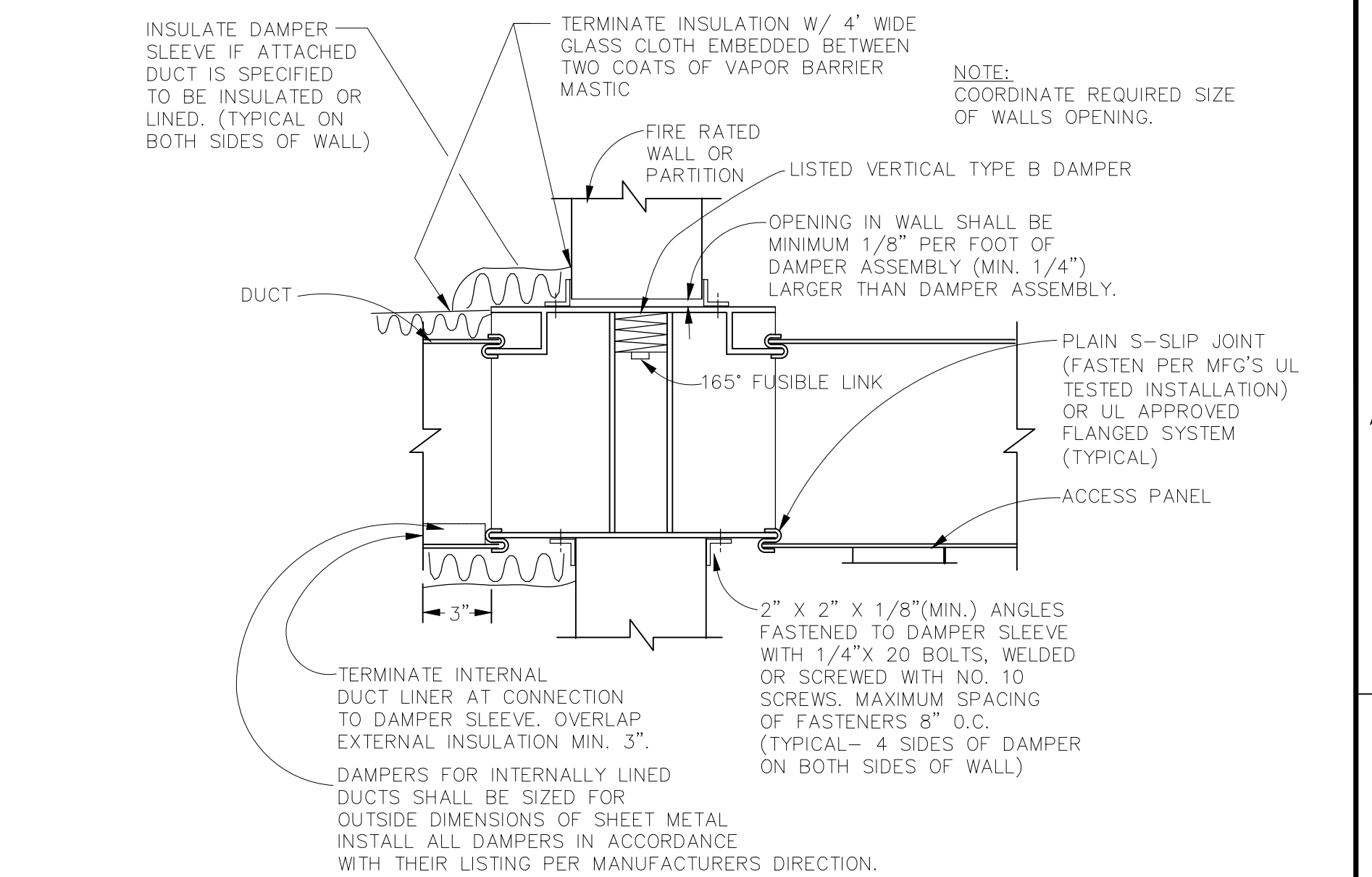
RECTANGULAR-TO-ROUND DUCT TAKEOFF DETAIL

NO SCALE



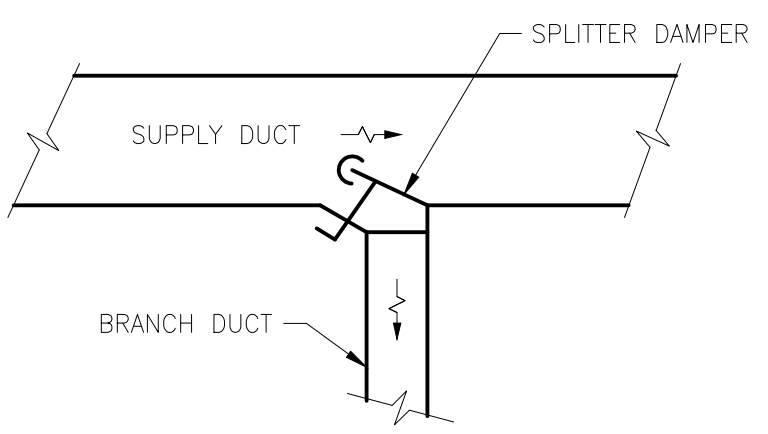
RECTANGULAR-TO-RECTANGULAR DUCT TAKEOFF DETAIL

NO SCALE



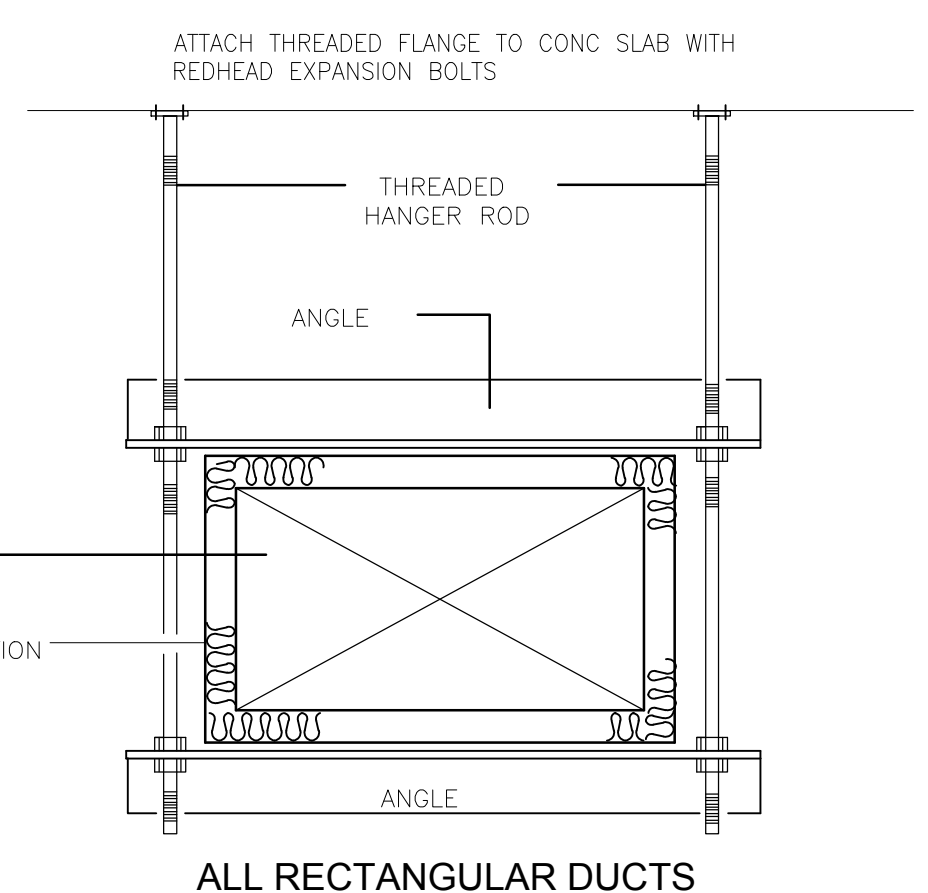
FIRE DAMPER IN WALL DETAIL

NO SCALE



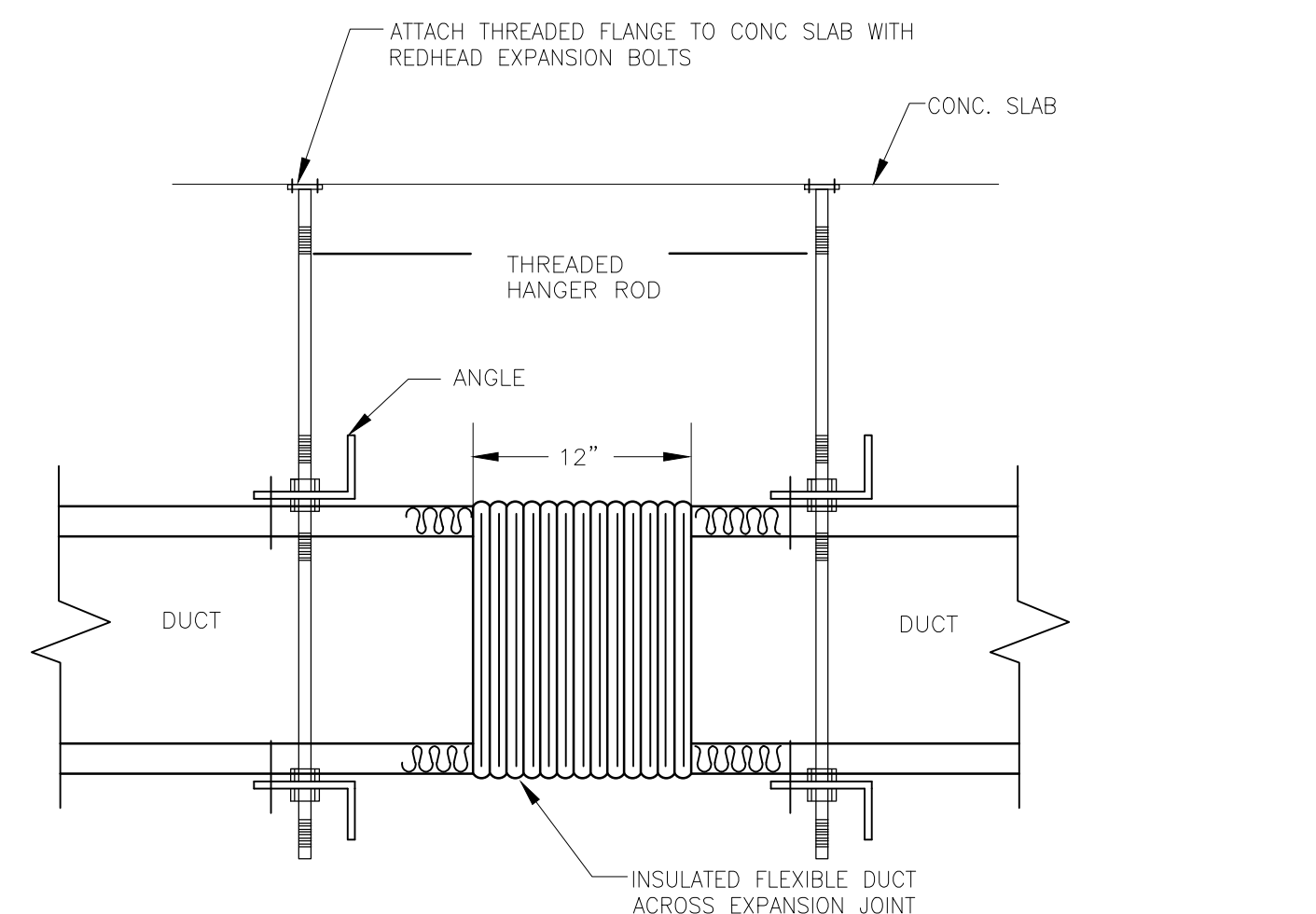
HARD DUCTED SUPPLY BRANCH DUCT TAKEOFF DETAIL

NO SCALE



TYPICAL DUCT HANGER DETAIL

NOT TO SCALE



DUCT EXPANSION DETAIL

NOT TO SCALE

FINAL DESIGN
APPROVED FOR CONSTRUCTION

CONSULTANTS:		ENGINEER-OF-RECORD STEPHEN T. STEFFE	FL P.E. NO. 70349	ARCHITECT/ENGINEERS: AKEA Design, Inc. 3603 NW 98th Street, Suite B Gainesville, FL 32606 Phone: (352) 474-6124 Fax: (352) 474-6324 COA: FL #29578 AKEA Project No. 110-15	Drawing Title HVAC DETAILS	Project Title RENOVATE 3AB FOR GASTROENTEROLOGY AND PULMONARY	Project Number 573-15-102	Office of Construction and Facilities Management
					Approved: Project Director	Location GAINESVILLE, FLORIDA	Building Number 1	Department of Veterans Affairs
Revisions:		Date				Date JULY 15, 2016	Checked STS	
						Drawn TJM	Drawing Number MH703	
							37 OF 72	



VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM (WITH SUPPLEMENTAL HEATING)

CONTROLS ABBREVIATIONS

BLR1-O	Air Quality Sensor	DA-T	Discharge Air Temperature	PHFB0-O	Preheat Face-Bypass Damper Output
BLR1-A	Boiler 1 Alarm	DA-T-SP	Discharge Air Temperature Setpoint	PH-O	Preheat Output
BLR1-C	Boiler 1 Command	DA-VP	Discharge Air Velocity Pressure	PHP-C	Preheat Pump Command
BLR1-EN	Boiler 1 Enable	DC-A	Dual Cool Unit Alarm	PHP-S	Preheat Pump Status
BLR1-O	Boiler 1 Output	EAD-C	Exhaust Air Damper Command	PH-T	Preheat Temperature
BLR2-A	Boiler 2 Alarm	EA-H	Exhaust Air Humidity	RAD-C	Return Air Damper Command
BLR2-C	Boiler 2 Command	EATR-H-T	Exhaust Air After Heat Recovery Temp	RA-H	Return Air Humidity
BLR2-EN	Boiler 2 Enable	EA-T	Exhaust Air Temperature	RA-Q	Return Air Quality
BLR2-O	Boiler 2 Output	EA-VP	Exhaust Air Velocity Pressure	RA-T	Return Air Temperature
BLR3-A	Boiler 3 Alarm	EF/DC-EN	Exhaust Fan/Dual Cool Unit Enable	RA-VP	Return Air Velocity Pressure
BLR3-C	Boiler 3 Command	EF1-C	Exhaust Fan 1 Command	RF-C	Return Fan Command
BLR3-EN	Boiler 3 Enable	EF1-S	Exhaust Fan 1 Status	RF-O	Return Fan Output
BLR3-O	Boiler 3 Output	EF2-C	Exhaust Fan 2 Command	RF-S	Return Fan Status
BP1-C	Boiler Pump 1 Command	EF2-S	Exhaust Fan 2 Status	RH-O	Reheat Output
BP1-S	Boiler Pump 1 Status	EF-C	Exhaust Fan Command	RVLV-C	Reversing Valve Command
BP2-C	Boiler Pump 2 Command	EF-O	Exhaust Fan Output	SF-A	Supply Fan Alarm
BP2-S	Boiler Pump 2 Status	EF-S	Exhaust Fan Status	SF-C	Supply Fan Command
BP-SP	Building Pressure Setpoint	EXH-O	Exhaust Air Damper	SFH-C	Supply Fan HI Command
C1CHWV-S	Chill Water Valve 1 Status	FAN-C	Fan Command	SFL-C	Supply Fan LO Command
C1CWV-S	Cold Water Valve 1 Status	FAN-O	Fan Output	SFMC-C	Supply Fan MED Command
C2CHWV-S	Chill Water Valve 2 Status	FBD-O	Face-Bypass Damper Output	SF-O	Supply Fan Output
C2CWV-S	Cold Water Valve 2 Status	FLT-S	Filter Status	SF-S	Supply Fan Status
C3CHWV-S	Chill Water Valve 3 Status	QLS-T	Glycol Loop Supply Temperature	STM-P	Steam Pressure
CD-C	Combustion Damper Command	QLYF1-C	Glycol Pump 1 Command	SUPHTG-C	Supplemental Heating Command
CD-P	Cold Deck Static Pressure	QLYF1-S	Glycol Pump 1 Status	SUPHTG-O	Supplemental Heating Output
CD-S	Combustion Damper Status	QLYP2-C	Glycol Pump 2 Command	VAV	Variable Air Volume
CD-T	Cold Deck Temperature	QLYP2-S	Glycol Pump 2 Status	W-C	Warmup Command
CH1-AMP	Chiller 1 Current	QLYR-T	Glycol Return Temperature	WC1-ADJ	Zone 1 Warmer/Cooler
CH1-EN	Chiller 1 Enable	QLYS-T	Glycol Supply Temperature	WC2-ADJ	Zone 2 Warmer/Cooler
CH2-AMP	Chiller 2 Current	QLYV-O	Glycol Valve Output	WC3-ADJ	Zone 3 Warmer/Cooler
CH2-EN	Chiller 2 Enable	HC-C	Heating/Cooling Command	WC4-ADJ	Zone 4 Warmer/Cooler
CH3-AMP	Chiller 3 Current	HC-O	Heating/Cooling Output	WC5-ADJ	Zone 5 Warmer/Cooler
CH3-EN	Chiller 3 Enable	HD-O	Hot Deck Damper Output	WC6-ADJ	Zone 6 Warmer/Cooler
CHWP1-C	Chill Water Pump 1 Status	HD-P	Hot Deck Static Pressure	WC7-ADJ	Zone 7 Warmer/Cooler
CHWP1-S	Chill Water Pump 1 Status	HD-T	Hot Deck Temperature	WC8-ADJ	Zone 8 Warmer/Cooler
CHWP2-C	Chill Water Pump 2 Status	HD-VP	Hot Deck Velocity Pressure	WC-ADJ	Warmer Cooler Adjustment
CHWP2-S	Chill Water Pump 2 Status	HP-A	High Pressure Alarm	W-SP	Warmup Setpoint
CHWP3-C	Chill Water Pump 3 Status	HR-O	Heat Recovery Output	ZN1HTG1-C	Zone 1 Heating Stage 1
CHWP3-S	Chill Water Pump 3 Status	HRP-C	Heat Recovery Pump Command	ZN1HTG2-C	Zone 1 Heating Stage 2
CHWR-T	Chill Water Return Temp	HRP-S	Heat Recovery Pump Status	ZN1HTG-O	Zone 1 Heating Output
CHWS-T	Chill Water Supply Temp	HR-T	Heat Recovery Temperature	ZN1-O	Zone 1 Output
CLG1-C	Cooling Stage 1 Command	HTG1-C	Heating Stage 1 Command	ZN1-T	Zone 1 Temperature
CLG2-C	Cooling Stage 2 Command	HTG2-C	Heating Stage 2 Command	ZN2HTG1-C	Zone 2 Heating Stage 1
CLG3-C	Cooling Stage 3 Command	HTG3-C	Heating Stage 3 Command	ZN2HTG2-C	Zone 2 Heating Stage 2
CLG4-C	Cooling Stage 4 Command	HTG4-C	Heating Stage 4 Command	ZN2HTG-O	Zone 2 Heating Output
CLG5-C	Cooling Stage 5 Command	HTG5-C	Heating Stage 5 Command	ZN2-O	Zone 2 Output
CLG6-C	Cooling Stage 6 Command	HTG6-C	Heating Stage 6 Command	ZN2-T	Zone 2 Temperature
CLG7-C	Cooling Stage 7 Command	HTG7-C	Heating Stage 7 Command	ZN3HTG1-C	Zone 3 Heating Stage 1
CLG8-C	Cooling Stage 8 Command	HTG8-C	Heating Stage 8 Command	ZN3HTG2-C	Zone 3 Heating Stage 2
CLG-A	Cooling Alarm	HTG-A	Heating Alarm	ZN3HTG-O	Zone 3 Heating Output
CLG-C	Cooling Command	HTG-C	Heating Command	ZN3-O	Zone 3 Output
CLG-O	Cooling Output	HTG-O	Heating Output	ZN3-T	Zone 3 Temperature
CM	Control Module	HUM-C	Humidifier Command	ZN4HTG1-C	Zone 4 Heating Stage 1
COMP1-C	Compressor 1 Command	HUM-O	Humidifier Output	ZN4HTG2-C	Zone 4 Heating Stage 2
COMP2-C	Compressor 2 Command	HUM-H	Humidifier High Limit	ZN4HTG-O	Zone 4 Heating Output
CF-C	Condenser Fan Control	HUM-Lo	Humidifier IOWH Limit	ZN4-O	Zone 4 Output
CF-S	Condenser Fan Status	HUM-sen	Humidifier sEMSOR	ZN4-T	Zone 4 Temperature
CP-C	Cooling Pump Command	HW-DP	Hot Water Diff Pressure	ZN5HTG-O	Zone 5 Heating Output
CP-S	Cooling Pump Status	HWP1-C	Hot Water Pump 1 Command	ZN5-O	Zone 5 Output
CT1-C	Cooling Tower 1 Command	HWP1-O	Hot Water Pump 1 Output	ZN5-T	Zone 5 Temperature
CT1-HI	Cooling Tower 1 High Speed	HWP1-S	Hot Water Pump 1 Status	ZN6HTG-O	Zone 6 Heating Output
CT1-LO	Cooling Tower 1 Low Speed	HWP2-C	Hot Water Pump 2 Command	ZN6-O	Zone 6 Output
CT1-O	Cooling Tower 1 Output	HWP2-O	Hot Water Pump 2 Output	ZN6-T	Zone 6 Temperature
CT1-S	Cooling Tower 1 Status	HWP2-S	Hot Water Pump 2 Status	ZN7HTG-O	Zone 7 Heating Output
CT2-C	Cooling Tower 2 Command	HWP3-C	Hot Water Pump 3 Command	ZN7-O	Zone 7 Output
CT2-HI	Cooling Tower 2 High Speed	HWP3-S	Hot Water Pump 3 Status	ZN7-T	Zone 7 Temperature
CT2-LO	Cooling Tower 2 Low Speed	HW-T	Hot Water Return Temp	ZN8HTG-O	Zone 8 Heating Output
CT2-O	Cooling Tower 2 Output	HW-S-T	Hot Water Supply Temp	ZN8-O	Zone 8 Output
CT2-S	Cooling Tower 2 Status	HWV-O	Hot Water Valve Output	ZN8-T	Zone 8 Temperature
CTBYP-O	Cooling Tower Bypass Valve	HX-O	Heat Exchanger Output	ZN-CO2	Zone Carbon Dioxide
CWP1-C	Cond Water Pump 1 Status	LP-A	Low Pressure Alarm	ZN-H	Zone Humidity
CWP1-S	Cond Water Pump 1 Status	MAD-O	Mixed Air Damper Output	ZN-Q	Zone Air Quality
CWP2-C	Cond Water Pump 2 Status	MA-T	Mixed Air Temperature	ZN-T	Zone Temperature
CWP2-S	Cond Water Pump 2 Status	OAD-C	Outside Air Damper Command	ZN-T/WC-ADJ	Zone Temp/Warmer Cooler
CWR-T	Cond Water Return Temp	OAD-ES	Outside Air Damper End Switch	ZN-T/ZN-H	Zone Temp/Zone Humidity
CWS-T	Cond Water Supply Temp	OA-H	Outside Air Humidity		
DA-P	Duct Static Pressure Setpoint	OA-T	Outside Air Temperature		
DAP-SP	Discharge Static Pressure	OCC-C	Occupied Command		

FINAL DESIGN
APPROVED FOR CONSTRUCTION

Office of
Construction
and Facilities
Management

 Department of
Veterans Affairs

SEQUENCE OF OPERATION

HVAC SYSTEM:

AIR HANDLING UNIT (AHU):

THE AHU SUPPLY FAN WILL BE STARTED AND STOPPED BY ITS RESPECTIVE HVAC STANDALONE DIRECT DIGITAL CONTROL (DDC) PANEL. WHEN THE AHU SUPPLY AND EXHAUST FANS ARE ENERGIZED, THE OUTSIDE AND RETURN AIR DAMPERS WILL OPEN TO PROVIDE THE SCHEDULED AIR VOLUME. THE DUCT STATIC PRESSURE SENSOR (SPS) WILL CONTROL THE TOTAL FAN VOLUME THROUGH A VARIABLE FREQUENCY DRIVE (VFD) IN ACCORDANCE WITH THE DAMPER POSITION IN THE VARIABLE AIR VOLUME (VAV) TERMINAL UNITS (BOXES). VAV BOXES ARE UNDER THE CONTROL OF THE ASSOCIATED SPACE TEMPERATURE SENSORS. THE AHU SHALL BE SUPPLIED WITH CHILLED WATER COIL, PRE-HEAT COIL, FILTERS AND DUCT MOUNTED OUTSIDE, AND RETURN AIR DAMPERS.

THE AHU SUPPLY/EXHAUST FANS SHALL RUN CONTINUOUSLY EXCEPT UPON FIRE/SMOKE ALARM. IN THE ALARM MODE, THE AHU SUPPLY AND EXHAUST FANS SHALL SHUT DOWN AND THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL CLOSE.

BEFORE STARTING THE FAN A SIGNAL FROM THE CONTROL PANEL SHALL OPEN OUTSIDE AND RETURN AIR DAMPERS. THERE SHALL BE AN ADJUSTABLE, DELAYED START TO AVOID NUISANCE TRIPPING OF PRESSURE SAFETIES. PROOF OF FAN OPERATION SHALL BE ESTABLISHED VIA A SIGNAL FROM THE DIFFERENTIAL PRESSURE SWITCH INSTALLED ACROSS EACH FAN. AHU FANS SHALL START IN LOW SPEED AND GRADUALLY INCREASE TO SYSTEM DEMAND LEVEL.

PROVIDE A MANUAL RESET HIGH LIMIT DUCT STATIC PRESSURE SENSOR, LOCATED IN THE SUPPLY AIR DUCT, TO DE-ENERGIZE AIR HANDLING UNIT AND EXHAUST FAN UPON A RISE ABOVE SET POINT, AS RECOMMENDED BY THE TEST AND BALANCE AGENCY, BUT NOT MORE THAN 1.0 INCH W.G. ABOVE SYSTEM OPERATING DUCT STATIC PRESSURE REQUIREMENT AT SUPPLY FAN DISCHARGE AT 100% FAN SPEED AND FULL SYSTEM AIR FLOW.

VAV TERMINAL UNITS:

VAV TERMINAL UNIT DAMPERS SHALL MODULATE BASED UPON A SIGNAL FROM THE SPACE TEMPERATURE SENSORS THROUGH THE LOCAL DDC CONTROLLER. THE STATION DDC PANEL SHALL HAVE FULL CAPABILITY TO CONTROL THE VAV BOXES AND REHEAT COIL 2-WAY CONTROL VALVES. EACH VAV BOX WILL HAVE A MINIMUM AIR VOLUME SETTING AS SHOWN IN THE VAV SCHEDULE (OPERATOR ADJUSTABLE).

ON A CALL FOR FULL COOLING, THE DAMPER SHALL BE SET FOR MAXIMUM DESIGN CFM SCHEDULED OR INDICATED. ON A FALL IN SPACE TEMPERATURE, THE DAMPER SHALL MODULATE TOWARD THE MINIMUM POSITION. WITH THE DAMPER AT MINIMUM POSITION AND ON A FURTHER DROP IN SPACE TEMPERATURE, THE HOT WATER RE-HEAT COIL SHALL BE ENERGIZED TO MAINTAIN SPACE TEMPERATURE.

DUCT STATIC PRESSURE:

THE DUCT STATIC PRESSURE SENSOR, MOUNTED IN THE DISTRIBUTION DUCTWORK, WILL TRANSMIT A SIGNAL, TO THE AHU DDC PANEL, THAT IS PROPORTIONAL TO THE DUCT STATIC PRESSURE. THE DDC, THROUGH THE VFD, WILL CONTROL THE AHU FAN SPEED/AIR VOLUME TO MAINTAIN THE STATIC PRESSURE SETPOINT DETERMINED DURING AIR BALANCING.

COOLING MODE:

COOLING MODE FOR THE AHU WILL BE ENABLED BY THE DISCHARGE AIR TEMPERATURE SENSOR, THE AHU DISCHARGE AIR TEMPERATURE SENSOR, THROUGH THE AHU DDC, SHALL MAINTAIN THE DISCHARGE TEMPERATURE SETTING OF 55 DEGREES FAHRENHEIT (OPERATOR ADJUSTABLE) BY MODULATING THE CHILLED WATER COIL 2-WAY CONTROL VALVE. THE AHU SUPPLY DUCT SPS WILL SENSE THE CHANGE IN DUCT STATIC PRESSURE AS THE VAV BOX DAMPERS MODULATE IN RESPONSE TO THE CORRESPONDING SPACE TEMPERATURE. THE SUPPLY TRAILING COOLING AIR VOLUME REQUIREMENTS, THE SPS WILL TRANSMIT A SIGNAL TO THE AHU DDC, WHICH WILL SEND A SIGNAL TO THE VFD TO VARY THE AHU FAN SPEED/AIR VOLUME IN ORDER TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT (ADJUSTABLE).

THE COOLING SYSTEM SHALL BE SUPPLIED THROUGH THE EXISTING CHILLED WATER PUMP BETWEEN THE NEW AIR HANDLING CHILLED WATER SYSTEMS AND THE CENTRAL CHILLED WATER SYSTEM. A 2-WAY MODULATING CONTROL VALVE WILL BE PROVIDED IN THE CHILLED WATER RETURN FROM EACH AIR HANDLING UNIT COOLING COIL TO MAINTAIN THE SUPPLY AIR DISCHARGE TEMPERATURE, TO 55 DEGREE FAHRENHEIT (ADJUSTABLE).

PRE-HEATING MODE:

HEATING MODE FOR THE AHU WILL BE ENABLED FROM THE AHU DDC THROUGH THE DISCHARGE AIR TEMPERATURE SENSOR. TEMPERATURE SENSORS SHALL BE PROVIDED IN THE HEATING WATER SUPPLY PIPING AND RETURN PIPING FOR THE AHU HEATING COIL AND REPORT THE HEATING WATER TEMPERATURE TO THE STATION DDC.

A 2-WAY CONTROL VALVE WILL BE PROVIDED IN THE HEATING WATER RETURN TO CONTROL THE PRE-HEATING VALVE. A TEMPERATURE SENSOR IN THIS RETURN PIPING WILL MODULATE THE HEATING HOT WATER CONTROL VALVE TO MAINTAIN 55 DEGREE FAHRENHEIT (ADJUSTABLE) SUPPLY TEMPERATURE IN THE PRE-HEATING HOT WATER SYSTEM.

REHEAT MODE:

THE RE-HEAT COIL 2-WAY CONTROL VALVE, EACH VAV BOXE SHALL BE SUPPLIED WITH A HOT WATER REHEAT COILS TO MAINTAIN SPACE TEMPERATURE BY MODULATING THE REHEAT COIL 2-WAY CONTROL VALVLE, THE REHEAT HOT WATER IS SUPPLIED THROUGH THE EXISTING HEATING WATER PUMP SHALL BE ENERGIZED THROUGH THE CONTROLLER TO PROVIDE SPACE HEATING BASED UPON THE SPACE HEATING REQUIREMENT ON CALL FOR PRE-HEAT OR REHEAT FROM THE DISCHARGE AIR OR SPACE TEMPERATURE SENSORS, THE HEATING WATER PUMP SHALL

[illegible]

AIR-CONDITIONED SPACE TEMPERATURE SETPOINT SCHEDULE			
SPACE	COOLING	HEATING	MIN/MAX HUMIDITY
OCCUPIED	70°F	75°F	30%/50%
UNOCCUPIED	70°F	75°F	30%/50%

NOTE: ALL SETPOINTS ARE OPERATOR ADJUSTABLE

GENERAL NOTES

1. FOR HVAC LEGEND AND SYMBOLS NOTES REFER TO DWG.
2. FOR HVAC DUCTWORK PLANS REFER TO DWGS.
3. FOR HVAC PIPING PLANS REFER TO DWGS.
4. FOR HVAC SECTIONS REFER TO DWG.
5. FOR HVAC DETAILS REFER TO DWGS MH-700 SERIES.
6. FOR HVAC EQUIPMENT SCHEDULES REFER TO DWGS.
7. FOR HVAC PIPING DIAGRAMS REFER TO DWGS.
8. FOR HVAC CONTROLS AND SEQUENCE OF OPERATIONS REFER TO DWGS.
9. THE ELECTRICAL POWER & CONTROL WIRING FOR THE ENVIRONMENTAL CONTROL SYSTEM SHALL BE FURNISHED AND INSTALLED IN METALLIC CONDUITS, MINIMUM SIZE OF CONDUIT SHALL BE 1/2" DIAMETER.

NOTES BY SYMBOL

- 1 VFD INTERFACE POINTS SUCH AS STATUS, SPEED CONTROL AND FAULT, ARE NOT TO BE CONSIDERED AS INDEPENDENT POINTS AND WIRED SEPARATELY.
- 2 VAN TERMINAL UNIT POINTS SUCH AS TEMP SENSOR, DAMPER CONTROL, AND FLOW MONITORING ARE NOT TO BE CONSIDERED AS INDEPENDENT POINTS AND WIRED SEPARATELY.
- 3 ONLY ONE POINT IS REQUIRED FOR THE OUTSIDE AIR TEMPERATURE SENSOR FOR ALL AIR HANDLING UNITS TOGETHER. DO NOT TIE THE OUTSIDE AIR TEMPERATURE SIGNAL FROM ONE AHU TO THE OTHERS.
- 4 OUTSIDE/RETURN AIR CFM SHALL BE VERIFIED WITH AIR FLOW MONITORING STATION (AFMS).
- 5 NOT USED
- 6 HYDRONIC SYSTEM DIFFERENTIAL PRESSURE POINT SHALL BE A CALCULATED VALUE BASED ON THE SYSTEM SUCTION AND DISCHARGE PRESSURE POINTS.
- 7 WATER AND AIR FLOW SHALL BE A CALCULATED VALUE BASED UPON THE SYSTEM SUCTION/OPERATION

CONTROL POINTS LIST

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					<div>Building Number</div> <div>1</div>	<div>Drawing Number</div> <div>MH901</div>	<div>40 OF 72</div>			
					<div>Approved: Project Director</div>				<div>Location</div> <div>GAINESVILLE, FLORIDA</div>	
					<div>Date</div> <div>JULY 15, 2016</div>	<div>Checked</div> <div>STS</div>	<div>Drawn</div> <div>TJM</div>			
Revisions:	Date									