

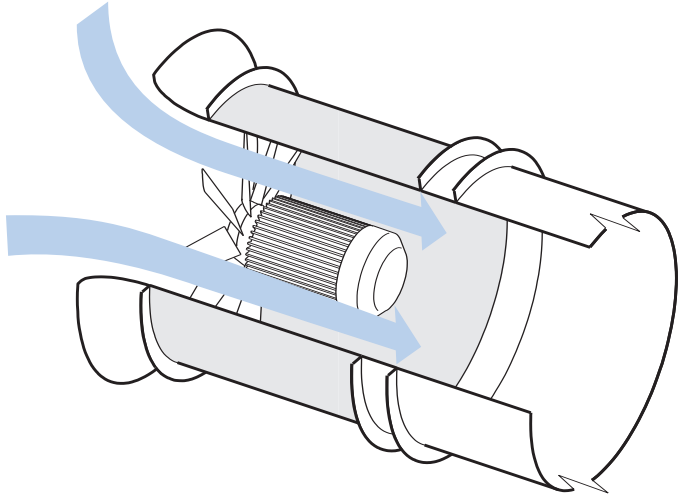
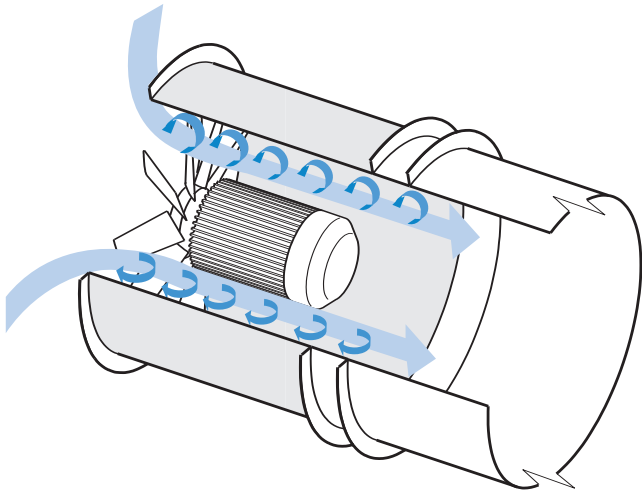
1.0 AXIAL FANS

Figure 1.1. - Inlet Cones

Use inlet cones for axial fan free air intakes to improve performance and noise level.

X Don't

✓ Do



An abrupt entry will generate turbulence at the impeller. Note blade tips will be starved of air which reduces pressure development capability, induces stall and increase the noise level generated by the fan.

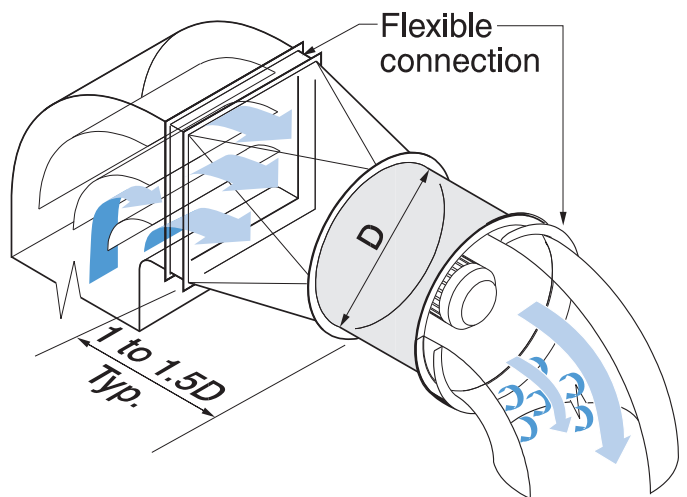
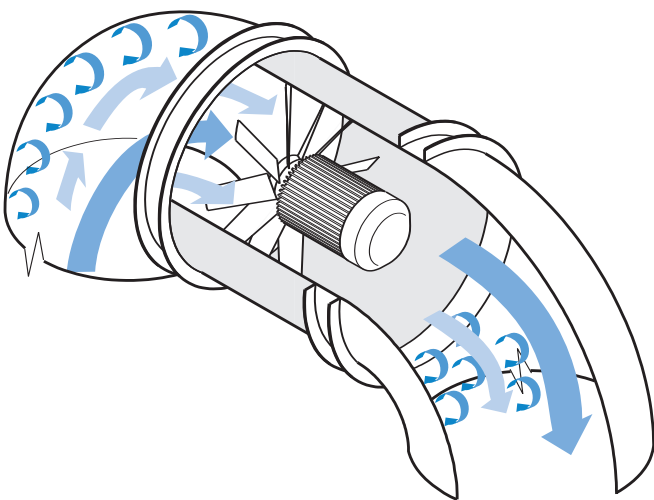
By fitting a correctly designed inlet cone the air flow to the impeller will be uniform resulting in the performance being optimised and minimum noise level generated.

Figure 1.2. - Turning vanes at sharp bends

Fit turning vanes in elbows adjacent to axial fans

X Don't

✓ Better



Eccentric flow conditions at both inlet and outlet will result in part of the impeller being starved of air and the fan not operating satisfactorily.

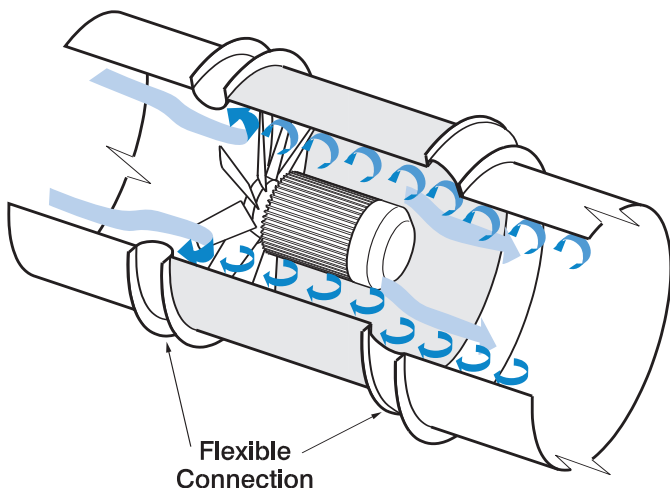
Square-to-round transitions and turning vanes in elbows assists uniform airflow; this is a compromise only and by no means ideal.

1.0 AXIAL FANS (Cont.)

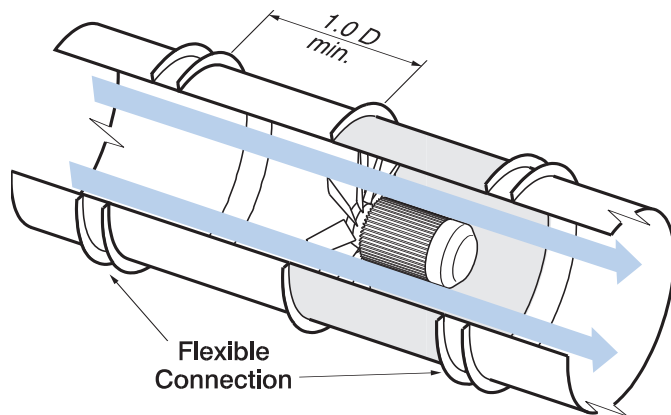
Figure 1.3. - Flexible connection to fan

Flexible connections must be taut or else turbulence at the fan inlet, noise level and pressure loss are all increased.

X Don't



✓ Do



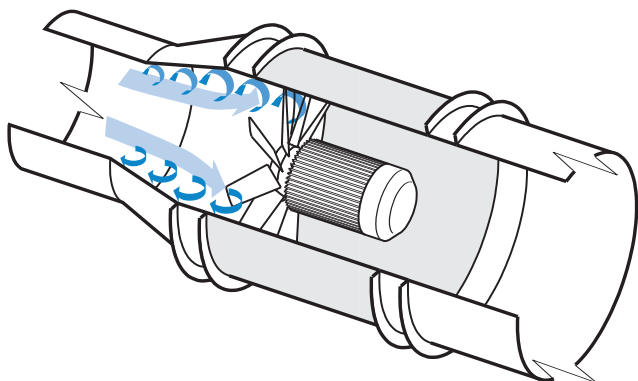
Slack or misaligned flexible connectors reduce the effective duct area. This generates turbulence and the blade tips are starved of air. Fan performance is reduced and noise levels increased.

If flexible connectors are fitted they should be remote from the fan and ensure they are taut. The air to the impeller tips is then not obstructed allowing the fan to operate to its optimum and minimises noise generation.

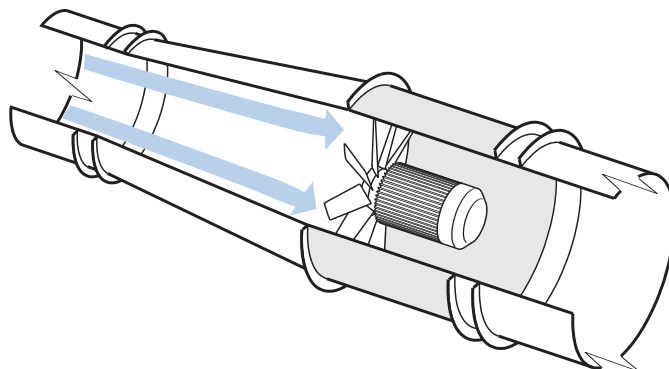
Figure 1.4. - Duct restrictions at fans

Ducts significantly smaller than the fan diameter create turbulence if transitions connect directly to fan.

X Don't



✓ Better



An abrupt duct expansion at fan inlet causes air separation from the duct, starves the impeller tips, creates turbulence, reduces performance and generates increased noise.

Duct expansions on the inlet to axial flow fans should be avoided where at all possible.

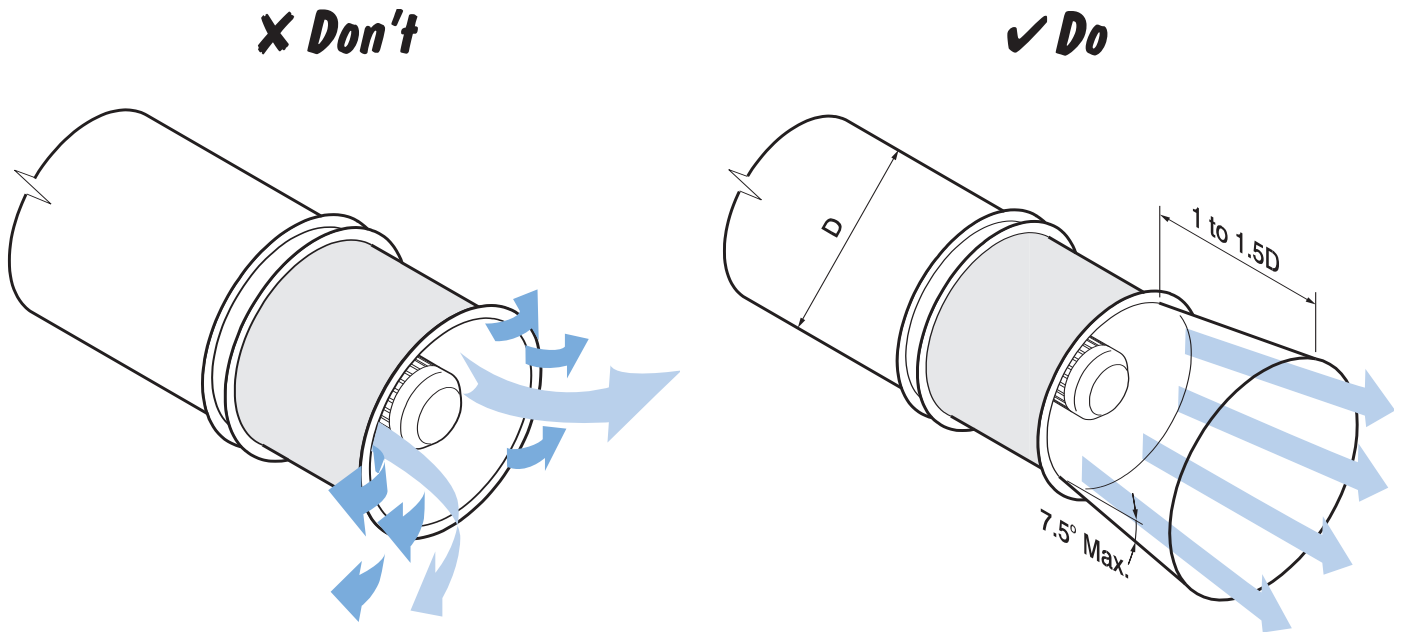
If essential the transition should have an included angle of not more than 15°.

INSTALLATION DO'S AND DON'TS

1.0 AXIAL FANS (Cont.)

Figure 1.5. - Pressure recovery

Look for opportunities for static pressure recovery at axial exhaust fan outlets.



To determine the system resistance the discharge losses have to be added before selecting the fan.

Discharge losses are highest in this arrangement and are equivalent to one velocity head.

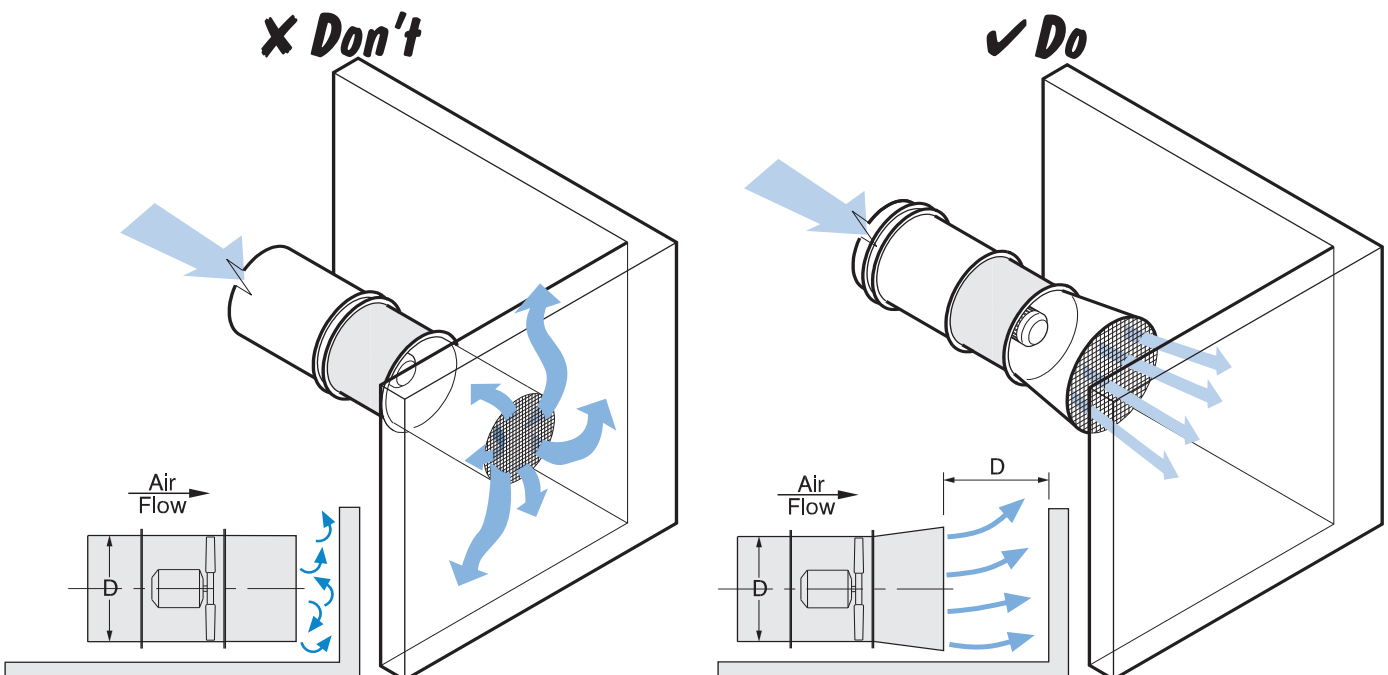
With a correctly designed discharge diffuser the pressure recovery in the diffuser will reduce the system total pressure.

Included angle of diffuser to be 15° or less.

Discharge losses reduced substantially in this arrangement.

Figure 1.6. - Obstruction at fan outlet

Don't obstruct fan outlet.



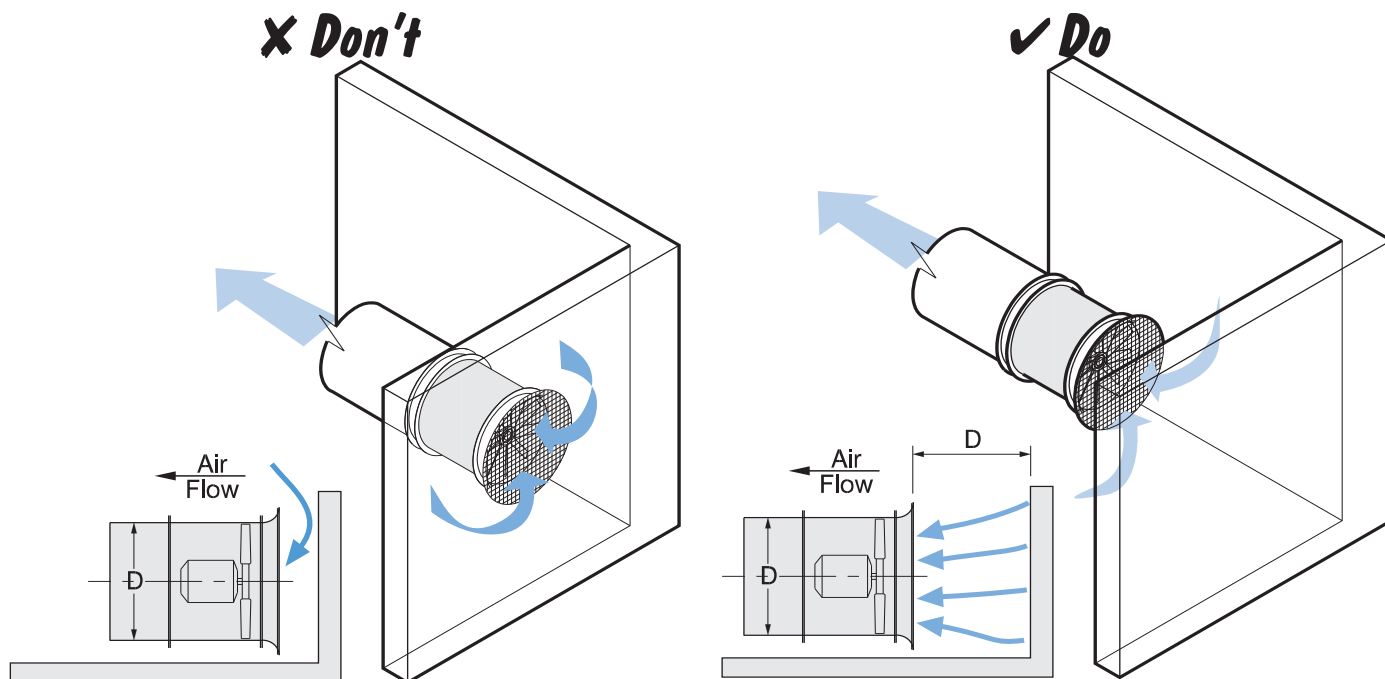
When the discharge is too close to a wall the obstruction generates noise and increases discharge losses.

Allow a gap of at least one fan diameter between fan outlet and obstruction and fit a diffuser on the discharge.

1.0 AXIAL FANS (Cont.)

Figure 1.7. - Obstructions at fan inlets

Don't obstruct fan inlets.



The impeller can be starved of air when the inlet to the fan is obstructed. This effectively increases the system resistance thereby reducing the air flow being handled by the fan.

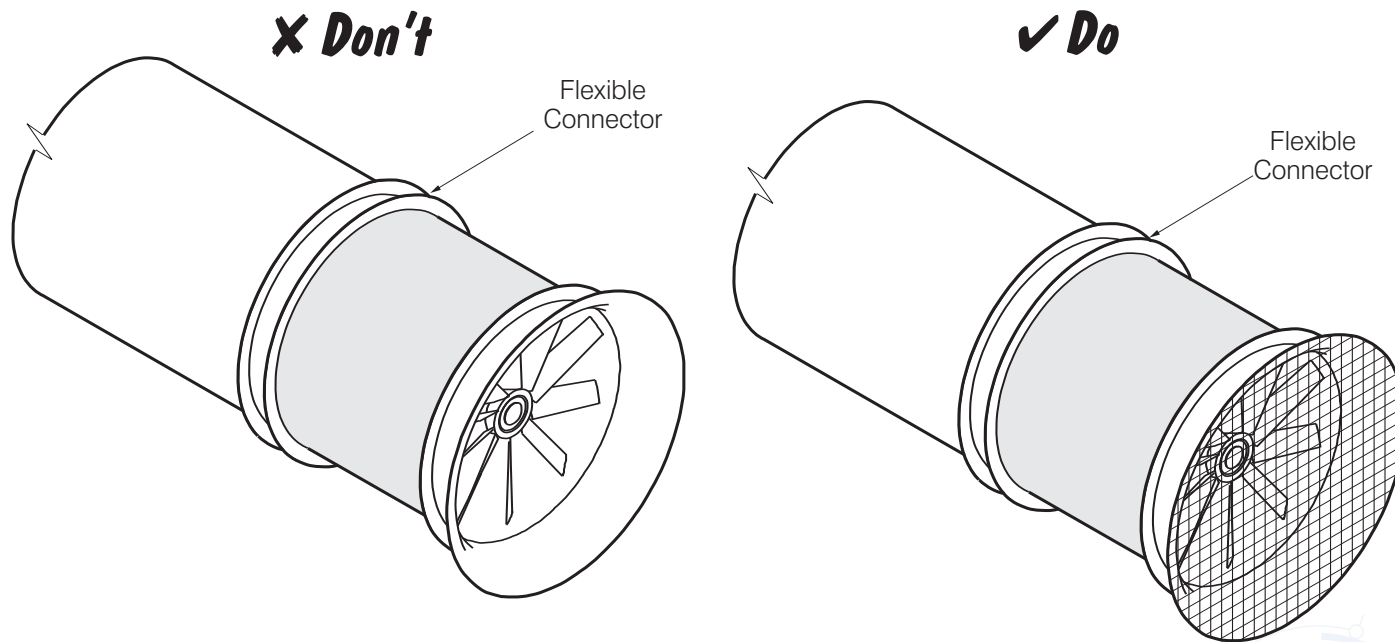
This applies to all fan types.

Allow a gap at least equal to one fan diameter between the fan intake and nearby obstructions, even then fan performance can be less than rated.

Always fit an inlet cone on open axial fan inlets.

Figure 1.8. - Guards

Safety of personnel around rotating machinery is crucial.



Don't leave open fan inlets unguarded. This is unsafe to personnel and machinery. In addition it may be illegal and leave the building owner or installer open to prosecution.

Ensure open fan inlets are fitted with suitable guards. These should be designed to comply with local regulations and not only protect against injury but lessen the risk of a foreign object entering the fan and causing damage.