

TWO PIPE AND FOUR PIPE FAN COIL SYSTEMS

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Fan Coil Systems:

Fan coil systems consist of multiple fan coil units, a piping system, chiller, and boiler. The fan coil units themselves are comprised of a finned-tube coil, an insulated drain pan under the coil to collect condensate, a fan to move air through the coil, filters, and a cabinet to house these components. Typically fan coils are either located above ceilings and ducted to ceiling diffusers, or under windows using console units. Console units are sometimes ducted through the wall for ventilation air.

The chiller may be air-cooled (available in either a single packaged unit, or in various split configurations), or water-cooled in a split configuration utilizing a cooling tower. Water-cooled chillers are more efficient because they reject heat to the wet bulb temperature of the outside air, while air-cooled chillers reject heat to the normal dry bulb temperature of the outside air. Water-cooled chillers require maintenance of the cooling tower. For this reason we do not usually recommend water-cooled chillers for smaller systems.

Two Pipe Systems: A two-pipe fan coil system consists of fan coil units with single coils, which are connected to two pipes (one supply pipe and one return pipe) that either provide hot water or chilled water throughout the building. A building with a two-pipe system is either entirely in a heating mode or entirely in a cooling mode. It is not possible to cool some rooms while heating others.

A two-pipe system is usually operated in the heating mode in the Winter and the cooling mode in the Summer. In the Spring and Fall it is not uncommon to have alternating hot and cold spells, or cold mornings with warm afternoons. This would require that the Owner either tolerate some temperature swings or switch the mode of the system. For example, suppose a warm day was encountered in October, when the system was in the heating mode. The Owner could either accept the lack of air conditioning for a few hours or days, or manually switch the system from heating to cooling. Automatic switchover is not recommended as it can lead to unnecessary cycling.

Two pipe systems cannot handle simultaneous heating and cooling, and are not acceptable where there are internal rooms with high internal gains, such as computer rooms.

Two pipe systems are less complicated in the sense that there are fewer pipes, coils, valves and controls.

Four Pipe Systems: A four pipe system has fan coil units with separate heating and cooling coils, as well as separate pairs of heating and cooling pipes. Hot water or chilled water is always available. The system is able to instantly switch from the heating mode to the cooling mode, or vice versa, and can provide heating to some rooms while simultaneously providing cooling to other rooms. It is very flexible.

Disadvantages are that it is more complicated, with ultimately twice as many control valves to maintain, and twice as much congestion due to piping. Four pipe systems are more expensive, typically by \$3.00-\$4.00 per square foot.