

VENTILATION SYSTEMS: UNDERSTANDING THE LANGUAGE AND SCIENCE

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THE THREE COMPONENTS OF VENTILATION

- **Quantity** - the amount of air supplied (or removed) from a specific room or space.
- **Quality** – the relative “cleanliness” of the air.
- **Flow** – the normal or planned direction of air movement from one space relative to another.

Note: There is more than one accepted standard used for design of healthcare spaces, it is important to know which criteria has been adopted at your organization.

QUANTITY

SPACES ARE DESIGNED TO HAVE THEIR AIR “REPLACED” AT RATES BASED ON RISK.

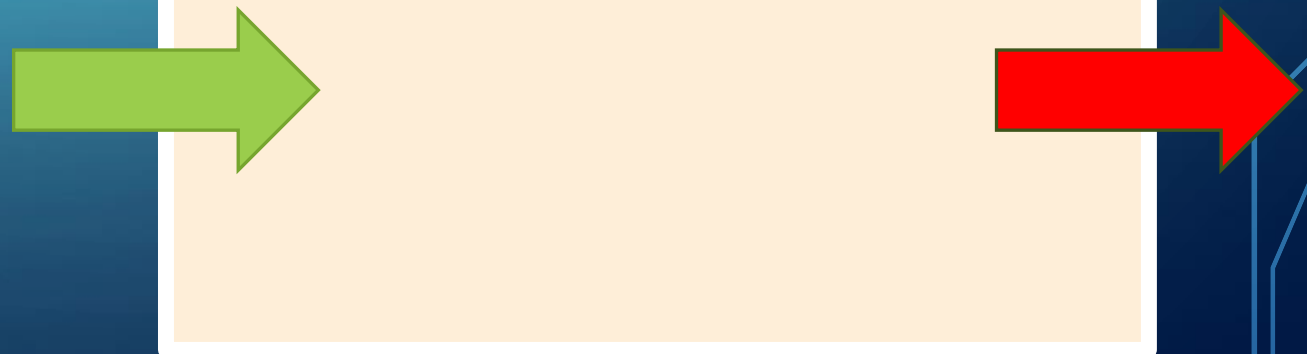
Quantity is often expressed in Air Changes per Hour (ACH)

- Higher Risk Areas (e.g. OR, Procedure Rooms) have higher exchange rates
- Quantity may vary as a result of climate control needs
- It is measured by comparing the volume of air supplied per minute as compared to the room volume.

QUANTITY

QUALITY

FLOW



QUALITY

QUALITY IS DETERMINED BY THE AIR SUPPLIED TO A GIVEN SPACE.

Quality includes the relative cleanliness, temperature, and humidity

- Cleanliness is controlled by the filters used. Filter specifications are based on risks.
- Temperature requirements are based on multiple factors, comfort, humidity control, and clinical specifications. In most cases, temperatures are controlled using water.
- Humidity is expressed as “relative” and indicates the amount of water vapor contained in the air supplied relative to the level that air is capable of containing. It changes based on temperature as air either expands or contracts in volume as temperature changes.

QUANTITY

QUALITY

FLOW



FLOW

FLOW, OR “PRESSURE”, IS DETERMINED BY THE AMOUNT OF AIR SUPPLIED VS REMOVED.

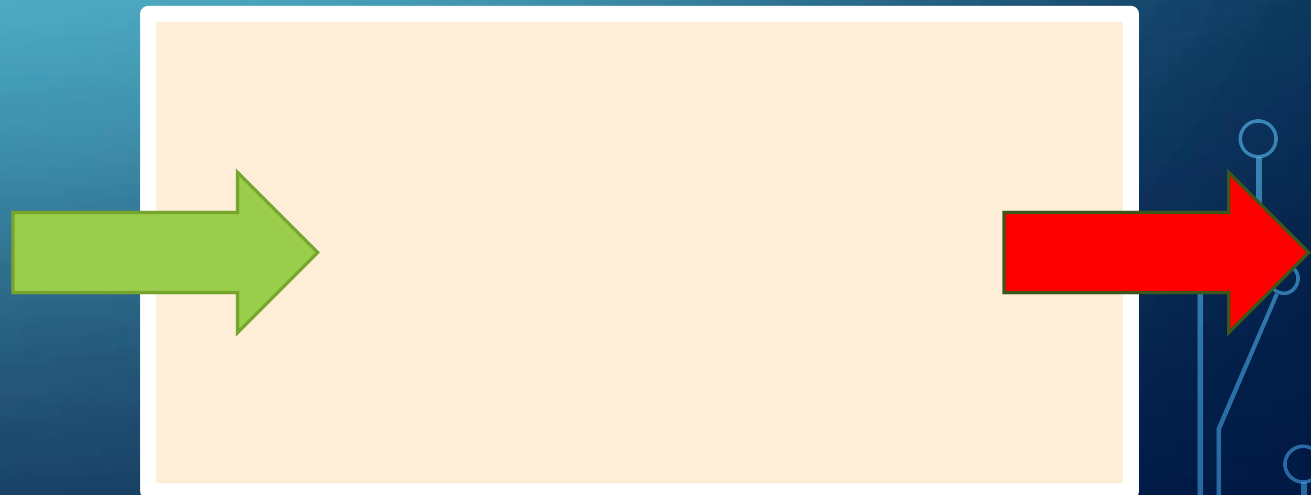
Differential pressure is determined by the planned use of space.

- Pressure is used to encourage pathogens to flow away from either patients or occupants, in rare case, both.
- Most critical spaces are “positively” pressurized with respect to surrounding areas. Key exceptions are A.I.I. rooms, decon spaces, and other dirty environments.

QUANTITY

QUALITY

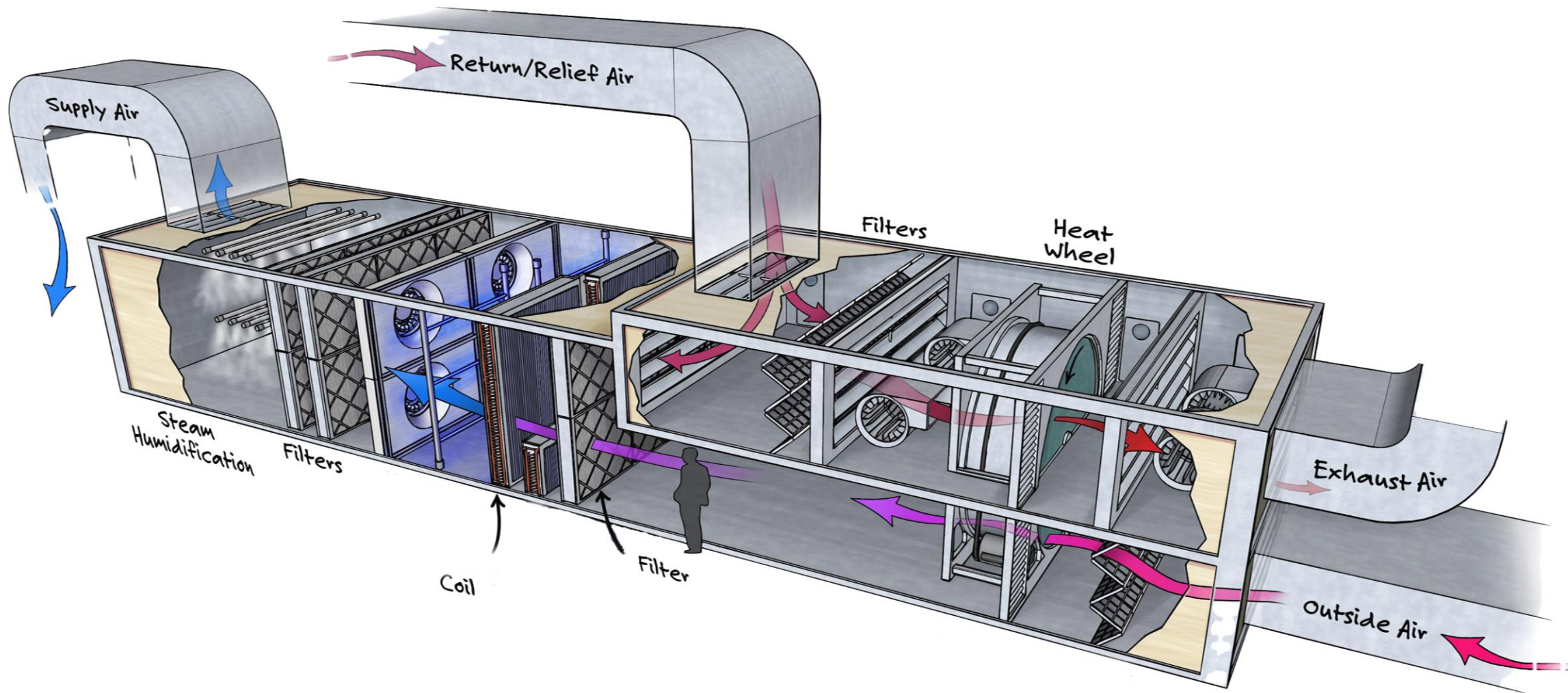
FLOW





The image shows a large, dark-colored industrial air handling unit (AHU) in a mechanical room. The unit is composed of several large panels with visible rivets and seams. To the right of the unit, there are white pipes and ductwork. The entire scene is overlaid with a teal color scheme. A black rectangular box with rounded corners is centered over the unit, containing white text. On the left and right sides of the image, there are stylized teal circuit board traces with circular nodes.

**MEET THE AIR HANDLING
UNIT! (A.K.A. AHU)**



The Parts



- The fan moves air through the unit and from space to space.
- Its size and speed largely determine “quantity”.



- Heating & Cooling coils transfer heat in order to condition the air to a desired temperature and/or relative humidity.



- There are typically two sets of filters (pre & final).
- Prefilters protect the unit, final filters protect the occupants.



- Heat Recovery
- Humidification
- UV Fixtures
- De-humidication

HEALTHCARE AHU'S, AIR THAT CARES

QUANTITY

QUALITY

FLOW



QUESTIONS?



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