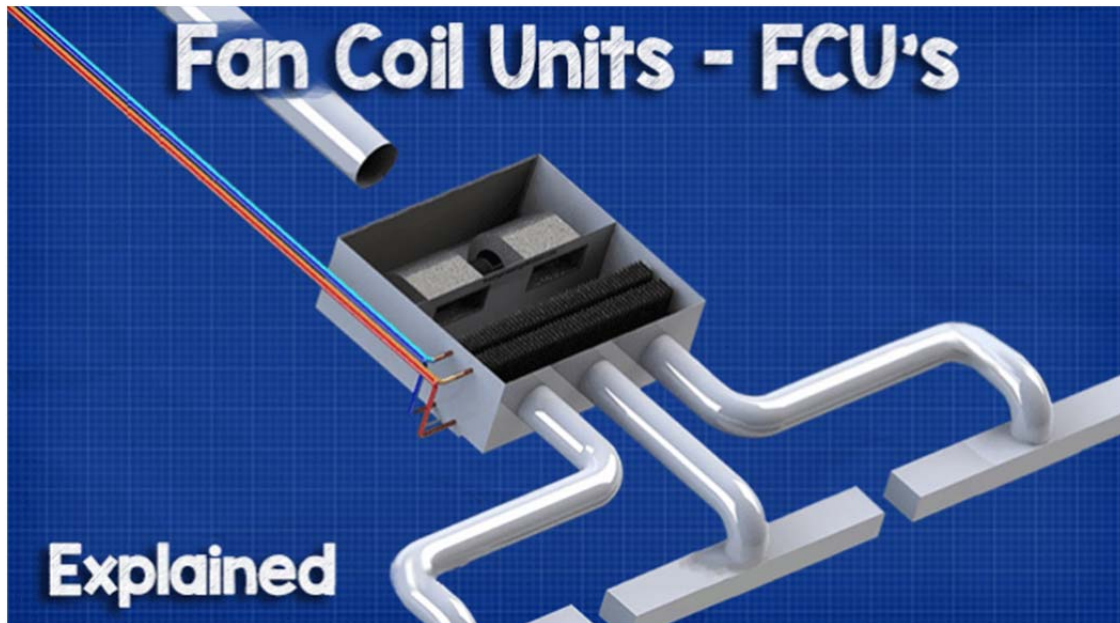


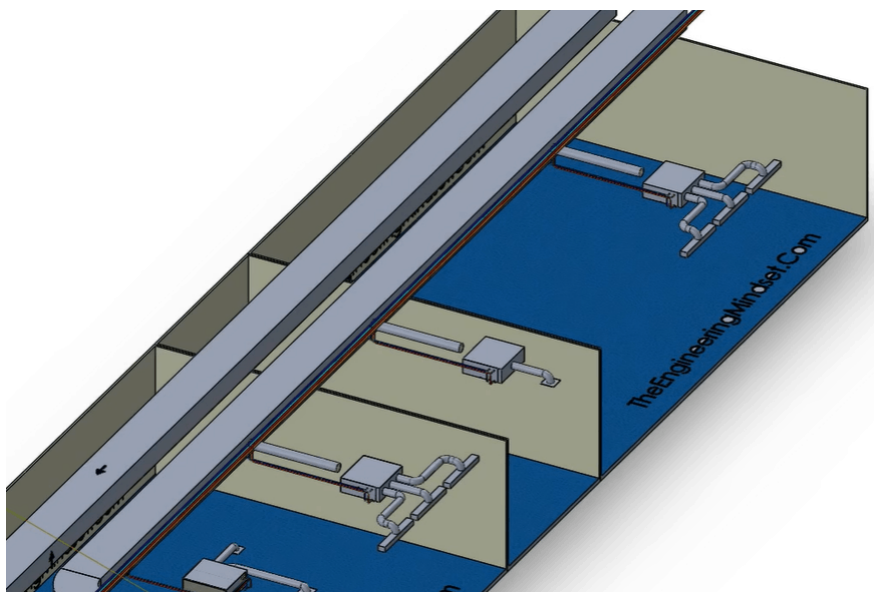
# Fan Coil Units – FCU



Top Ad

Fan Coil Units. In this article, we are going to be looking at FCU's. FCU stands for fan coil unit but often engineers will just call them a fan coil, to save time. Fan coil units are very common in all types of buildings, from offices, bars, canteens, even some homes and apartments will have a fan coil unit in them. Fan coil units are used to condition the local air to suit the temperature requirements of the immediate space.

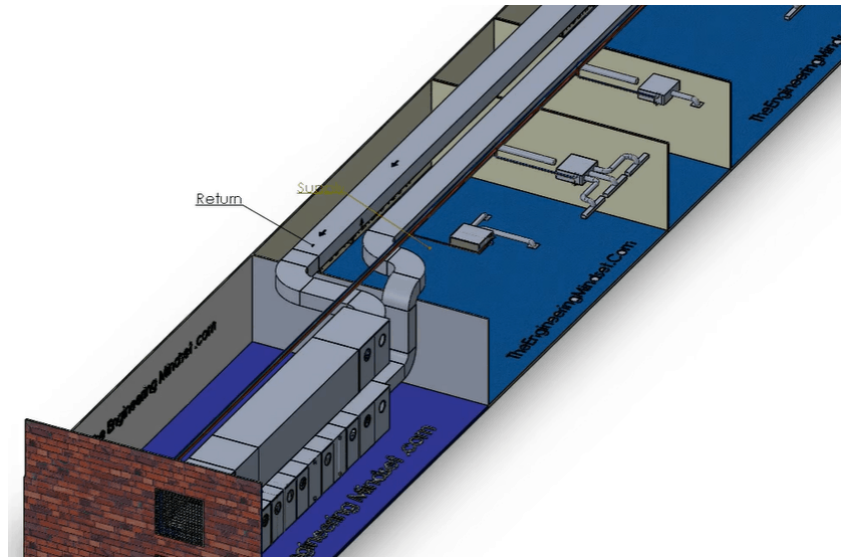
**Scroll to the bottom to watch the YouTube tutorial on Fan Coil Units**



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As illustrated in the above image. There are two main ducts (supply and return) which will go around the building to supply the various rooms. Coming off the supply duct is a round duct supplying the fan coil units. The fan coil units are connected to either a heating coil, a cooling coil or both heating and cooling coil. These will condition the air. A motorised fan inside the fan coil will then force the air out into some smaller, localised, ducts to strategically distribute the air within the room.



In this model you can see the main **AHU** which is supplying fresh air to the building via the main supply duct. These run out all over the building taking the shortest route for efficiency. Branches will come off of this and they will feed fresh air into each room. Each room will need a certain volume of fresh air supply per hour. This fresh air is directed into the back side, the inlet, of the fan coil unit but this branch isn't usually directly connected to the unit, there is a gap between the two. There is a reason for that, which we'll look at later.

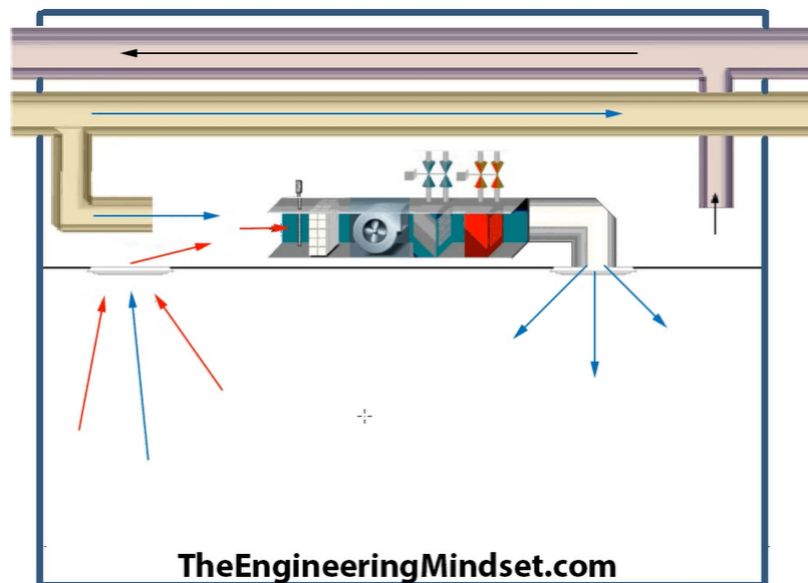
A motorised fan will suck the fresh air into the fan coil unit. The fan will force the air across the heating and/or cooling coils before forcing it out through the localised diffusers.

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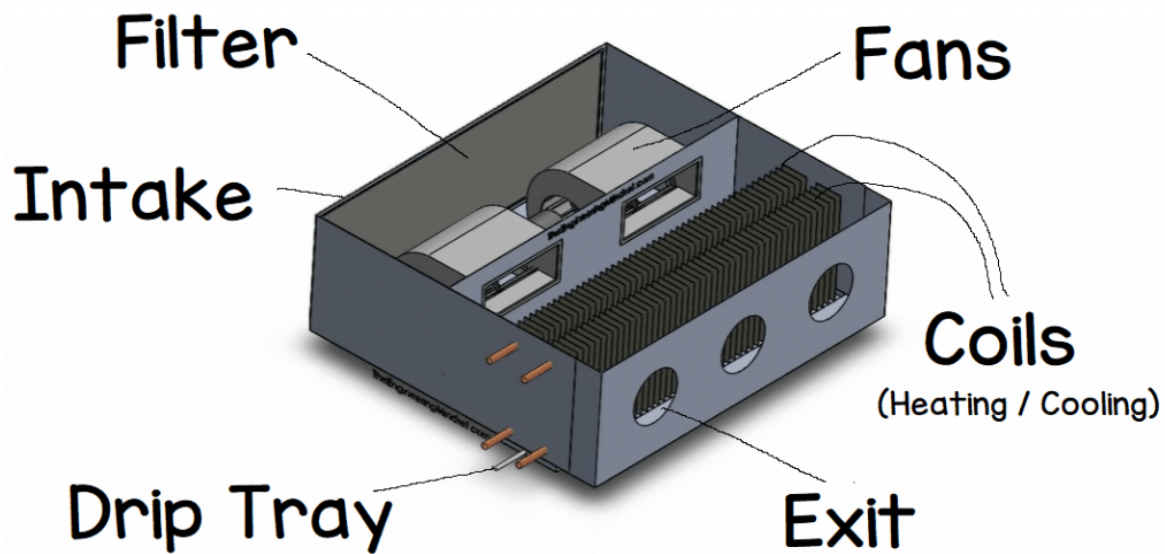
Once the air enters into the room it will provide the heating/cooling to the occupants or equipment inside. It will then take one of two routes. It will either be sucked into the return grille and be sucked back into the AHU via the return duct. Otherwise it will be pulled back into the fan coil unit via a grille in the false ceiling.



The Fan Coil Unit is located up in the ceiling. I've shown an example above of a false ceiling typical of an office. There are two types of vents in the ceiling, the diffusers which distribute the air into the room and the return grille which sucks the air back in.



The air will return via the return duct. It will be pulled into the ceiling void. Some of the freshly treated air can be wasted by being pulled directly back into the void even though it hasn't been of any use to the room. This can be mitigated with good design. Once in the void the return air will mix with the fresh air and be pulled into the fan coil unit. Otherwise the main return duct will suck this air in and take it back to the AHU.



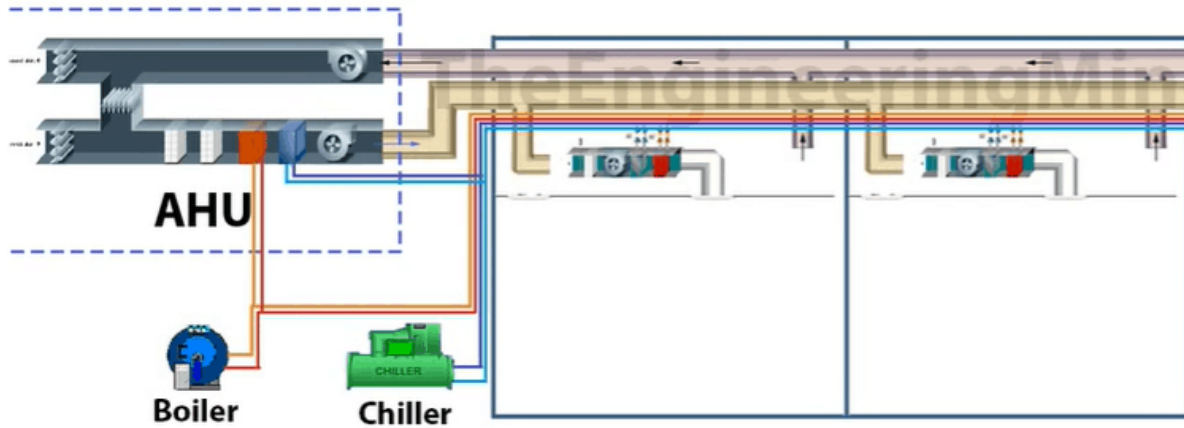
Fan Coil Units are a fairly simple design. You can see where it gets its name from because it basically just a fan and a coil **heat exchanger**.

The air enters via the back through a filter to clean the air from dust etc. The filters can just be pulled off to be cleaned or they can be replaced.

Once that air is pulled through the filters it enters into the fans. Typically a fan coil will have 1-3 fans inside depending on the size. Two fans are fairly common office FCU's. Driving these fans is a small electrical motor.

The fans are usually quite small, only ~80 watts.

The fans then force the air through the heating and/or cooling coils. They are just coil heat exchangers which simply heat the air up or cool it down, depending on the requirements for the local environment. Some units will be heating only, some will be cooling only and others will have both heating and cooling capabilities.



The coil heat exchangers will typically utilise a hot and/or chilled water supply which is distributed from the buildings boilers and chillers. However, electrical heaters can be used for heating purposes and some coils use a direct expansion coil fed by a refrigeration system for cooling.

If a cooling coil is used, it can generate a lot of condensation where the warm moist air is condensing onto the cold surface of the coil. The cooling coil will remove the moisture from the air. This condensed liquid will run off the coil and collect in the drip tray at the bottom. A drain line will also need to be connected to drain this water away.

After the air has passed across the coils, it enters into the discharge plenum and distributed into the small diameter ducts for localised distribution. These ducts are typically round.