

Of the 6 components (can you quickly name them all?) every modern hydronic system *must* have, the one I most often find missing is the air separator. I say modern because early systems circulated by gravity and had no pumps. And, almost always, the boiler was the air separator.

If there is no air separator there will be problems, e.g. noise, poor circulation, poor heat transfer. A fellow who did some painting for us found out I knew something about boiler systems and started chewing on my leg about noise in his system. He said when it kicked in, he had to turn up his TV. I asked him if it sounded like a babbling brook running through the room, and he said 'Yes!'. There was no air separator. He had one installed and the system was quiet within minutes.

One of my biggest pet peeves is reliance on automatic air vents (AAV) to remove air. AAV's don't work well unless they're attached to an air separator. All air separators, even inexpensive small 'air scoops', increase the flow area and reduce the flow velocity. That lower velocity allows free air to separate from the water stream and get captured by the AAV. Imagine a bubble of free air zipping down a pipe and reaching a point where there's an AAV but no separator. Do you think it will stop, possibly *reverse direction*, and fight its way into the vent? I think not.

Every time I walk onto a job and see AAV's installed all over the place it's highly likely there is no *functional* air separator. What makes an air separator function at its best?

- ✓ It's installed where the fluid temperature is high, and the fluid pressure is low
- ✓ It reduces the fluid velocity to allow free air to rise and be captured
- ✓ The AAV on top of it cost more than \$4.00

As mentioned above, older high mass boilers were excellent air separators. The large volume meant very low water velocity, the fluid was hot, and if the expansion tank was connected to the boiler the pressure was low. Perfect.

You should only need one air separator/AAV in a system, but there is a situation where more than one may be a good idea. If there's a secondary loop that has a low injection flow from the primary loop, (see JB Tech Talks No. 5 & No. 9) it may take a long time for free air in the secondary to make its way through the injection connection back to the primary loop and the air separator. Adding a separator/AAV to the secondary loop will solve the problem.

Another reason why I don't like to see lots of AAV's in a system is that they are all leaks-in-waiting.

One final comment. Low loss headers are popular now, and they function well as air separators. Why? If they have a quality AAV on them, they touch all the bases. High temperature, low pressure, and low water velocity.

Question – what would allow a system to work fine with an air separator but no automatic air vent?