HYDRONIC PRESSURISATION SYSTEM

Large, Hi-rise, multistory buildings with large water volumes and also ice-storage systems with large brine storage require large expansion volumes. The acceptance volume, the effective volume to accommodate expansion fluid, of the pressurized expansion tank depends on the operating pressure limits, i.e., Pi - Initial pressure and Pf - Final pressure. Initial pressure is dependent on the static head of water column and final pressure on the maximum allowable pressure limit of the hydronic system components.

In most of the systems, to keep the cost of hydronic systems components low, the final pressure is kept as low as possible thus reducing the difference between the final and the initial pressures to minimum and this reduces the acceptance volume of a pressurized expansion tank substantially, to as low as 10% - 20% of the total tank volume, necessitating the need for multiple pressurized expansion tanks.

Use of multiple pressurized expansion tanks in such applications is not a very good solution for the following reasons

- It requires large installation space
  - The tank construction hast to be changed based on working pressure
  - It is practically difficult to pressurize all the tanks to the same pressure unless the tanks are connected on the gas side through a gas charging manifold

The better solution is to use **Pressure Maintaining Station**. The use of these is quite common in countries with large HVAC systems and it has following features.

- It uses tank with rubber bladder to provide separation between air and water
  - The main bladder tank works at atmospheric pressure and thus its design is independent of system working pressure or static head
  - Only a small pressurized expansion tank is used to compensate for very minor pressure variations
  - A pressure sensor connected to a microprocessor based controller keeps a check on the system pressure and during expansion excess water is released through a motorized valve from the system to the tank while during contraction the water is pumped from the tank to the system.
  - The minimum volume of water in the main tank is ensured by keeping a check on the level.
  - More water is allowed to flow into the main tank, to compensate for water system losses, whenever the level falls below the minimum.
  - Air separator can generally be eliminated, as the air automatically gets purged out when the water flows form high pressure system to ambient pressure main tank.
  - Air in the tank is released through an airvent provided at the top.