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Room Ventilation Schedule Reassessment

All ECM content was independently developed and reviewed to be vendor, product and service provider-neutral.

Description

Save energy, money and increase occupant comfort with a room ventilation reassessment (RVR) of your facility. Thoroughly reevaluating ventilation and minimum airflow requirements space by space can yield savings in air handling unit (AHU) fan, cooling and heating energy, while ensuring adherence to code and standard requirements.

Project Talking Points

- A room ventilation schedule (RVS), usually generated during the design phase of a project, specifies the amount of supply and outdoor air provided, as well as the amount of return and exhaust air extracted from each space. Ventilation and airflow should be determined as a function of the room type, area, ceiling height and relevant American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standard, among other factors.
- Space types in a facility change over time, and ventilation and airflow rates may no longer be relevant or compliant with the most recently adopted code. RVR addresses this issue by resetting rates to be compliant with current codes and generates a new RVS as an output.
- Zone terminal unit (TU) flows are reevaluated based on the new RVS data, providing an opportunity to identify under or over-performing areas. This generally results in reduced airflows at the AHU serving the TUs.
- Often, building ventilation and airflow rates have been set to a flat percentage of design airflow rather than taking into consideration the needs of the specific space. This is especially common in non-critical spaces, such as administrative offices, waiting lobbies and staff lounges. This leads to the overuse of energy and patient comfort issues.
- Know how your system operates. The requirements for a system with a constant volume (CV)TU are different from a variable air volume (VAV)TU.

Benefits

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- **Cost Benefits:** Reducing fan, heating and cooling energy reduces overall energy costs.

- **Environmental Benefits:** Reducing energy consumption also has associated emissions reductions and positive environmental impacts.

- **Societal Benefits:** Occupant comfort is increased through RVS efforts, and the money saved can be redirected into enhanced patient care.

Purchasing Considerations

- If your air handler does not have variable frequency drives (VFDs), consider installing them prior to implementation of an RVS. Full savings potential of this process will not be realized without drives.
- Consider the ease of access to your dampers. For example, if you have a CVTU, flow adjustments will likely occur at the damper, and ease of access is important to keep costs low.

How-To

1. Establish a group of key stakeholders, including facility managers, mechanical engineers, facility staff, floor supervisors, building automation system (BAS) vendor and any external consultants.

2. Collect drawings for the facility, and ensure, at a minimum, the following are included:
    - Any planned renovation, addition or retrofit drawings
    - Any renovation, addition or retrofit drawings that have already occurred
    - Architectural drawings, including reflected ceiling plans
    - As-builts
    - Life safety drawings
    - Mechanical drawings for all parts of the facility
    - BAS setpoints and trend data for TUs (when available)

3. Extract relevant data from these plans and associate each space with an AHU. The spreadsheet should also capture the following:
    - Room number (unique identifier)
    - Room name (for easy classification)

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- TU associated with the space (note, this could be a VAV box, a CV box, a reheat coil, etc.)
- Space supply, return and exhaust airflow (either from the existing heating, ventilation and air conditioning [HVAC] drawings or, preferably, from BAS data)
- Square footage
- Ceiling height
- Space occupancy, if readily available
- Number of diffusers, if clear

4. Once this data is amassed, classify by appropriate space type. For health care specific spaces, use American National Standards Institute (ANSI)/ASHRAE/American Society for Health Care Engineering (ASHE) 170 – Ventilation of Healthcare Facilities. For non-health care specific spaces, such as offices or staff break rooms, use ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality. Always use the most recent version available.

5. After rooms are classified, use relevant ASHRAE ventilation tables to determine appropriate ventilation and airflow levels versus actual. This allows for a calculation of potential energy savings.

6. Using this information and the calculation methodology in ASHRAE 62.1, develop a new code-compliant list of airflow and ventilation levels.

7. Give this list to the facilities staff to implement. Coordinate with floor managers as necessary for manual adjustments and inspections and with the BAS vendor for VAVTU setpoint changes.

8. Be mindful of the pressure relationships in spaces, as well as the overall pressure of the facility. For example, isolation rooms should have a negative pressurization, while protective environment rooms are expected to be positively pressurized.

9. Test the performance of the system post-implementation, and measure and verify your energy use after implementation.
    - Don't forget to see if a project such as RVS adjustment qualifies for a rebate in your area. Before project implementation, seek pre-approval from your local rebate program, if available.

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Resources

- ASHRAE: Designing and Operating High-Performing Healthcare HVAC Systems (three-house course)
- ASHRAE: Healthcare Facilities: Best Practices for HVAC Design and Operation (six-hour course)
- ASHRAE: HVAC Design Manual for Hospitals and Clinics, 2nd Edition
- LEED v4. For BD + C: Healthcare
  - Energy and atmosphere
    - Fundamental commissioning and verification: Prerequisite
    - Minimum energy performance: Prerequisite
    - Enhanced commissioning: Credit
    - Optimize energy performance: Credit
  - Indoor environmental quality
    - Minimum indoor air quality performance: Prerequisite
    - Thermal comfort: Credit

Regulations, Codes and Standards, Policies

- ANSI/ASHRAE Standard 62.1 – Ventilation for Acceptable Indoor Air Quality
- ANSI/ASHRAE/ASHE Standard 170 – Ventilation of Healthcare Facilities