

Efficiency and benefits of direct driven fans



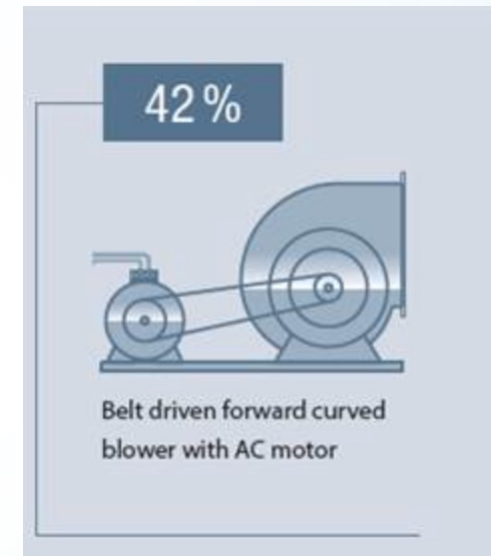
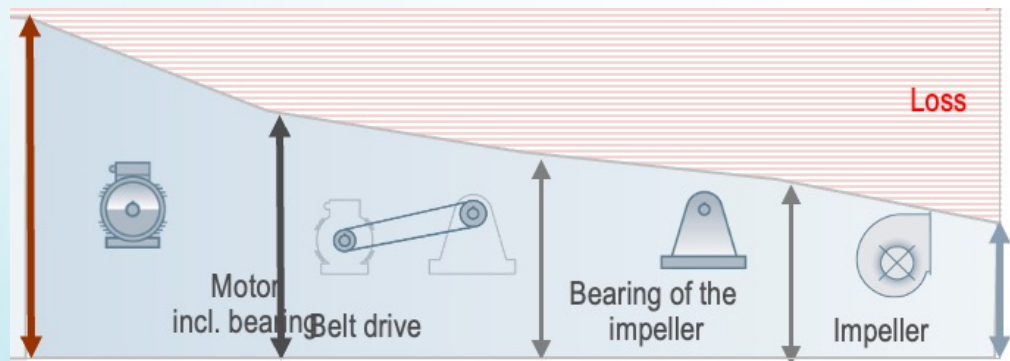
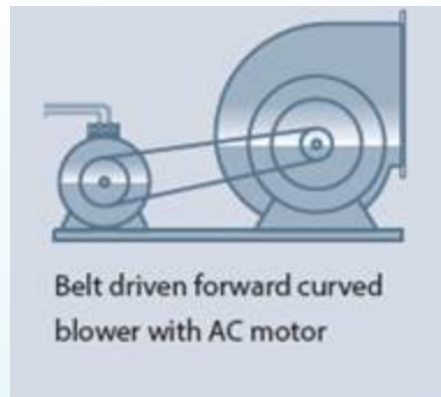
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Overview

- Belt driven fans
- Direct driven fans
- Benefits of direct driven fans
- Fan efficiencies

Belt driven fans

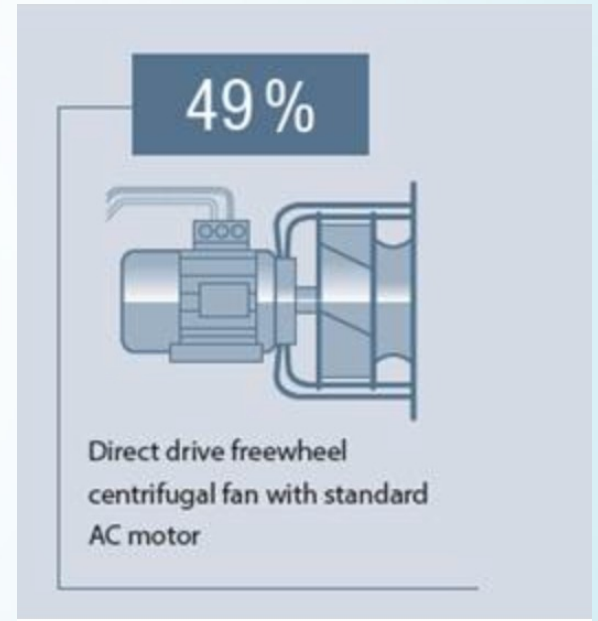
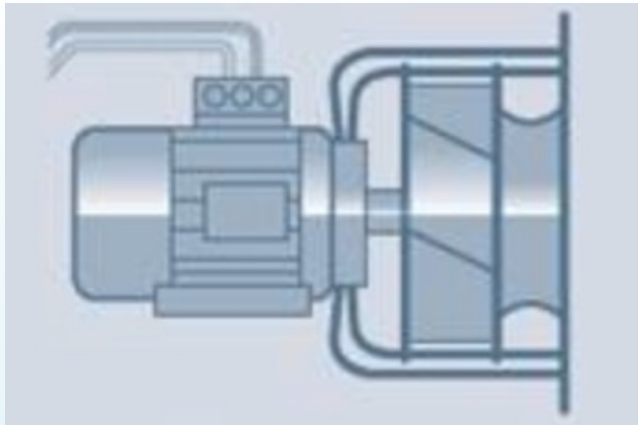
Belt driven fans



- Transmission loss
- Higher maintenance: belt and pulley
- Higher footprint

Direct driven fans

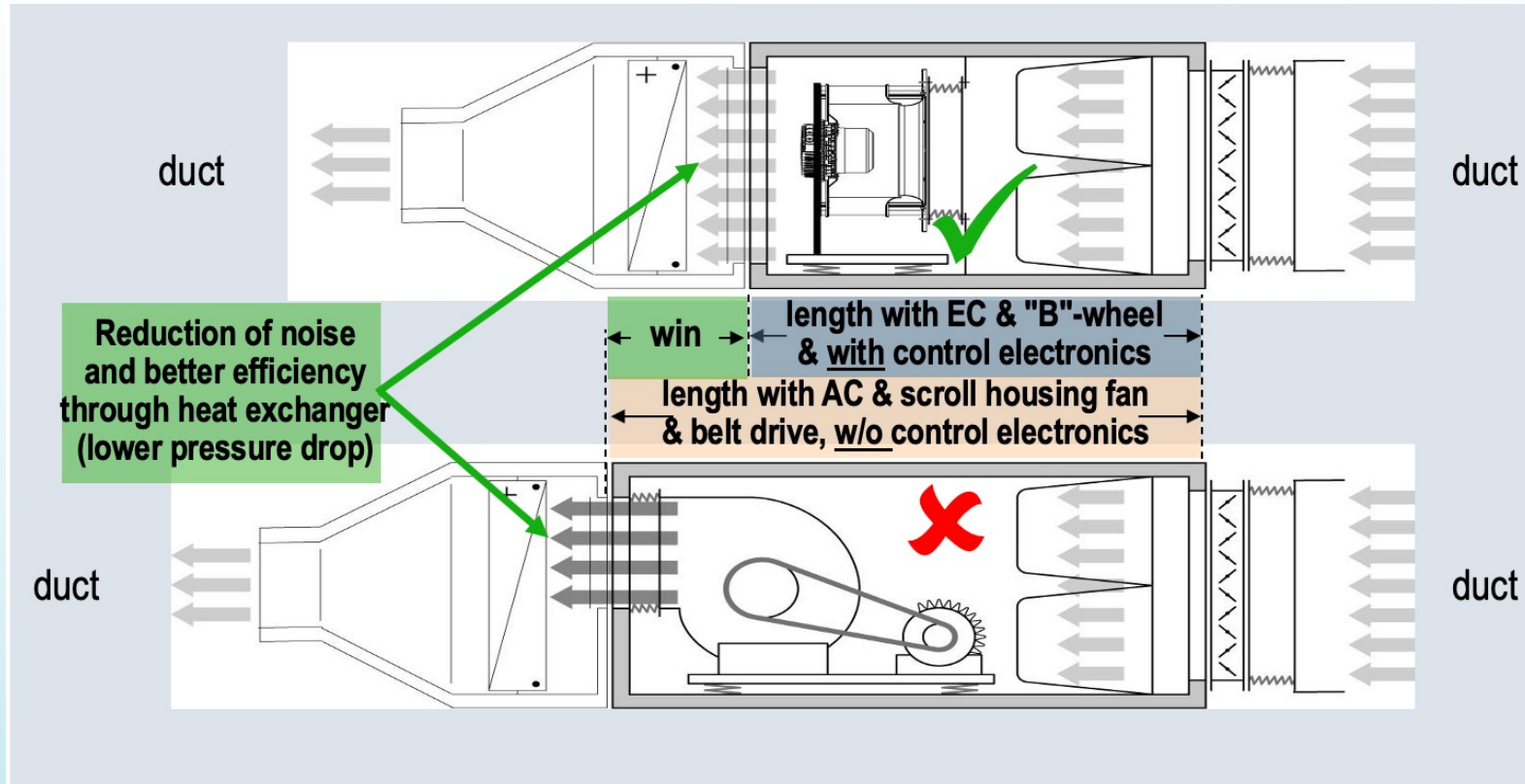
Direct driven fans



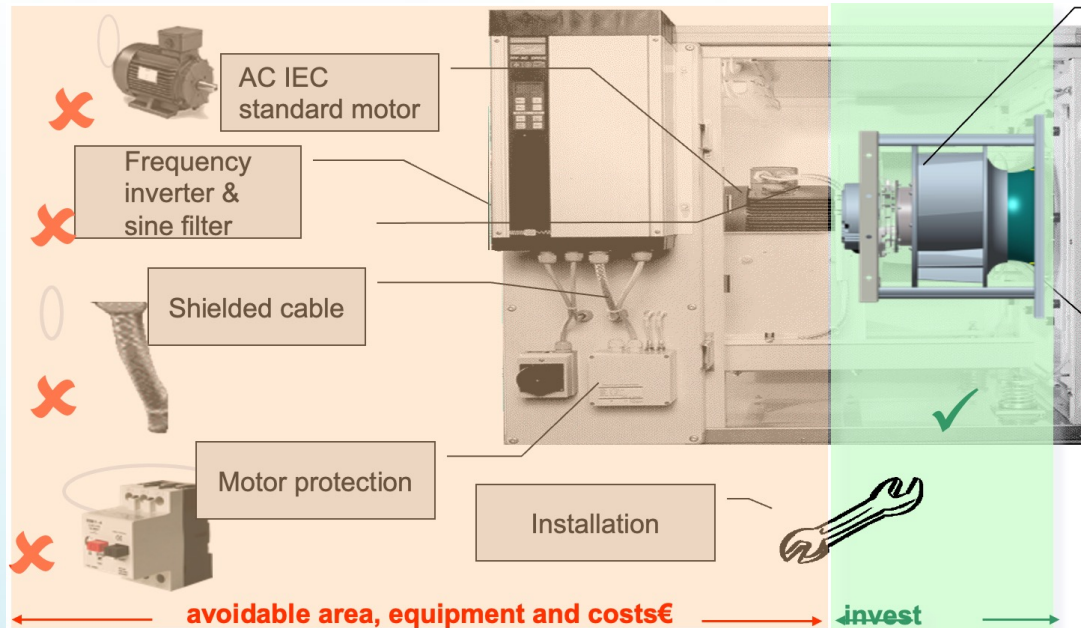
- Relatively lower losses
- Still high losses in the air side

Benefits of direct driven fans

Compactness: Space saving



Benefits of direct driven fans



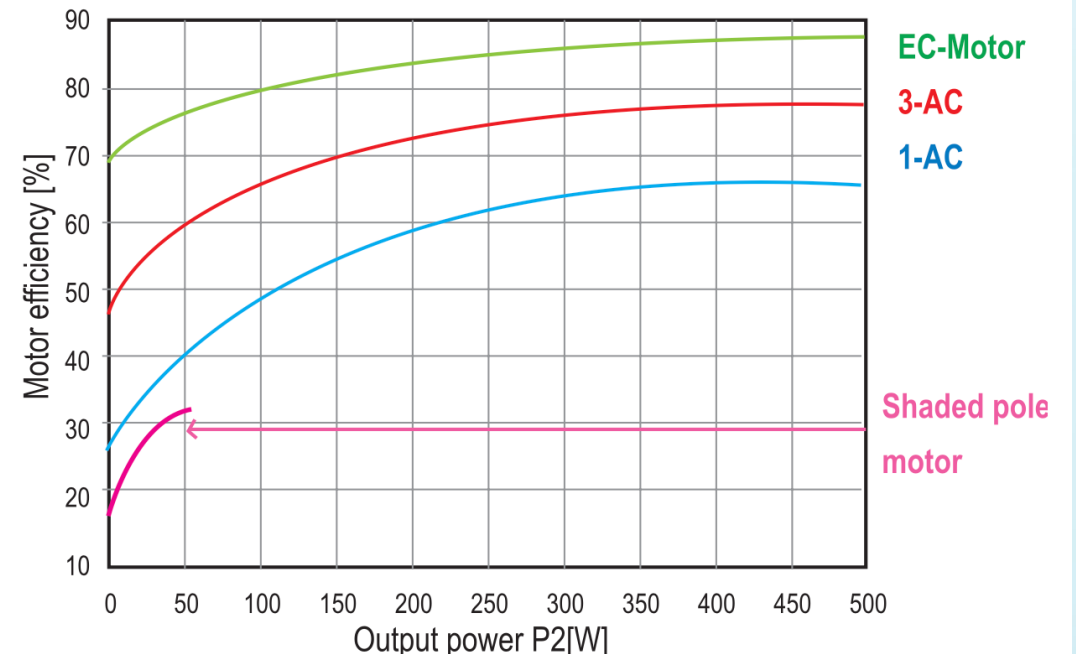
Direct driven fan

- Lower losses
- Better efficiency
- Easy installation (plug & play)
- Space Saving

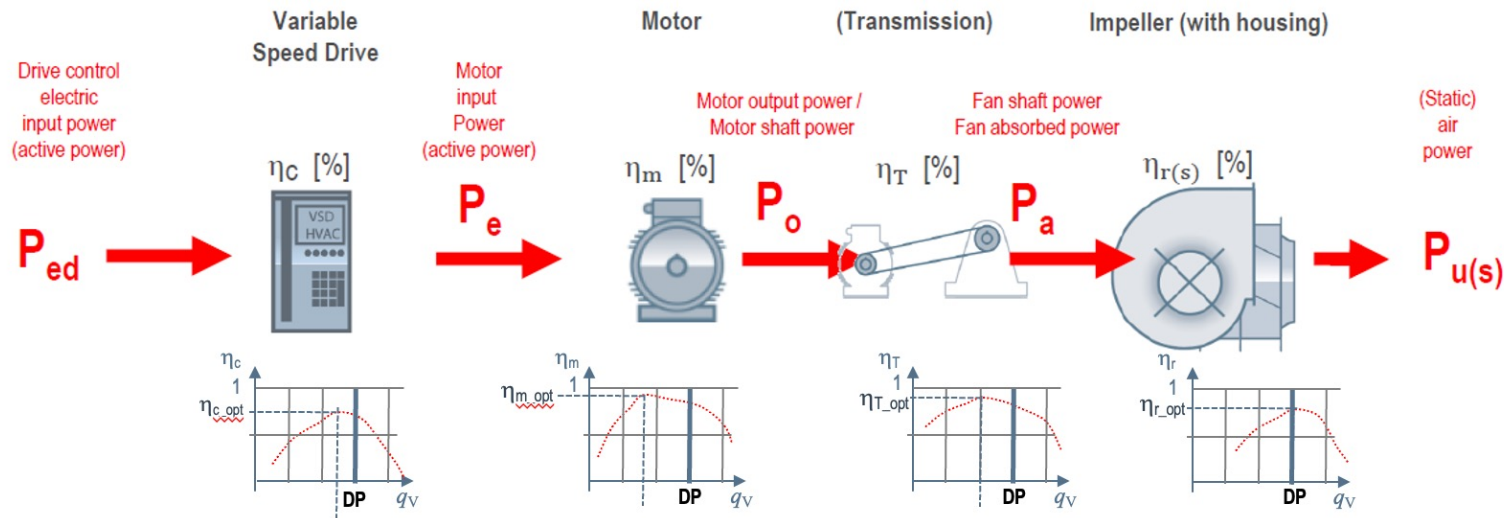
Fan efficiencies

Motor efficiency

$$\text{Efficiency (\%)} = \frac{\text{Output power (Watts)}}{\text{Input power (Watts)}} \times 100$$



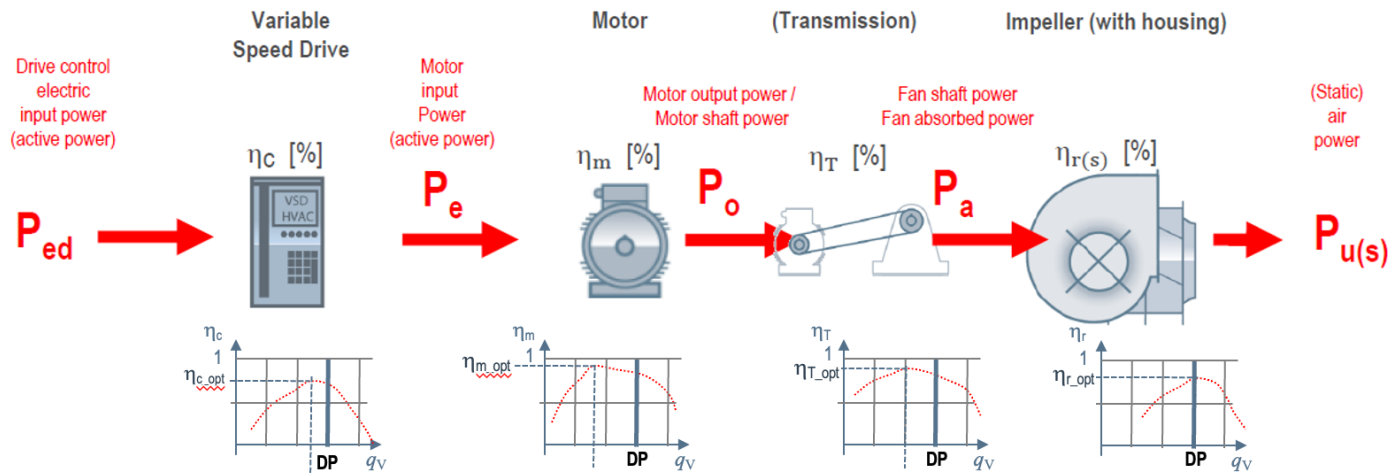
System efficiency



impact

part load data for components are not available!

Wire-2-air efficiency vs. component efficiency



$$\eta_{(static) \text{ fan}} \neq \eta_{c_max} \times \eta_{m_max} \times \eta_{T_max} \times \eta_{r(s)_max}$$

→ use tested data

ISO standard committee understands that all components bought individually are NOT capable of running in peak rated efficiency (ALL of them at the same time)