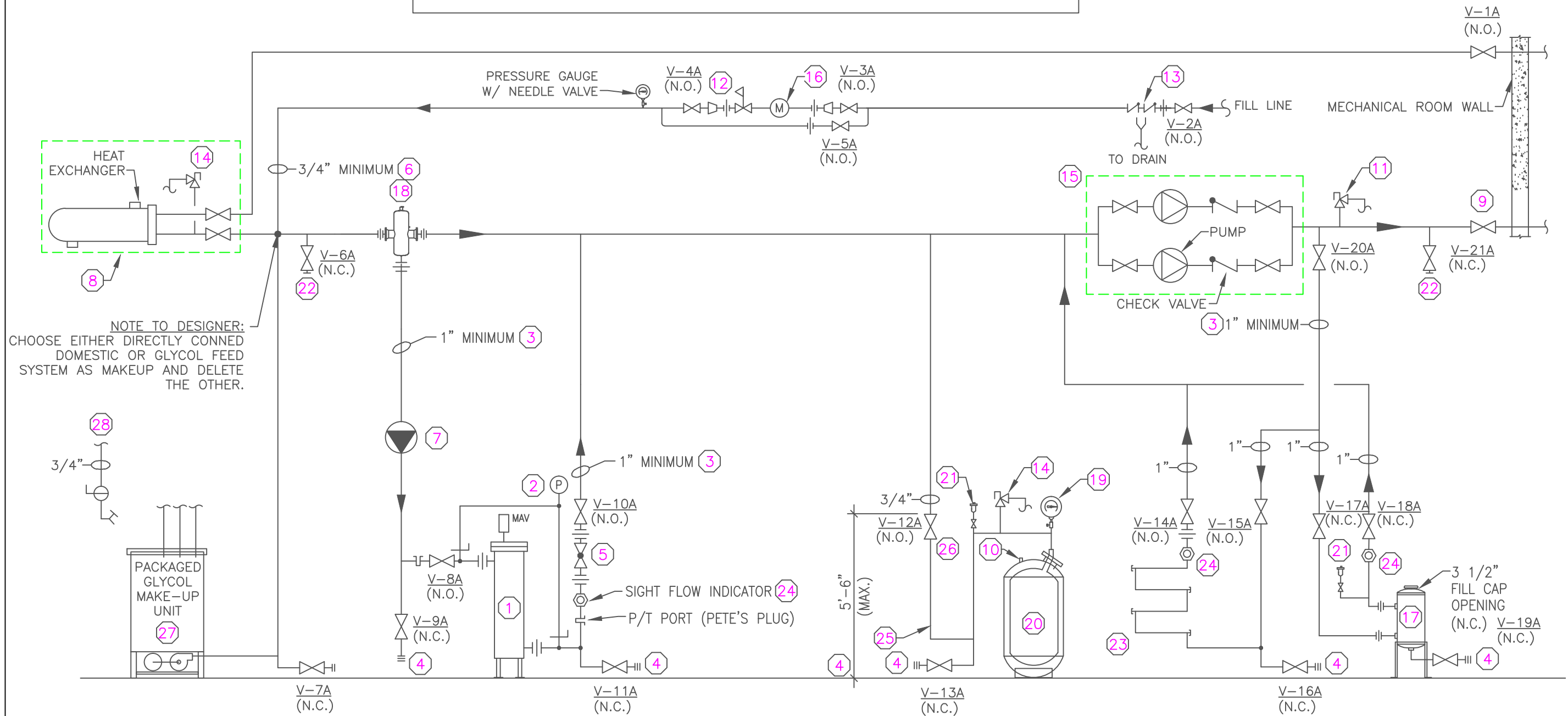


NOTE TO DESIGNER: THIS DETAIL IS TO BE APPLIED TO ALL HYDRONIC HEATING OR COOLING SYSTEM DESIGNS. SLIGHT MODIFICATIONS MAY BE REQUIRED FOR INDIVIDUAL APPLICATIONS. EXAMPLES INCLUDE: CAMPUS CHILLED WATER BUILDING HEAT EXCHANGERS, CHILLER(S), BOILER(S), PRIMARY/SECONDARY PUMPING, WATER SOURCE OR GROUND SOURCE HEAT PUMPS, MULTIPLE STEAM HEAT EXCHANGERS, SYSTEMS CONTAINING GLYCOL.



NOTE TO DESIGNER:
CHOOSE EITHER DIRECTLY CONNED
DOMESTIC OR GLYCOL FEED
SYSTEM AS MAKEUP AND DELETE
THE OTHER.

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① SIDE STREAM BAG FILTER W/ BOLT-ON TOP. FILTER FLOW RATE FOR A GIVEN SYSTEM SHALL BE THAT REQUIRED TO PROVIDE EIGHT (8) TOTAL WATER SYSTEM VOLUME CHANGES PER DAY. DESIGNER SHALL UTILIZE THE FOLLOWING EQUATION:

$$\text{BAG FILTER FLOW (GPM)} = [(\text{TOTAL SYSTEM VOLUME} \times 8) / 1440]$$

USE #BFN12 BY FILTER SPECIALIST INC. GASKETS RATED FOR 250°F MINIMUM. STAINLESS STEEL VESSEL. FSI BPENG 25 MICRON BAG FILTER. 2" NPT SIDE INLET AND BOTTOM OUTLET. FURNISHED AND INSTALLED BY CONTRACTOR.

② PRESSURE GAUGE W/ ISOLATION COCKS

③ SIZE FOR 4 FOOT PER SECOND MAXIMUM VELOCITY AT DESIGN FLOW.

④ DRAIN VALVE (N.C.) WITH MALE HOSE THREAD END.

⑤ VICTAULIC/TA MODEL TA7MP PRESSURE INDEPENDENT BALANCE VALVE AND UNION. SIZE FOR REQUIRED SIDESTREAM BAG FILTER FLOW.

⑥ FOR SYSTEMS HAVING A TOTAL VOLUME GREATER THAN 500 GALLONS, INCREASE SIZE OF MAKE-UP SYSTEM COMPONENTS AS NEEDED TO ALLOW FOR A TOTAL SYSTEM FILL TIME OF UNDER 2 HOURS. DIRECT CONNECTIONS TO GLYCOL SYSTEMS ARE PROHIBITED.

⑦ GRUNDFOS INLINE CIRCULATOR CAPABLE OF CALCULATED BYPASS FLOW RATE FROM ABOVE AT 10 PSI. 120v

⑧ SEE TYPICAL PSU HEAT EXCHANGER PIPING DETAIL

⑨ WHERE PSU VALVE SPECIFICATION DICTATES THAT BUTTERFLY VALVES MUST BE USED BASED UPON PIPE SIZE, PROVIDE HIGH PERFORMANCE BUTTERFLY VALVES ONLY WHERE PIPING EXISTS MECHANICAL ROOM. ALL OTHERS IN HOT WATER SYSTEM SHOULD BE STANDARD BUTTERFLY VALVES.

⑩ AIR CHARGING VALVE. DRY TANK FILL VALVE PRESSURE (PSIG) IS DETERMINED BY THE FOLLOWING EQUATION:
 $P = [(0.433 \times \text{VERTICAL DISTANCE IN FEET FROM SYSTEM HIGHPOINT DOWN TO TANK CENTERLINE}) + 4]$

⑪ SAFETY PRESSURE RELIEF VALVE - PIPED TO FLOOR DRAIN. SELECT RELIEF VALVE TO PREVENT SYSTEM PRESSURE FROM RISING MORE THAN 10% ABOVE THE MAXIMUM ALLOWABLE WORKING PRESSURE OF THE SYSTEM COMPONENTS, TAKING INTO ACCOUNT THE EFFECT OF STATIC HEAD. NOT REQUIRED AT THIS LOCATION IF SAFETY PRESSURE RELIEF VALVE IS BEING PROVIDED ELSEWHERE IN THE SYSTEM TO MEET PA L&I REQUIREMENTS.

⑫ PRESSURE REDUCING VALVE. PRV SETTING (PSIG) IS DETERMINED BY THE FOLLOWING EQUATION:
 $P = [(0.433 \times \text{VERTICAL DISTANCE IN FEET FROM PRV TO SYSTEM HIGHPOINT}) + 5]$. NOT TO EXCEED MAXIMUM PRESSURE OF LOWEST RATED COMPONENT.

⑬ REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER WITH OPEN AIR GAP

⑭ PROVIDE SAFETY PRESSURE RELIEF VALVE AT THIS LOCATION BETWEEN PRESSURE VESSEL AND FIRST ISOLATION VALVE IF PRESSURE VESSEL CAPACITY IS GREATER THAN OR EQUAL TO 120 GALLONS (PA L&I REQUIREMENT). PRESSURE VESSEL MUST BE ASME CERTIFIED IF GREATER THAN OR EQUAL TO 120 GALLON CAPACITY. SELECT RELIEF VALVE TO PREVENT SYSTEM PRESSURE FROM RISING MORE THAN 10% ABOVE THE MAXIMUM ALLOWABLE WORKING PRESSURE OF THE SYSTEM COMPONENTS, TAKING INTO ACCOUNT THE EFFECT OF STATIC HEAD, PIPE TO FLOOR DRAIN.

⑮ SEE TYPICAL PSU PUMP PIPING DETAIL

⑯ 5/8" NEPTUNE T-10 DIRECT READ WATER METER

⑰ CHEMICAL POT FEEDER. NEPTUNE MODEL #DBF-2HP. NO EXCEPTIONS.

⑱ COALESCING TYPE AIR/DIRT SEPARATOR. SPIROTHERM OR THRUSH ONLY, NO EXCEPTIONS.

⑲ PRESSURE GAUGE WITH NEEDLE VALVE

⑳ EXPANSION TANK (FIXED OR REPLACEABLE BLADDER TYPE)

㉑ SPIROTHERM SPIROTOP AIR VENT, NO EXCEPTIONS

㉒ 2" PIPE NIPPLE, WITH THREADED BALL VALVE AND CAP FOR QUICK FILL/FLUSH.

㉓ COUPON RACK. GE PART #2032806. 304SS, 1"NPT, WITH 4 COUPON HOLDERS.

㉔ MCMaster-CARR, HIGH TEMPERATURE (0-250F) DOUBLE WINDOW, THREADED, BRONZE SIGHT WITH PADDLE OR FLAPPER. MATCH PIPE SIZE.

㉕ UNDERSLUNG CONNECTION TO CREATE THERMAL TRAP (12" MIN. DROP)

㉖ OPEN VALVE, REMOVE HANDLE, AND WIRE A TAG TO THE VALVE THAT STATES THE FOLLOWING: "VALVE SHALL REMAIN OPEN AT ALL TIMES".

㉗ NEW PACKAGED GLYCOL MAKE-UP FEED SYSTEM. SYSTEM SHALL INCLUDE STORAGE TANKE, PUMP, STRAINER, CHECK VALVE, PRESSURE SWITCH, ALARM AND DRY ALARM CONTACTS AND ALL OTHER ACCESSORIES REQUIRED FOR SYSTEM OPERATION. NEPTUNE MODEL G-50-1A, 1.5 GPM @100 PSI, 120V PLUG IN ELECTRICAL CONNECTION. FOR TWO GLYCOL SYSTEMS WITH THE SAME PERCENTAGE AND TYPE OF GLYCOL, PROVIDE DUAL FEED SYSTEM IN LIEU OF MULTIPLE TANKS.

㉘ 3/4" HOSE BIBB REQUIRED IN ROOM FOR MAKEUP TANK FILL.

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