

**COIL COMPANY**  
HEAT EXCHANGE · AIR HANDLING

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## Fan Coil Operation and Replacement

The term "Fan Coil Unit" has a very general meaning in our industry and many do not truly understand the operational aspects of these units. They have a very limited range for air flow and conditioning and deviations from this range can cause problems in the system and facility.

### Selection

A fan coil is a unit that has a direct driven fan(s) and thus can only produce an air flow based on the motor speeds (usually three speeds) against a predetermined amount of total pressure. Since the units are normally sized at 400 cfm/ton then a unit will be able to produce that tonnage with a 3 row water coil. If a 4 row coil is selected then the air flow at high speed will be less because a 4 row coil has more air resistance than a 3 row coil. Let's say a 3 row coil will deliver a leaving air temperature of 58° F and the reason a 4 row might be required would be a design requiring 55° F leaving air. In other words, selection of the proper air flow and coil rows is paramount in the final design and selection of the proper unit.

Most units that are horizontal and are designed for short runs of duct usually include an external static pressure of about 10 inches. If you have more external static pressure from longer duct runs, grille, plenums etc. then the selection of unit may have to be the next size up to make sure proper air flow versus systematic. Many existing units were not designed properly and produce far less air than desired. Many vertical units require duct especially ones that are furred into a wall or are located in an adjacent utility room.

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## Two pipe vs. Four pipe

Two pipe is simply that heating and cooling is accomplished with the same coil (probably a 3 or 4 row coil). There can be a manual or automatic changeover and most facilities have designated dates for this changeover. Obviously this limits a facility because you have a designated time for heating and cooling and many times the weather doesn't cooperate.

Four pipe is two separate coils in direction of air flow with one for cooling and the other for heating. Most times that is a 3 row or 4 row coil for cooling and followed by a 1 or 2 row hot water coil on the downstream side of cooling coil. More expensive overall system installation but gives the facility the ability to cool or heat at almost any time of year. The extra rows in this design must be properly sized by fan coil manufacturer to make sure that air flow is not a problem.

## Coil piping and hook-up

You must first determine type of Automatic Temperature Control and that usually requires selection of two way or three way or other type valves. You then also must select the location of these ATC valves (Supply or Return Lines).

You must determine the balancing method (Manual Flow or Automatic Flow Adjustment). The benefits and limitations of manual flow is gpm readout, gpm easy to adjust, will handle dirty systems, set point can be lost and it takes more time to adjust flow. With automatic flow you get system energy savings, great with three way valve systems, permanent and tamperproof device, good for variable speed fans, less time required to achieve results but it is not east to read gpm flow.

Selecting coil piping detail and piping and run-out branch size.

Selecting accessories such as balancing valves, unions or sweat connections, isolation valves (ball valves), y-strainers, P/T plugs, air vents, coil hose, ball valves and nipples.

Other considerations include drain pan piping and also flushing and cleaning coils and system.

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### Replacing units

The replacement of existing fan coil units is usually a long term project because the units are within the occupied space. Normally the entire facility can't be shut down so designated areas need to be selected until all units are finally replaced. It is very important that the owner work with an installer and fan coil manufacturer that can deal with this long term program.

Most facilities do not have the as built drawings on the units to be replaced and many times the labels on sides of units are removed or unreadable. In this case then the unit needs to be reviewed for its performance. Most coils in units are sized at 400 feet/minute velocity so if you take the face area of coil (finned height x finned length and divide by 144) and multiply it x 400 then you will obtain the cfm air flow for unit to be replaced.

Replacing fan coil units is not a direct replacement and the new unit will not be the same dimensions as the old unit. Manufacturers build units per a catalog size and arrangement and it is very important that the new design fit within the physical limitations at the job site.

When replacing units, it is also important to work out problems with old units and incorporate solutions in the new units. Lack of air flow or lack of cooling or heating can be alleviated with new units. To determine a units actual air flow then the use of meter

measuring velocity at the coil and multiplying the actual velocity times the coil square feet will equal actual cfm flow. Remember that the air flow may be reduced because of dirt laden coils.

Many systems have water temperature or quantity problems. By this we mean that a coil that is supposed to have 44° F water actually sees 47° F water. The new unit may require an extra row of coil to be able to overcome the warmer water.



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***Valves and Controls mounted on your units***

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Many projects require delivery of units for specific shutdown and installation schedules. We can meet those exacting schedules and it doesn't matter if it is one unit or a hundred units.

Horizontal units from 200 to 2200 cfm (½ ton to 6 ton), Vertical upright units from 200 to 1200 cfm (½ ton to 3 ton) and vertical utility room units from 200 to 2500 cfm (½ ton to 7 ton).

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Coil Company, LLC  
P.O. Box 956  
Paoli, PA 19301

Toll Free: (800) 523-7590  
Phone: (610) 251-0257  
Fax: (610) 251-0805