

More on AC Distribution

Air Distribution in Central Systems

- AHU to condition air
- Air distribution system to transport air

Central system can have several methods of servicing areas that may have various HVAC needs. This (Zoning) depends on:

- Occupancy schedule
- Occupant density
- Exposure and internal heat gains
- Amount of required outdoor air
- Volume of supply air (SA) and T needed to each area or Zone

Typical Distribution Systems are:

- 1- Single Zone System- Constant Air Volume (CAV) with Reheat
- 2- Multizone System- (CAV)
- 3- Dual Duct System- (CAV)
- 4- Variable Air Volume System (VAV)

1- Single Zone System- Constant Air Volume (CAV) with Reheat

- Separate ducts from the AHU to each room or zone
- Each duct has its reheat coil (gives good T and Humidity control)
- Reheat coils are not that EE may be restricted by local E codes
- Air is supplied to the entire system at the T required for the zone with the highest cooling load

2- Multizone System- (CAV)

- AHU uses heating coil(hot deck) and cooling coil (cold deck) in parallel. Dampers are set up across the deck at the outlet.
- Separate ducts are run from each set of dampers to each zone
- Cold and hot air are mixed dampers according to zone requirements
- Provides good T control
- Humidity may not be satisfactorily controlled in system which brings in too high a proportion of OA
- Limited scale – each AHU max at 12 – 14 zones
- Best for small to med size apps where humidity is not required

3- Dual Duct System- (CAV)

- Separate hot and cold main ducts run from heating and cooling coils in the AHU
- Separate ducts feed a mixing box (each box represents a zone)
 - Inside mixing are dampers that respond to thermostats in zones
- system designed to move air through ducts to mixing box at high velocity . Noise

3- Dual Duct System- (CAV)

- system designed to move air through ducts to mixing box at high velocity . Noise attenuation section is built into box
 - Flexibility of system to meet needs of individual zones is good but;
 - installation is high – fan demand is high wastes E because overcooled air is reheated
- should have cold deck set at highest T and reverse for hot deck

4- Variable Air Volume System (VAV)

- varies air quantity rather than T to each zone to maintain the appropriate room T
- branch ducts are run to the separate VAV units (one for each zone)
- the VAV has dampers or valves to vary air volume to space
- single main duct is run from the AHU
- Typically more EE than CAV

4- Variable Air Volume System (VAV)

- thermostats in the zones control dampers to maintain desired air T
- Can have problems W/ spaces w/ higher latent loads such as auditoriums and conference rooms
- At low loads air volume is reduced as is level of OA- if proportion of OA is increased it is good to have reheat coil in VAV box
- VAV handles air volume reheat handles humidity

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