Howden Axial Fan Retrofit Solution

# Cover plate for blade screws

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## Cover plates for blade screws can optimise the geometry of the blade root and can improve efficiency by up to 2% points. The investment pays back by reduced power consumption.

On some axial fans it is possible to do alterations to get a higher efficiency. A possibility is to fit a cover plate over the holes for the assembly screws on the blade root.

The highest efficiency can be achieved on fans with ratio between 1.4 and 1.6.

The cover plates are made of 1.5 mm aluminium plate which are laser cut into shapes for each dedicated hub and blade type. Each cover plate is kept in place with two stainless steel screws.

### Impact and benefit

By fitting plates to cover the screws on the blade root, a possible raise in the efficiency can be seen according to diagram (fig. 1). The raise depends on the ratio and the position of the operation point (fig. 2).

### Execution

The rebuild must be done at a Howden facility or by a Howden specialist on site because a dedicated knowledge is required to drill the holes and make the tread in the blade root.

A specialist is needed as there is a risk of cracks in the blade root if the work is not done correctly.

Secondly the production of the cover plates requires special tooling. This involves shaping, adjusting, and drilling holes in the plates and blades.

### Example

A fan with a 6000 kW motor, 995 rpm, and a hub ratio of 1.6 runs in 90% of the time in a year - 7800 hours. The fan will in normal running speed conditions require about 3200 kW, which gives a consumption of 24,960 MWh per year.

With the cover plates attached, according to fig. 1, a raise in the efficiency of about 1.5% point can be achieved. This gives a saving of 449,280 kWh per year.

Old fan without cover plates

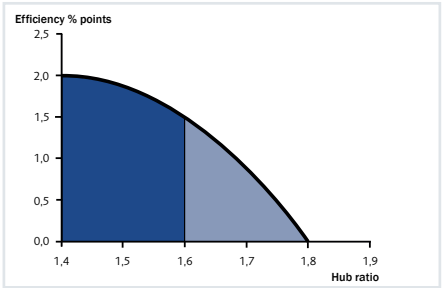


Fig. 1. The figure shows as guidance the maximum raise in efficiency which can be achieved at a given hub ratio and point of operation.

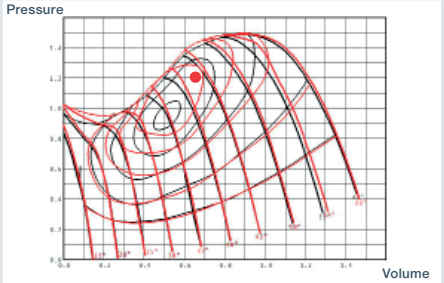


Fig. 2. Performance curve from a test set-up showing how cover plates can improve the efficiency and raise the stall line (dashed line). Red line is with cover plates.
● Area of max. efficiency widens and point of duty improved by approx. 2% points.

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