HVAC fundamentals

Acoustic design process

Many stages of the testing process affect the acoustic performance of the building, from design right through to proactive maintenance. Each stage has a responsibility to ensure that the acoustic performance meets the desired expectations by applying the most effective noise solution.

Co-ordinate mechanical equipment selection

- Balance must be struck between loudness of the sound source and distance located from the space.
- Required coordination between mechanical engineering (system selection) and the architect (space planning).

Reduce source sound levels to the extent possible

- Try and reduce sound levels as much as possible.
- Avoid low frequency producing equipment, like forward curve fans, as low frequencies are difficult and costly to attenuate.
- Design constant volume fans to operate at peak efficiency and use viable frequency/ EC fans to control fan speed for variable volume units, replacing the need for inlet guide vanes/throttling dampers.

Install duct-borne noise control devices as required

- It can be difficult to meet noise level requirements using standard inline sheet ducts.
- Some combination of sound attenuation, sound plenums and acoustic flex duct will required to achieve conformance with the standard specified.

Follow guidelines related to air velocities, air flow and air balancing

- Larger duct that allows slower air velocities and a duct system designed for smooth airflow to help reduce self-generating noise through air turbulence.
- Install flex without kinks and hard bends.
- Avoid opposed blade dampers on terminal devices.
- Select air terminal devices (grilles, diffusers) with NR rating of 18 or less

Avoid common duct routing pitfalls

- Don't use unducted/plenum returns/exhausts.
- Route noise ducts away from sound sensitive spaces.
- Route common duct away from adjacent sound sensitive space – avoid cross talk phenomenon.

Correct HVAC equipment

- Correctly specify, install and commission HVAC equipment.

Monitor the engineering process

- Avoid value engineering noise critical parts.
- Monitor the construction and installation process with regular reviewers.
- Ensure site specific reviews are carried out.

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