AXIOM INDUSTRIES LIMITED

HVAC Tech Note #21 – December 2004

Pressure Loss in Closed Systems

Closed hydronic systems lose pressure for one of three reasons:

Venting air – this is normal in systems with automatic air vents, primarily during startup

Leaks – this is not normal and should be avoided (see HVAC Tech Note #20)

Fluid is drained for service or some other reason.

Because water and other fluids used in closed systems are incompressible, a very small loss of fluid can result in a complete loss of pressure. For example, in order to add 1% more water to a full, closed vessel, you would have to apply a pressure of about 3,000 psig. Conversely, if you were able to accomplish that, you could drop the pressure in the vessel from 3,000 psig to 0 psig be releasing only 1% of the water. Note – do not try this at home!

The cold water in a freshly purged and filled heating system will be about 2-3% dissolved air by volume. Added to that will be any trapped free air that was not caught by the purging process. These systems, then, may require as much as 3-5% of their total volume made up to get through the venting process.

Once all of the air is vented, the pressure loss and requirement for makeup fluid in a tight system should be very low. However, loss of pressure for whatever reason can cause several undesirable things to happen, so it's important that adequate pressurization be maintained.

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