

AIR IN WATER SOLUBILITY

All water contains a certain amount of entrained air; this is commonly referred to as water solubility.

As we all know, air is the single worst enemy to any hydronic heating system.

When the air is released from the solution, it can collect and create air pockets at the top of pipes and heating elements, also known “air locking” of a system. The air can also increase the corrosion rate of certain metals throughout the system.

To avoid these unwanted occurrences, air elimination devices are routinely used to remove most of the air trapped in the water molecules. The table shown below depicts the solubility curve for air contained in water.

As noted, increasing the temperature at a fixed or constant pressure reduces the amount of air that can be contained within the water molecule. In this example, at 50 PSIA, at a temperature of 50F, the water can contain just below 8% air by volume.

Conversely then, at 200F, the water molecule can contain approximately 3.5% air by volume.

Therefore, as you can see, reducing the pressure while temperature remains constant reduces the amount of air that can be dissolved in solution.

As indicated below, 125F water at 80 PSIA would contain approximately 7% air by volume. For purposes of our example, that same 125F water at 20 PSIA would contain less than 2% air by volume.

Therefore the conclusion must be that the air contained within the water molecules is least soluble at the points of highest temperature and lowest pressure.

The air separators should then be installed at this point in the system.

