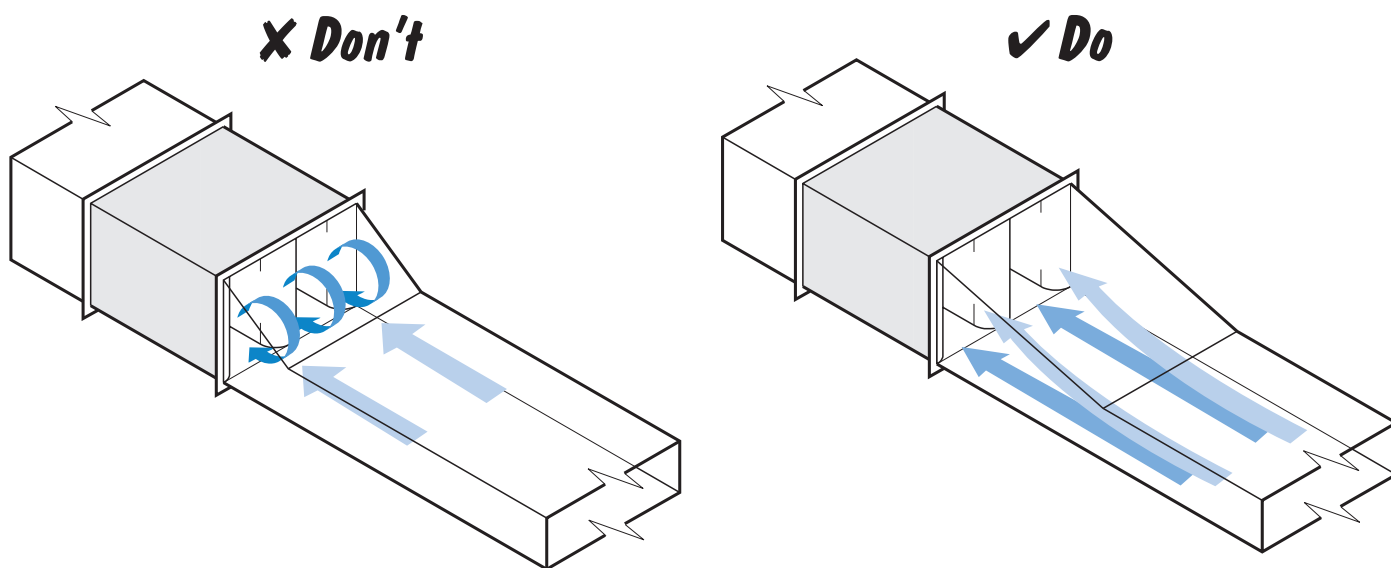


4.0 NOISE CONTROL

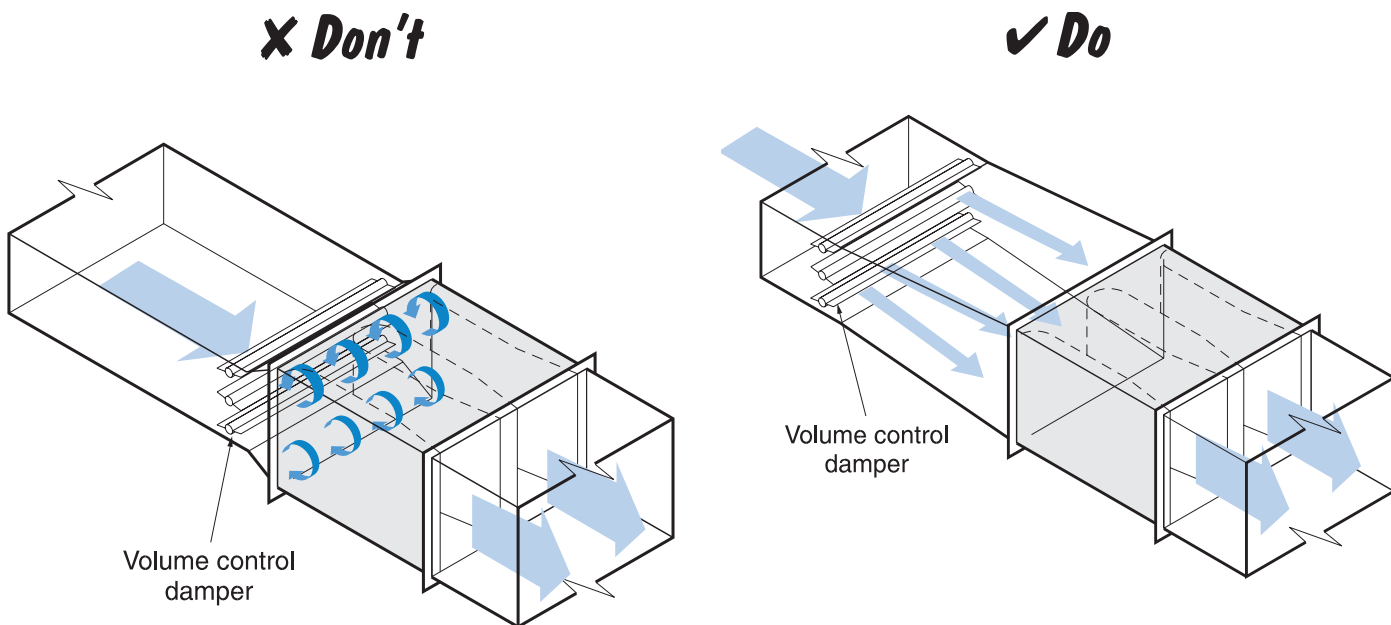
Figure 4.1. - Transitions



Abrupt transitions immediately adjacent to an attenuator will cause the attenuator pressure drop to increase.

Ensure transitions close to attenuators are gradual or, better still, remote.

Figure 4.2. - Volume control dampers



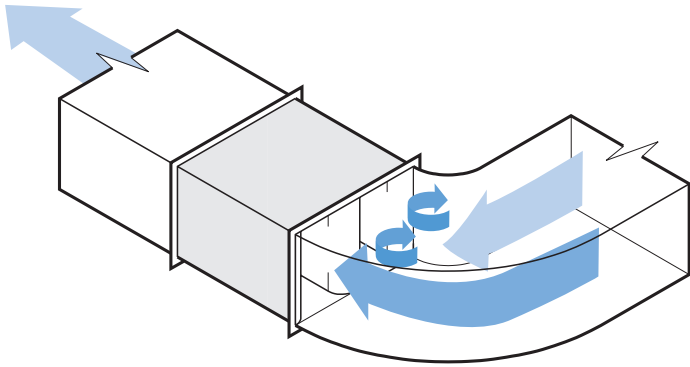
Don't site volume control dampers or fittings too close to attenuators as they can cause a dramatic increase in attenuator pressure drop.

Allow for a settling duct between volume control dampers and attenuators.

4.0 NOISE CONTROL (Cont.)

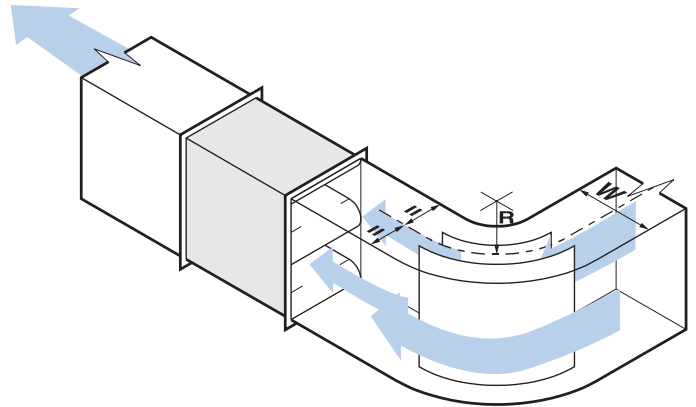
Figure 4.3. - Attenuators in relation to bends

X Don't



Don't use attenuator splitters as shown when sited close to a bend as the pressure loss across it will be greater than expected.

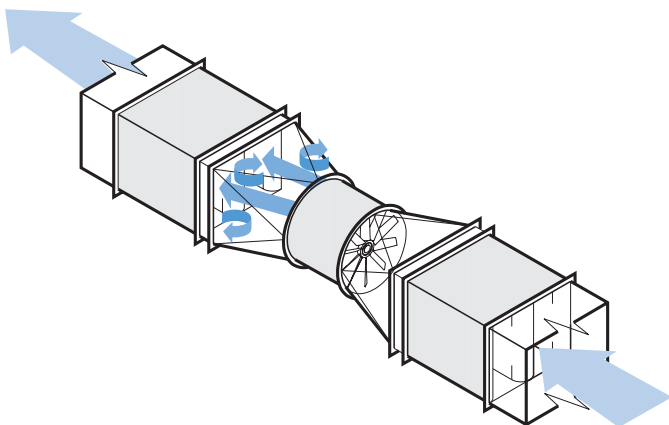
✓ Do



Do ensure attenuator splitters are in the plane of the bend as shown. Fit turning vanes only if $R/W < 1.0$

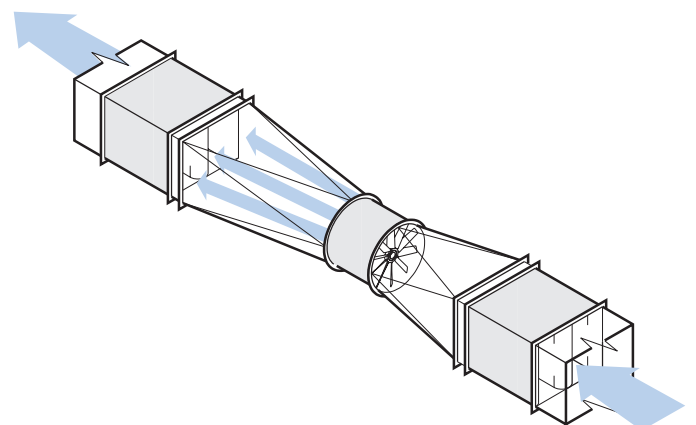
Figure 4.4. - Attenuator position relative to axial fans

X Don't



Don't site a rectangular attenuator close to an axial fan intake or discharge. Air is accelerated through an attenuator and fan discharge air is uneven and swirling.

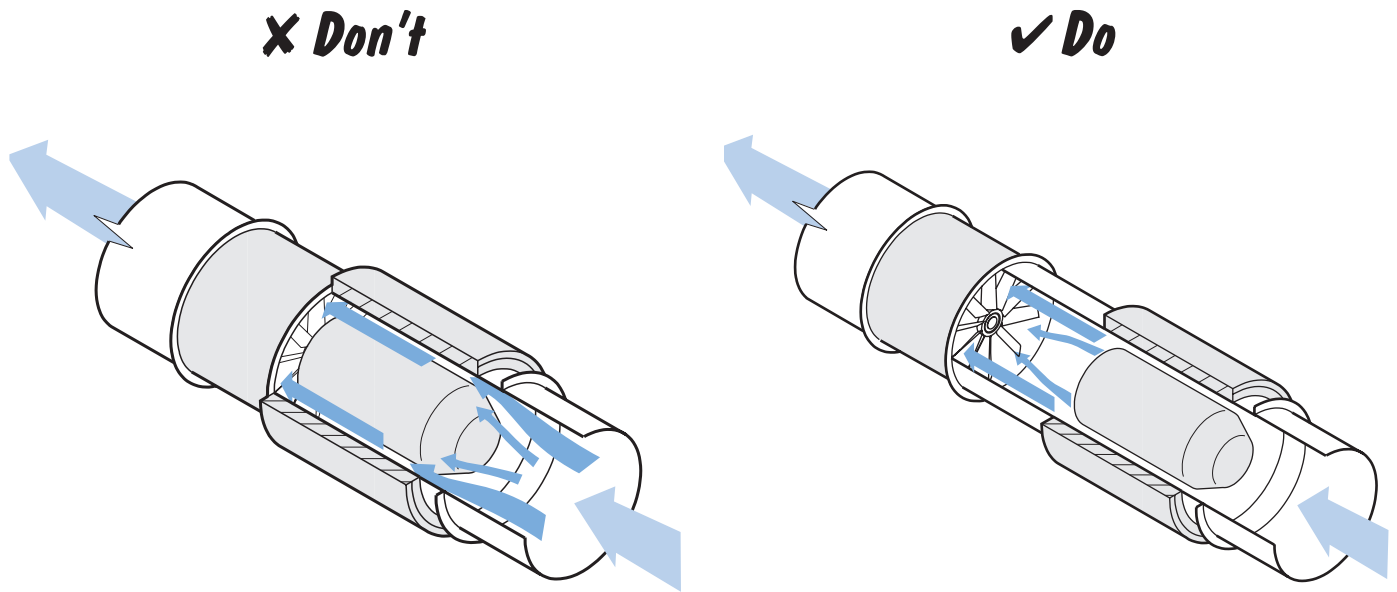
✓ Do



Allow adequate distance between attenuators and fan.

4.0 NOISE CONTROL (Cont.)

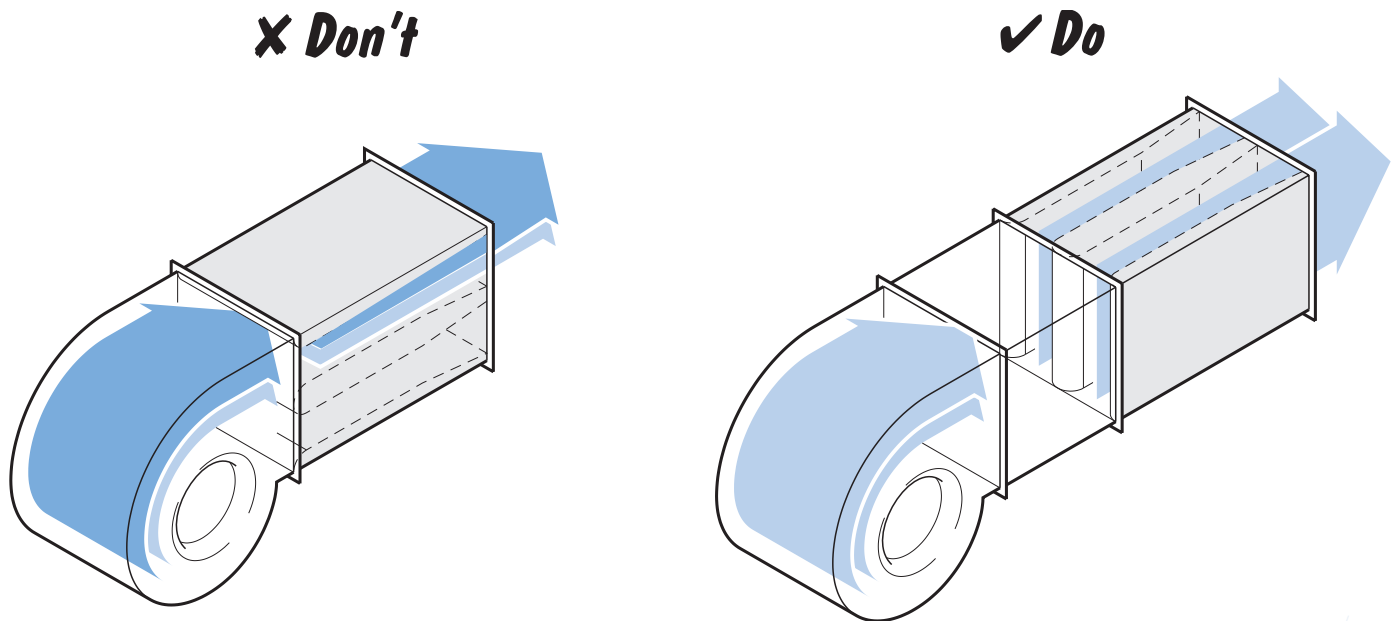
Figure 4.5. - Attenuator position relative to axial fan



Don't site pod attenuators immediately upstream of the fan as the attenuator pod will block the air flow to fan impeller. However, if the pod is the same size or smaller than the impeller hub bolting directly to the fan is acceptable.

Allow one diameter of straight duct between pod attenuator and the fan inlet to ensure impeller obtains an even flow of air.

Figure 4.6. - Silencer position relative to centrifugal fans

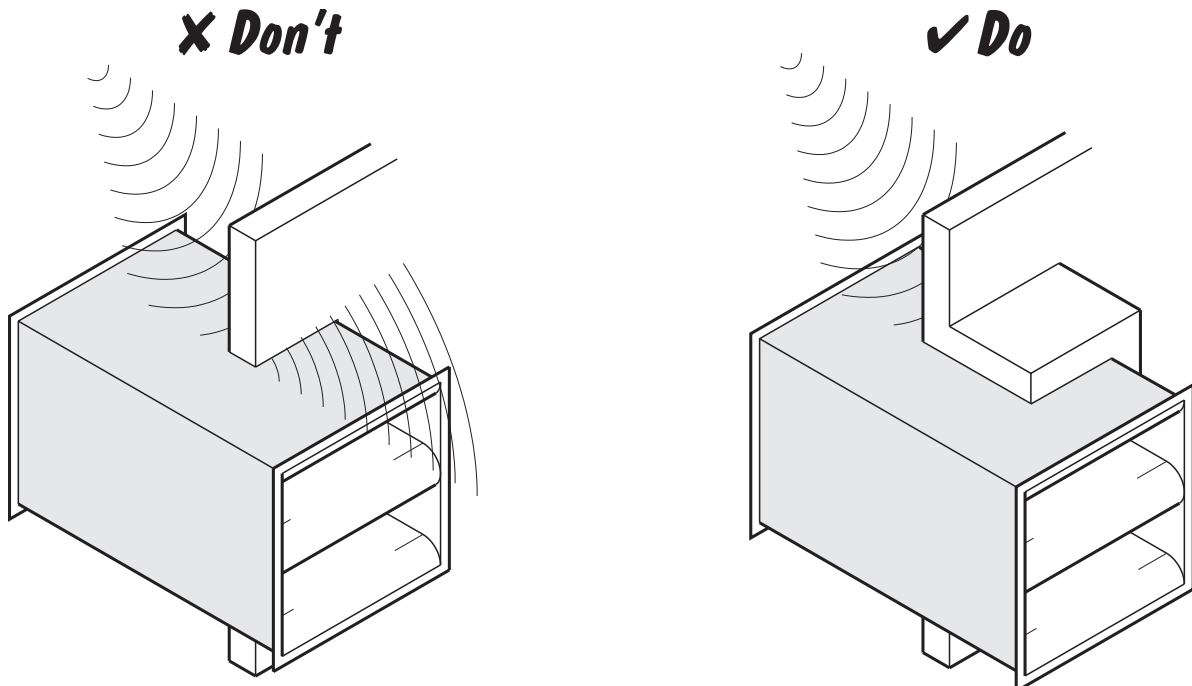


Don't place a rectangular silencer hard against the discharge of a centrifugal fan. Note the splitter orientation.

Do place a spacer between the fan and the silencer, and rotate the splitter orientation by 90°.

4.0 NOISE CONTROL (Cont.)

Figure 4.7. - Acoustic sealing of silencers to achieve very low noise levels

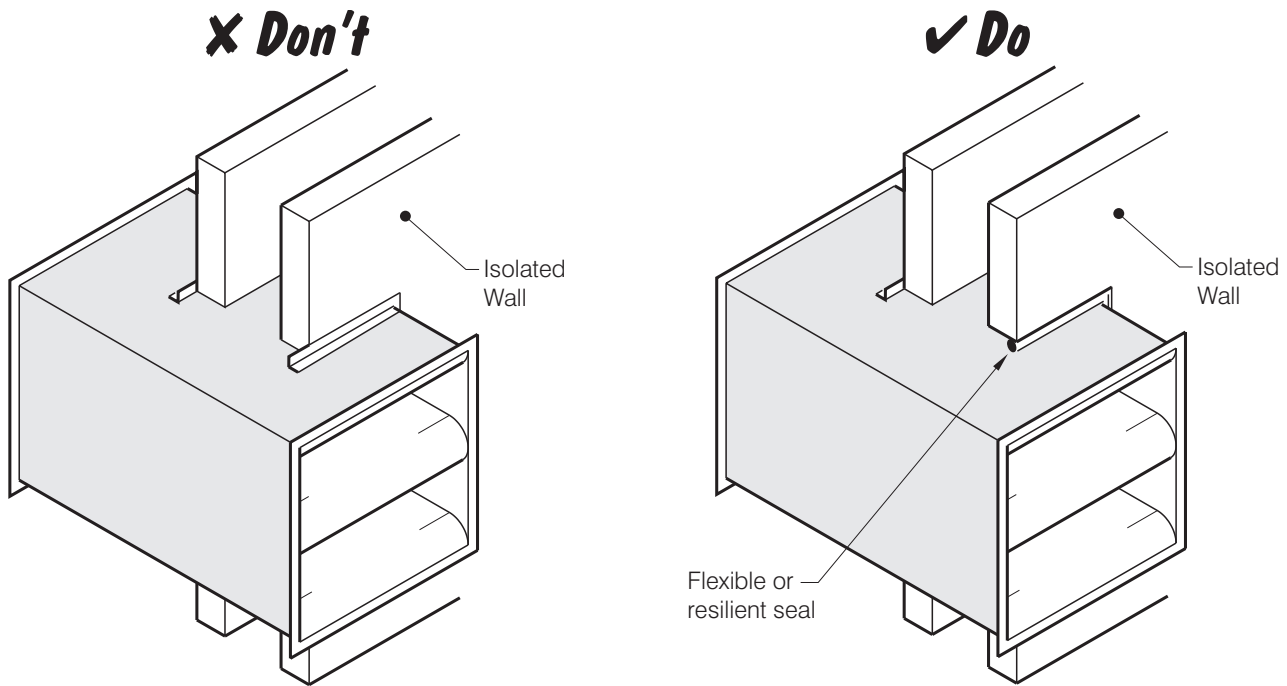


Don't: When trying to achieve very high attenuation or very low noise levels (eg. NR20) do not use an inadequate seal between the silencer and wall opening.

Do: Place a concrete sleeve around the silencer to increase the acoustic seal between rooms.

For less stringent requirements, pack around the silencer with a resilient material to affect a complete seal between the attenuator and the opening.

Figure 4.8. - Isolated walls

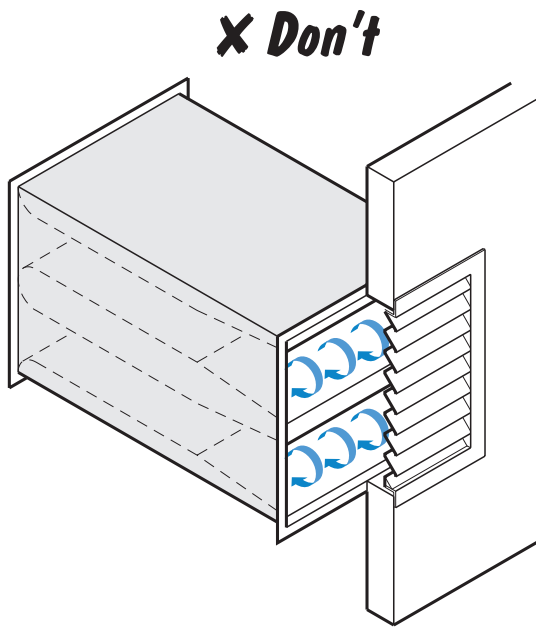


Don't bridge the isolated wall to the non-isolated wall with the silencer fixings.

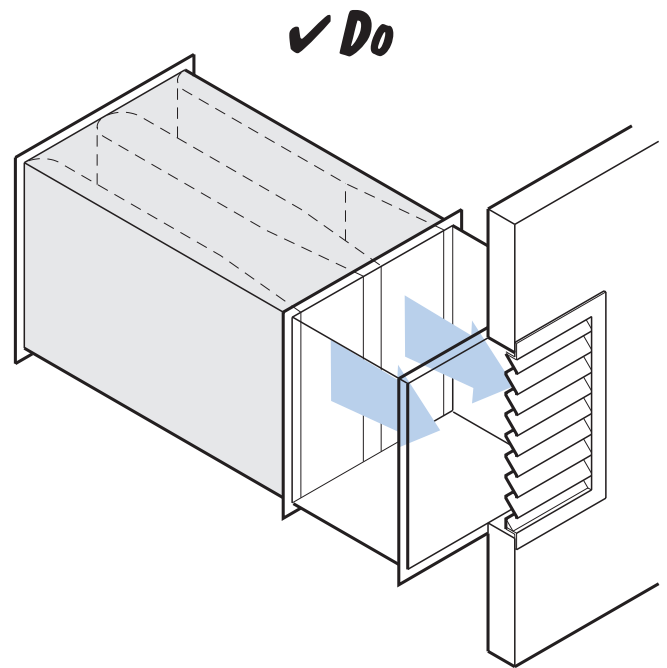
Do fix the silencer to one wall only, and place a flexible or resilient seal on the isolated wall.

4.0 NOISE CONTROL (Cont.)

Figure 4.9. - Louvres on Silencer Discharge

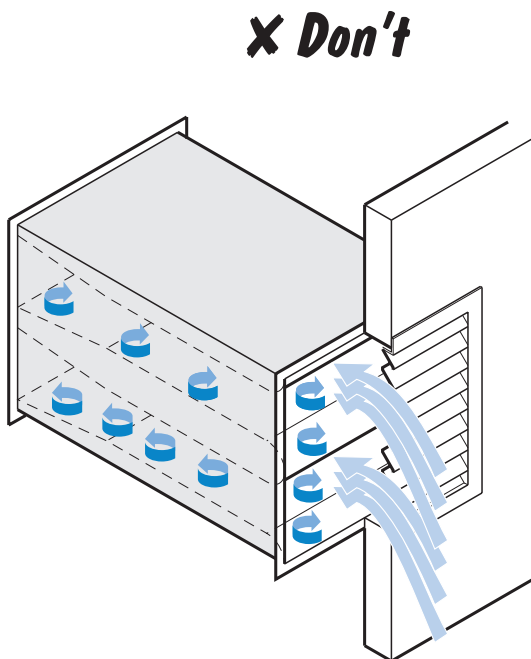


Don't place a silencer immediately in front of a louvre.

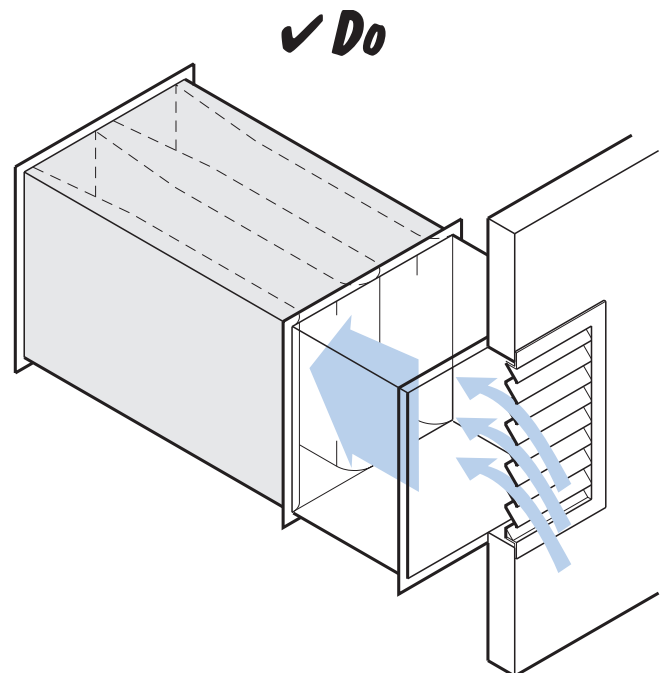


Do ensure that the splitter orientation is at 90° to the louvre orientation and place a spacer between the silencer and discharge louvre.

Figure 4.10. - Louvres on Silencer Inlet



Don't place a silencer immediately downstream of a louvre.



Do place a spacer between the louvre and the silencer and ensure that the splitter orientation is at 90° to the louvre orientation.

4.0 NOISE CONTROL (Cont.)

Figure 4.11. - Fan position relative to noise sensitive areas

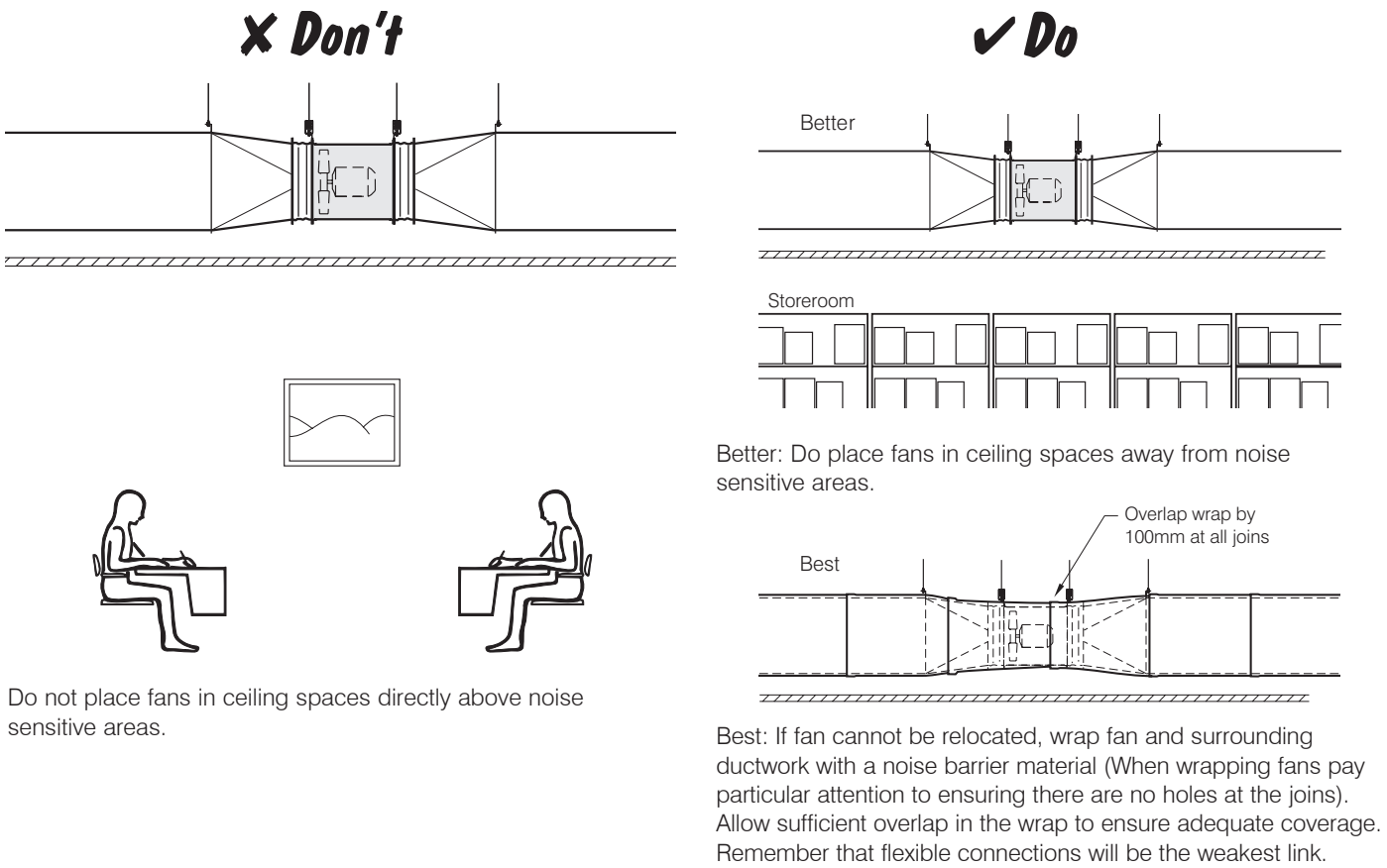
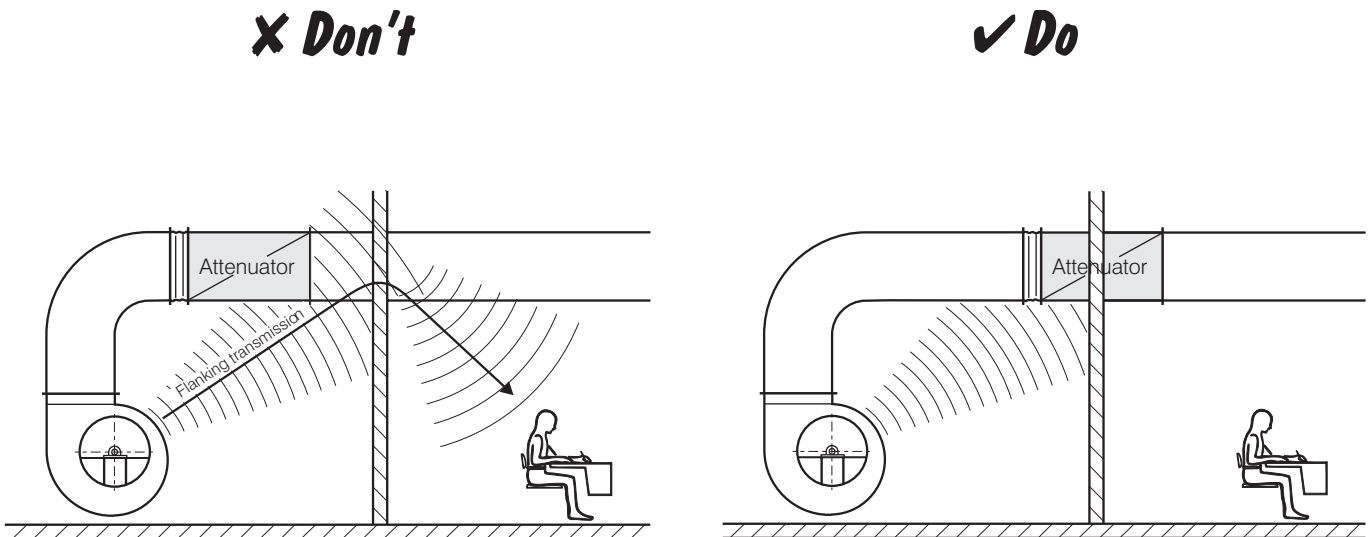


Figure 4.12. - Flanking transmission



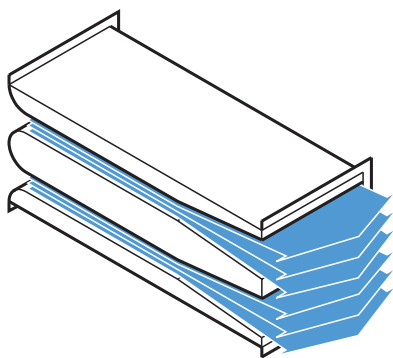
If an attenuator is installed as shown, noise from the fan can bypass the attenuator and enter the conditioned space. This is known as flanking transmission and will negatively impact on the expected attenuator performance.

Installing the attenuator through or against the wall minimises the chance of flanking transmission via the duct system ensuring the expected performance is achieved.

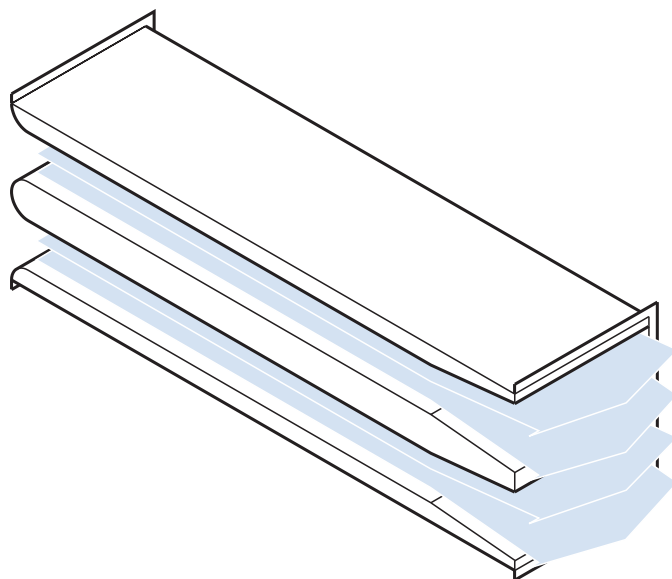
4.0 NOISE CONTROL (Cont.)

Figure 4.13. - Airflow generated noise from silencers

X Don't



✓ Do



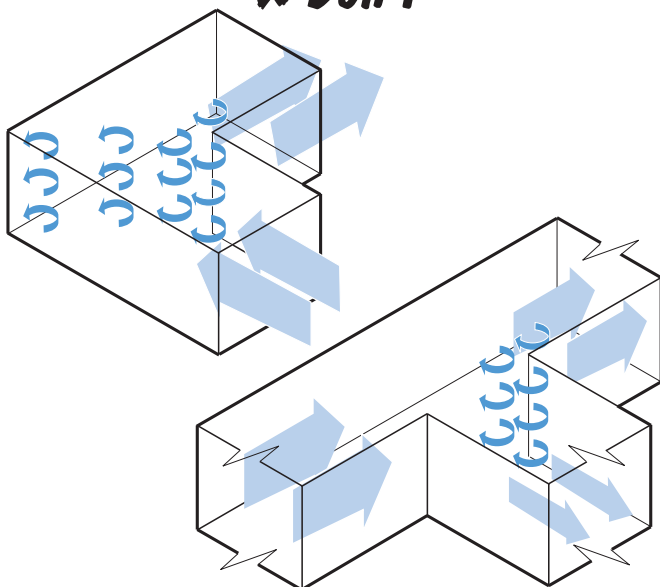
Don't select a silencer with high attenuation and low percentage open area without checking the airflow generated noise level.

Do check silencer airflow generated noise levels when these conditions occur. If airflow generated noise is too high, try using a longer silencer with a larger open area to get the same attenuation at a lesser airflow generated noise, or acoustically treat the duct after the silencer.

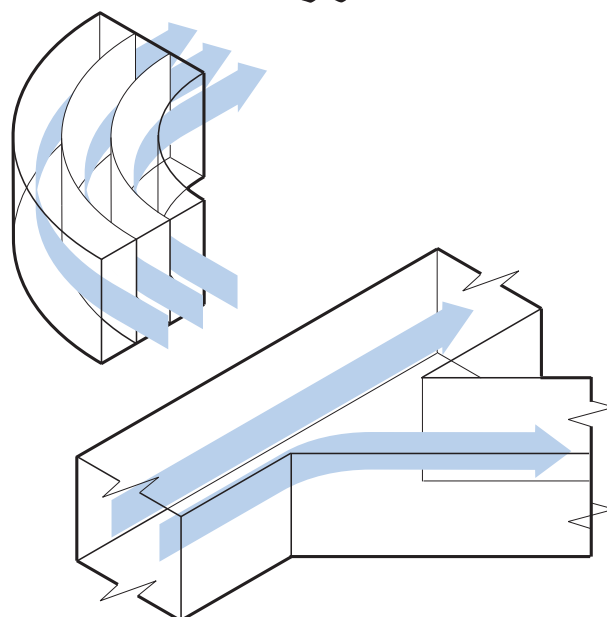
As a general rule of thumb, a pressure drop of 30 Pa should limit the airflow generated noise of a silencer to an acceptable amount in normal office areas.

Figure 4.14. - Changing direction of airflow

X Don't



✓ Do



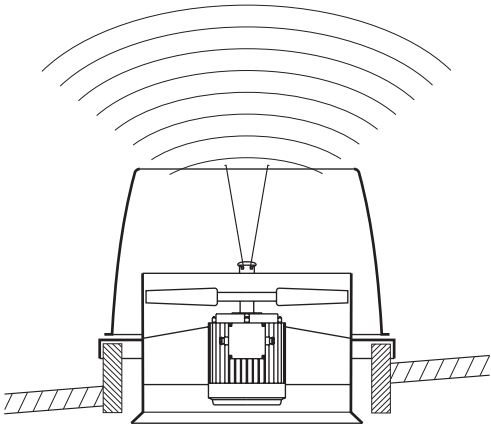
Don't use sharp bends or takeoffs.

Do use sweeping bends and takeoffs. Use long chord turning vanes where possible. Keep velocities low to reduce airflow generated noise levels.

4.0 NOISE CONTROL (Cont.)

Figure 4.15. - Reduction of external noise generated from roof units

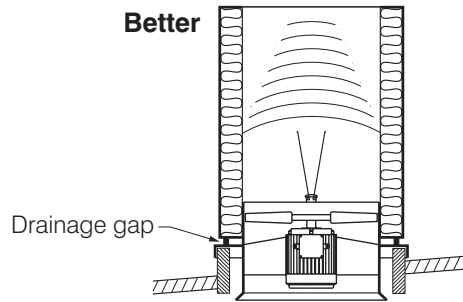
X Don't



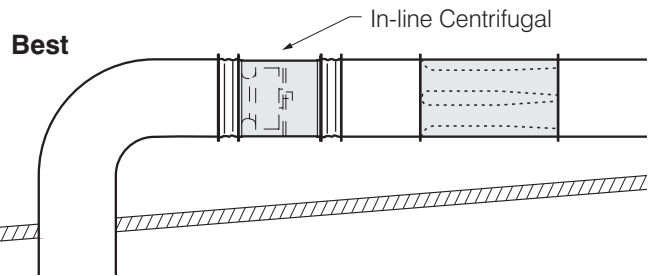
When generated noise could be a problem, and a quieter fan cannot be selected.

Caution: No acoustic treatment.

✓ Do



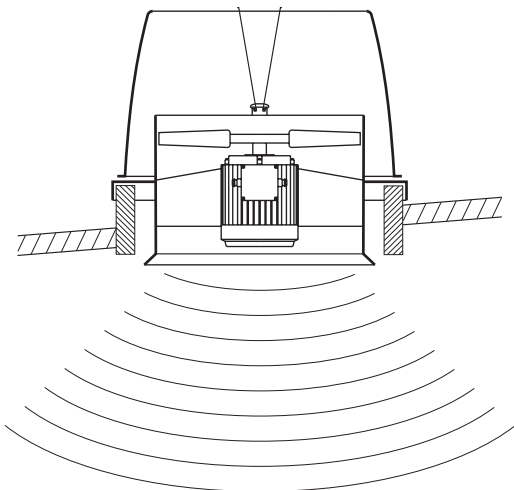
Better: Replace windband of fan with silencer.



Best: Change to an inline fan running parallel to the roof, and place a rectangular silencer on the outdoor side. Direct the duct opening away from noise sensitive areas.

Figure 4.16. - Reduction of Internal Noise from non-ducted roof units

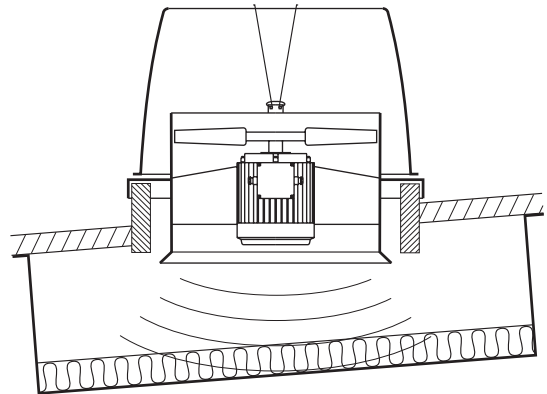
X Don't



When the fan could exceed the internal background noise, and a quieter fan is not available for selection.

Caution: No Acoustic treatment.

✓ Do

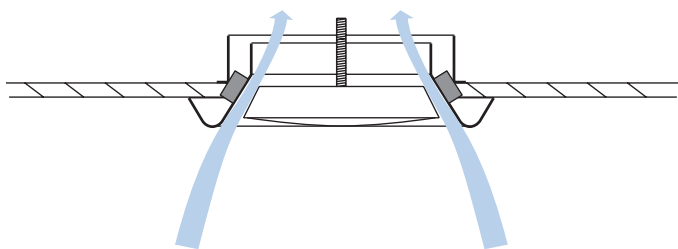


Place an acoustic baffle below the fan inlet / discharge.

4.0 NOISE CONTROL (Cont.)

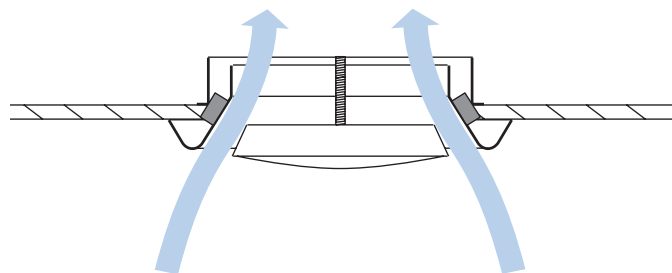
Figure 4.17. - When noise generated by grilles can cause a problem

X Don't



Don't allow high velocity air to pass through grilles.

✓ Do



Do ensure velocities through supply and exhaust air grilles are low by increasing the grille size or number of grilles.

Size ductwork for constant static pressure to each grille, thus eliminating or minimising the need for balancing damper adjustment (which can generate excessive noise).