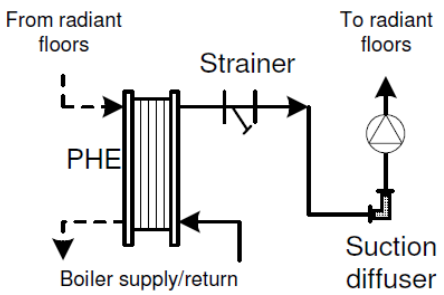
JB Tech Talk No. 13: ONE TOO MANY STRAINERS

Answer to question from JB Tech Talk No. 12 – the combustion tester probe must be in the undiluted flue gas stream, upstream of the draft hood/diverter on atmospheric appliances.

One of our mechanical engineering consultants had used radiant floor heating in a new health centre and it wasn't working. He was rightly more than a little concerned. We had supplied most of the equipment so he and I went on a road trip to see what was wrong.

Below is a simple schematic of the piping layout. The radiant floor loop is isolated from the boiler loop with a flat plate heat exchanger (PHE). These are very effective heat transfer devices because of their small flow passages and highly turbulent flow. Unfortunately, what makes them good heat exchangers also makes them good strainers.



You will notice there is a conventional strainer but it's *downstream* of the PHE. It's also immediately upstream of the suction diffuser on the pump inlet, which also has a strainer in it. Two strainers back-to-back, and both downstream of what needs to be protected is not a logical installation.

The contractor's guy was quick to point out that the pipeline strainer was clean. I wasn't surprised because it had a strainer (the PHE) upstream. He was still skeptical that the PHE was plugged, so we had to prove it.

We were able to confirm a low loop flow from the pump head and low flow at individual radiant floor zone manifolds by checking the head loss across the automatic flow limiters. There were not; however, any gauges or pressure/temperature (P/T) test plugs that we could use to check the pressure drop across the PHE. We found a spot upstream where I could put in a P/T plug (I always have a couple in my tool bag). I got a bit of a glycol shower but once the test plug was in, we could see that the PHE had a high pressure drop. It was plugged.

Fortunately, it was a bolted frame PHE, so it was easy to open it up. It was full of little pebbles and other crud. After hosing it off and bolting it back together, the loop flow was right where it was supposed to be and the radiant floors started coming up to temperature. Everyone was happy.

On the drive home, the consultant told me he was going to pay more attention to putting in P/T plugs in key locations so it would be easier to test and troubleshoot as we had just done. Good advice for anyone in our industry. To that, you can add "put a strainer *upstream* of plate heat exchangers".