

ACOUSTICS GUIDELINES AND CHECKLISTS TO HELP CREATE QUIETER AIR-HANDLING SYSTEMS!

AHU GUIDELINES

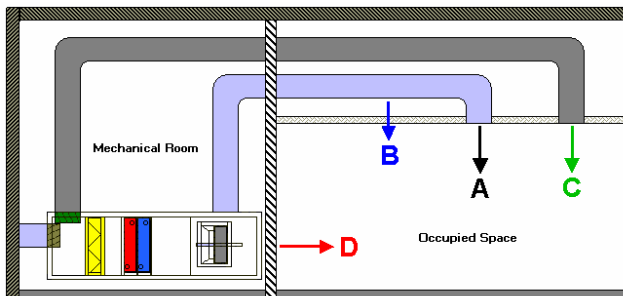
- DO** determine your critical sound path or paths. This will help you to select the quietest AHU fan and configuration for the application.

A = Sound that comes from the discharge duct.

B = Sound that comes off the duct.

C = Sound that comes from the return ducts.

D = Sound that radiates through the wall.



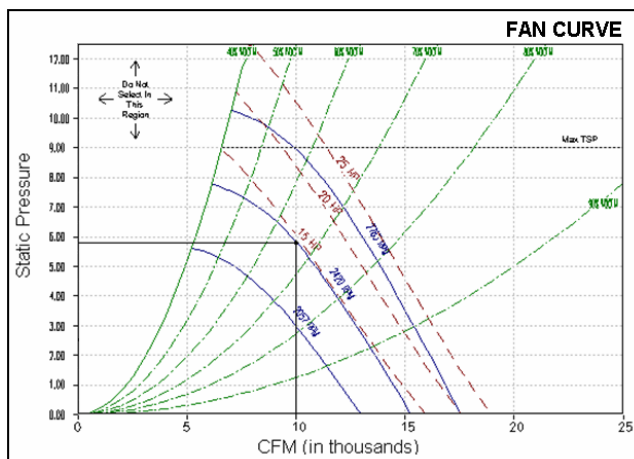
A = Discharge

C = Return

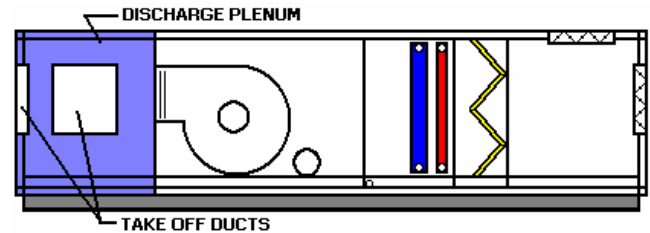
B = Duct Breakout

D = Radiated

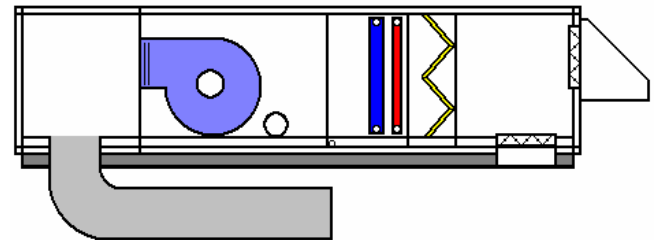
- DO** select the fan to operate on the right side of the curve, safely away from the stall region.



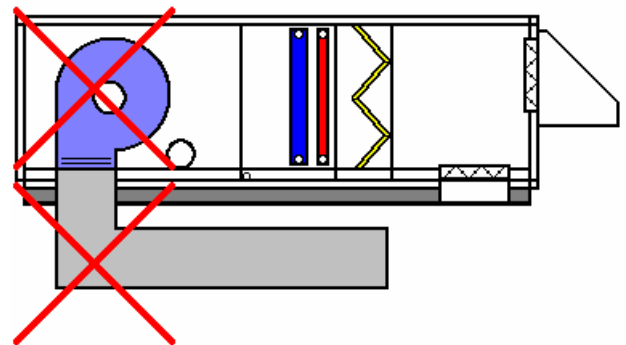
DO use discharge plenums to help with low frequency turbulence and provides lower cost, and lower pressure drop than sound attenuators.



- DO** use perforated lining if discharge plenum outlet is not directly in line with fan outlet.
- Note:** Take offs from the discharge plenum should be in two directions if possible to lower outlet velocity.
- DO** use a discharge plenum on roof mounted air-handlers to help eliminate potential for breakout noise.



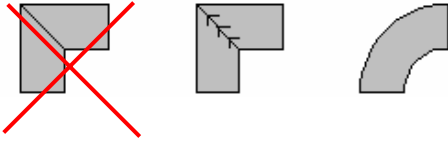
- DO** use heavy gage radius elbows. Elbows should be below the roof as far from the plenum outlet as possible.



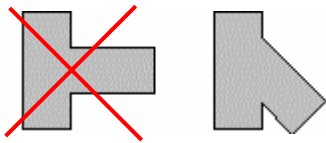
- DON'T** use a down discharge on roof-mounted air-handlers when an elbow or tee is below the unit as this will cause breakout noise.
- DON'T** use square elbows on roof-mounted applications.

DUCT GUIDELINES

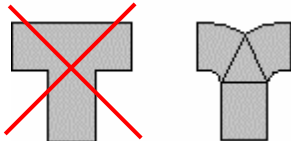
Maintain a minimum distance of 1.5 duct diameters before entering an elbow, tee or a takeoff.



- **DO** use **long radius** elbows whenever possible, especially when elbows are applied directly to fan outlet.
- **DO** maintain heavy gage on elbows to resist oil canning.



- **DO** use **gradual** transitions on take-offs whenever possible and avoid abrupt changes in airflow patterns.
- **DO** maintain heavy gage on take-offs to resist oil canning.



- **DO** use **radius** tees whenever possible and avoid abrupt changes in airflow patterns.
- **DO** maintain heavy gage on tees to resist oil canning.

ACOUSTIC PRE-INSTALLATION CHECKS

Consider the following before finalizing the design and installing the air handling unit:

- ☐ Review the details on the plans, specifically the design and gage thickness of the discharge and return ducts.
- ☐ Determine which path is critical and configure the air-handler for the application.

☐ Select the most efficient fan. This will *usually* be the quietest.

☐ Pick the right fan for the application. Housted, plenum and vane-axial = low to medium static pressure, airfoil = medium to high static pressure.

☐ Select the fan to operate on the right side of the curve, safely away from the stall region.

☐ Try not to exceed 2,500 fpm on fan outlet velocity.

☐ Make sure comparison of fans is "apples-to-apples." Check fan type, diameter, number of blades, outlet size, RPM, HP, and FPM.

☐ Use variable speed drives in lieu of inlet guide vanes.

☐ Use flexible conduit at the motor and a flexible duct connector at the fan/unit housing interface to mitigate vibration and noise transmission to the structure.

☐ Use fixed sheaves.

☐ Locate the equipment room adjacent to non-critical spaces.

☐ Use heavier gage on ductwork and fittings right off the fan outlet. The heavier the duct gage, the lower the breakout noise.

☐ Inlet and discharge transitions should be gradual.

☐ Duct fittings should be designed for low-pressure drop.

☐ Keep all transitions gradual and avoid abrupt airflow patterns.

☐ Maintain 1.5 to 3 duct diameters from fan discharge to sound attenuator, elbow or transition.

ACOUSTIC POST-INSTALLATION CHECKS

Consider the following when installation is complete:

☐ Do the air-handling equipment and ductwork meet plans and specifications?

☐ Has the airside test & balance been completed by a licensed balancing contractor and meet design criteria?

☐ Is the ductwork sealed correctly at all joints?

☐ Is the ductwork or piping touching wall or ceiling?

☐ Is the drive belt riding properly in sheave, and are the sheaves aligned? Have fixed sheaves been used?

☐ Have all shipping bolts have been removed and does the fan assembly float freely?

