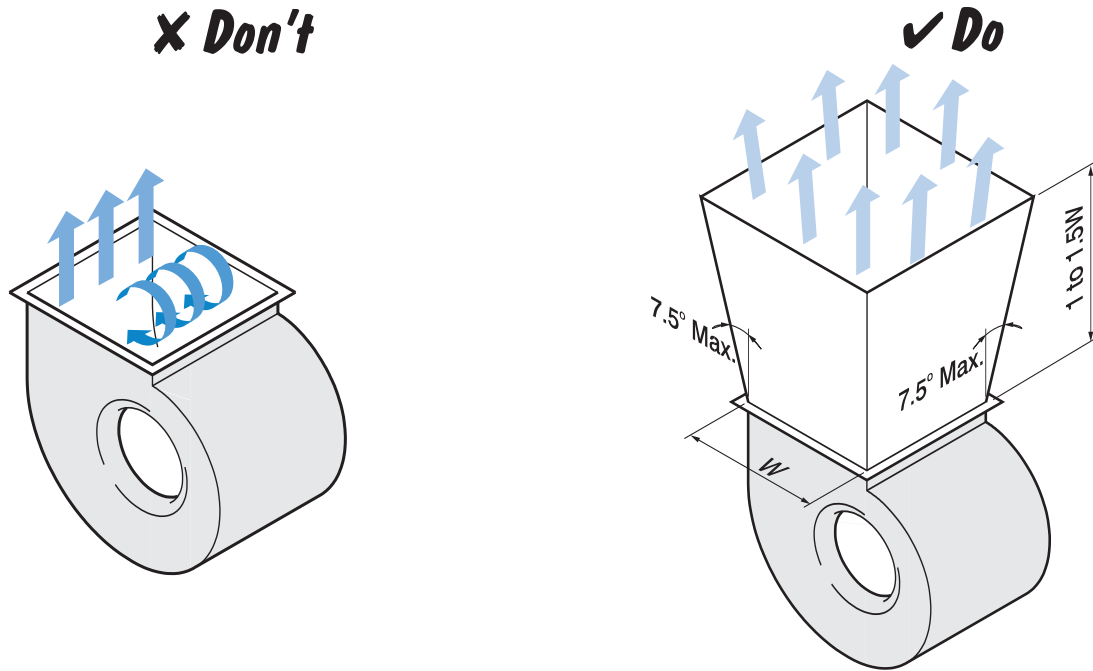## 2.0   CENTRIFUGAL FANS

Figure 2.1. - Pressure recovery

Look for opportunities for pressure recovery at centrifugal exhaust fan outlets.

✘ *Don't*   ✔ *Do*

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 by up to 75% in this arrangement.

Figure 2.2. - Bends on fan discharge

Bends near fan discharge should be in the direction of wheel rotation to prevent needless pressure loss.

✘ *Don't*   ✔ *Do*
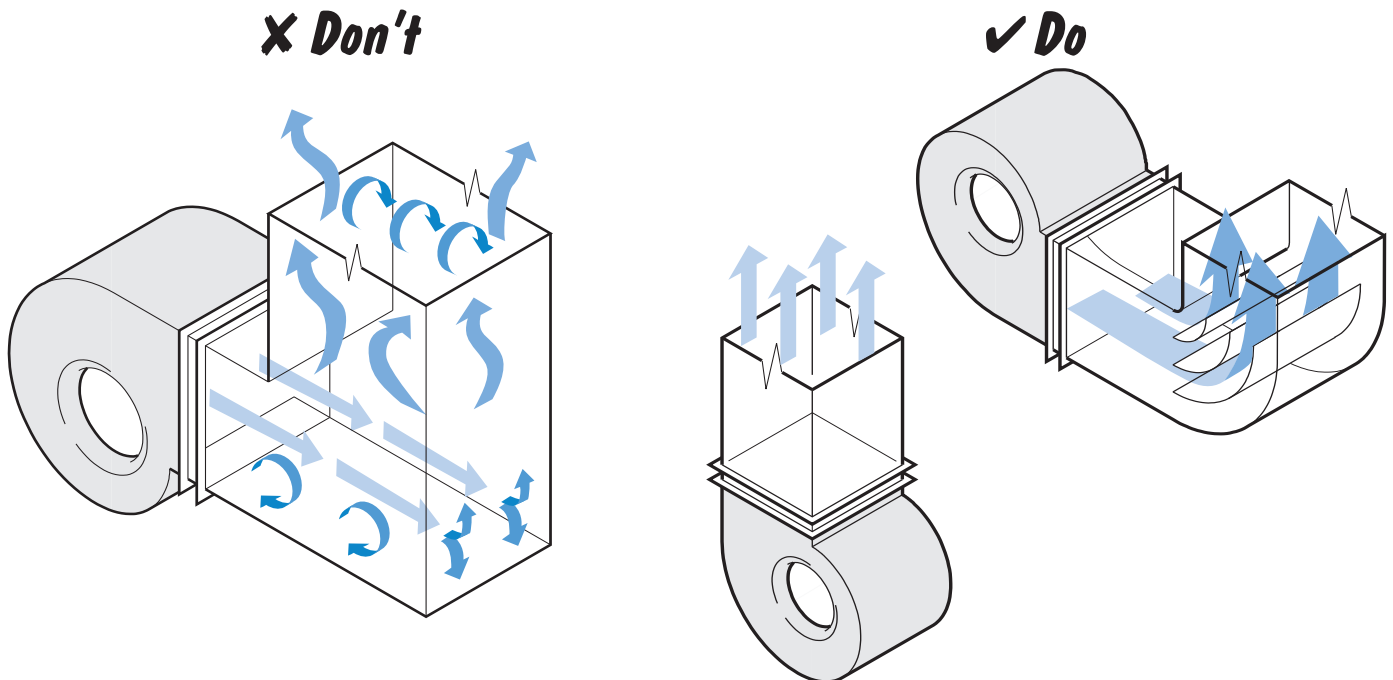
Air moves faster at the outside of the fan housing and is not evened out before striking the abrupt bend. A very high pressure loss results.
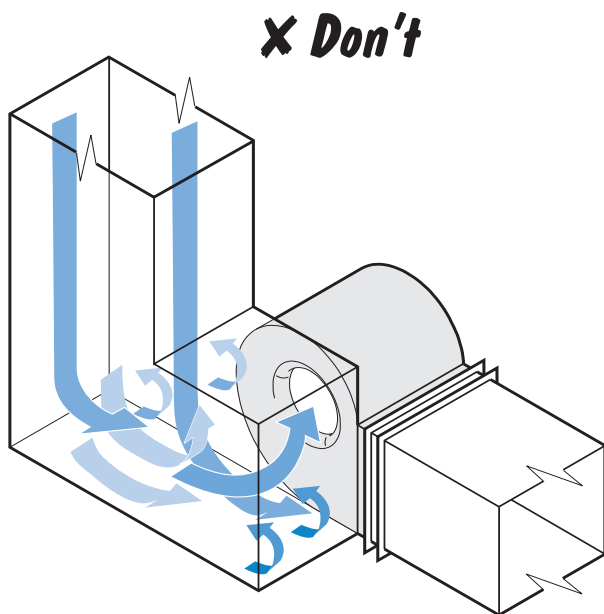
Improved discharge arrangement with radiused bends and splitters or different fan mounting position will reduce system losses.

Bends should 'rotate' in the same direction as the impeller.
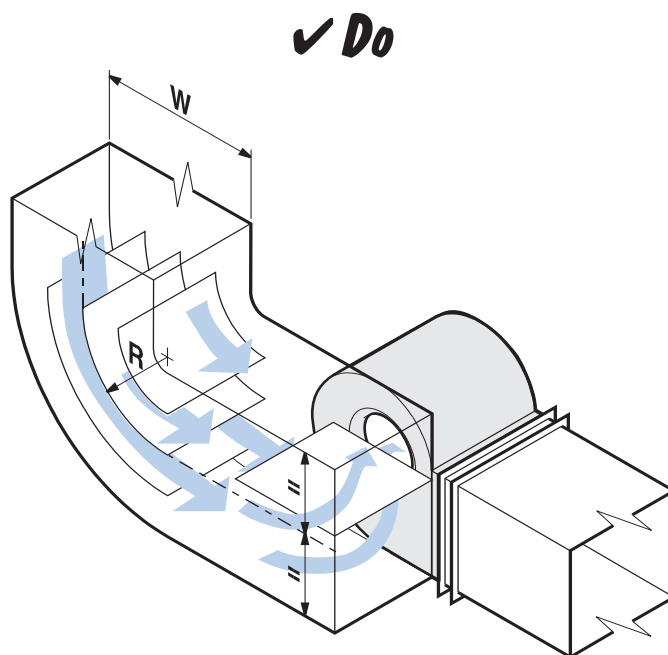
2.0   CENTRIFUGAL FANS (Cont.)

Figure 2.3. - Spinning of air at inlet connection

Ensure spinning of air at fan inlet does not take place

✗ **Don't**

✔ **Do**

A poorly designed inlet box can generate spinning of the air which can reduce performance by around 25%.

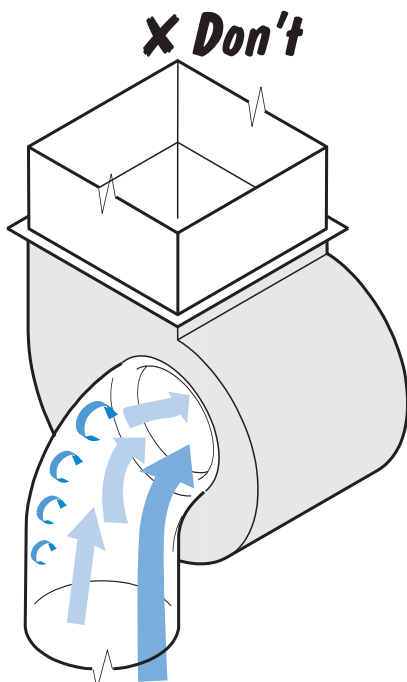Also, avoid small inlet boxes as they can cause surging.

Splitters at the inlet help prevent spinning flow. Turning vanes, where R/W<1.0 improves uniformity of flow approaching the fan inlet.

Inlet boxes should be amply sized.

Figure 2.4. - Eccentric inlet flow

Do ensure inlet air to the fan is evenly distributed.

✗ **Don't**

✔ **Do**

Eccentric air distribution at fan inlet diminishes fan performance by up to 45% because the main flow is accelerated through an effectively smaller duct area on one side while turbulence and high intensity pressure fluctuations occur on the other.
Noise level is also increased.
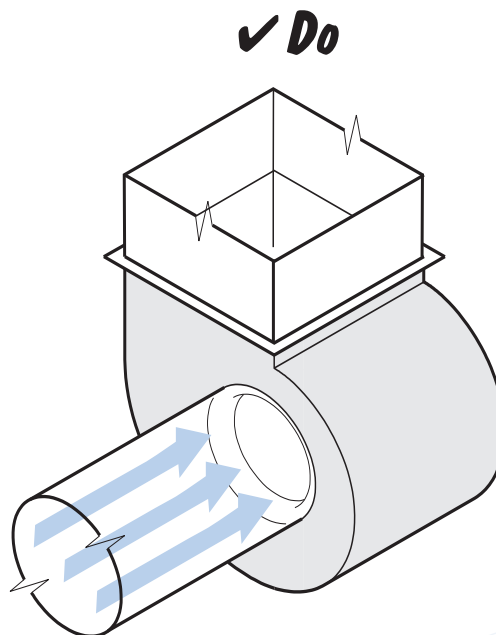
Rated fan performance is only achieved when air flows evenly into the fan impeller.