

JB Tech Talk No. 5: The Letter H – Getting Started with Primary-Secondary Piping

Primary-secondary (P-S) piping/pumping is a great tool for use in hydronic systems but I've found that a lot of people see P-S connections as mysterious and have trouble understanding how they work.



I have hydronic training boards that have a P-S connection with a sight flow indicator in the decoupler (common) pipe, as shown to the left. By manipulating the primary and/or secondary flows, the decoupler flow can be made to go in either direction. I always enjoy some of the 'Aha!' moments when people see that paddlewheel stop and go the other way.

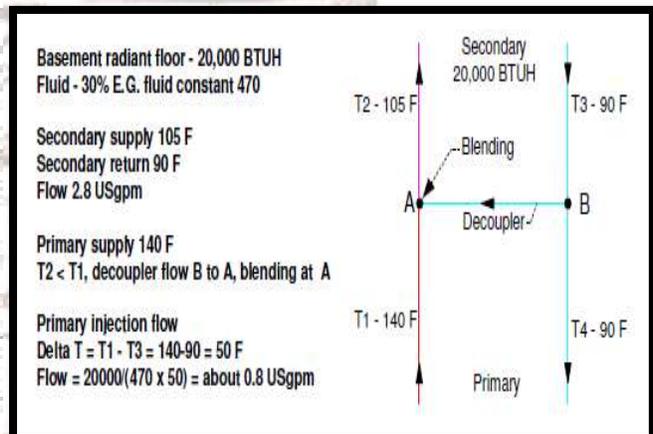
Even though it can go in either direction, decoupler flow in most applications should only be in one direction. All hell can break loose if it isn't. And even though the system may *operate* with no flow in the decoupler, it should likely never be *designed* that way.

For me, the first step in doing anything with P-S is to draw a big capital H. Every P-S connection has 4 arms and an H drawing works great for designing, commissioning or troubleshooting. Here's an example of a design with the secondary temperature lower than the primary.

Simple! Everything you need to know is there; load, flow rates, decoupler flow direction and where the blending *should* take place; a graphic illustration of what should happen in the connection.

I wish designers would put similar details on their drawings for all P-S connections.

Once all the information is there, it will be easier to decide on the best control option. A small injection flow rate like the one in the example is a challenge and needs to be done correctly.



When troubleshooting P-S connections, I draw an H on a piece of paper and take all the temperatures. (Sometimes that's the hardest part.) I can then tell right away what's going on and whether it's right; I've found a lot that aren't.

P-S is a big topic for a short article. I will have more to tell you in future JB Tech Talks.

Question: in the example above, what happens if the secondary flow increases but the primary flow does not? Answer in the next JB Tech Talk.