



AxiTop diffuser for axial fans

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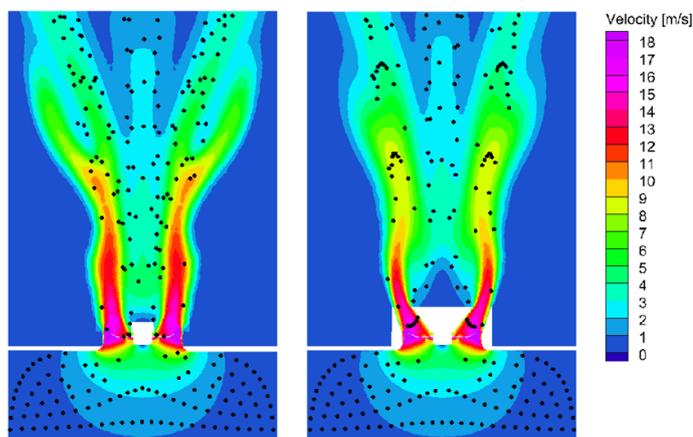
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Greater efficiency, less noise, reduced exit losses.

In refrigeration and cooling installations, heat exchangers are used to dissipate the waste heat that is generated into the surrounding air. To improve the heat exchangers dissipation capacity, fans force cool air through the heat exchanger. There are various design and configuration considerations to ensure these fans are as efficient as possible, quiet and to increase their service life. A new, passive component, the so-called AxiTop diffuser, makes for a substantial improvement in efficiency and noise. Its pressure-boosting effect minimises discharge losses and makes it easier to adjust the fan to commercially available heat exchangers.

As we all know, a medium can only absorb a certain amount of heat energy for each degree Kelvin. Therefore, possible temperature difference and the amount of heat to be dissipated both define the volume of the cooling air flow that is required. This is the air any such fan has to force through the heat exchanger under consideration. Because refrigeration systems are usually operated with long duty cycles, it is all the more important to make economic use of the input power, as every additional watt increases the end users costs. Using a suitable fan impeller design creates your required air flow. Naturally, flow separations and backflows need to be avoided as they cause energy losses and additional unwanted acoustic behaviour. Not surprisingly, all fan manufacturers are aware of this and offer more or less suitable solutions. Now, however, ebm-papst as the leading manufacturer of fans and motors, has decided to take this one decisive step further.

Using a diffuser substantially reduces the losses normally experienced once the impeller has discharged the air. This is not new technology but in the hands of the renowned R&D team at ebm-papst it has been improved by the innovation of a unique inner diffuser. It has changed the humble diffuser into one that delivers real value.



Without Diffuser

With Diffuser



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Know how - the airflow through the AxiTop diffuser

To make air flow through a heat exchanger, a pressure differential of sufficient size is needed to overcome the flow resistance of the exchanger. Normally, the airflow generated exits the fan at high speed and dissipates into the surrounding air. Dissipation means that the kinetic energy of the flow is converted into heat that can no longer be technically utilised. In our case, however, the innovative AxiTop diffuser slows down this flow and allows us to convert a large proportion of the dynamic kinetic energy into static pressure. This reverse-conversion boosts the pressure increase of the impeller. With all components aerodynamically optimised, this improves efficiency significantly, while also making it possible to bring down the fan speed and thus greatly reduce noise.



The AxiTop diffuser offers more options for adaptation

In practical terms, using the AxiTop diffuser not only reduces energy consumption; it also offers more creative freedom to users and development engineers. The diffuser configuration can be opti-

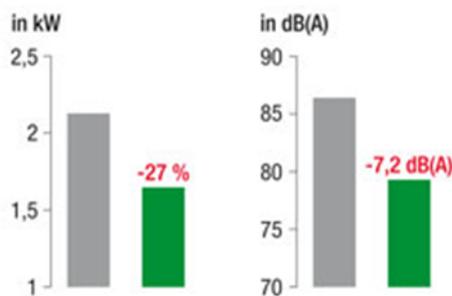
mised with respect to various and different characteristics, depending on the application. At identical energy input, you can increase fan output, or have identical air performance at reduced energy consumption. Acoustic behaviour, too, can be greatly improved using the diffuser. This is especially important in noise-sensitive applications (e.g. in cooling or air conditioning units operating at night).



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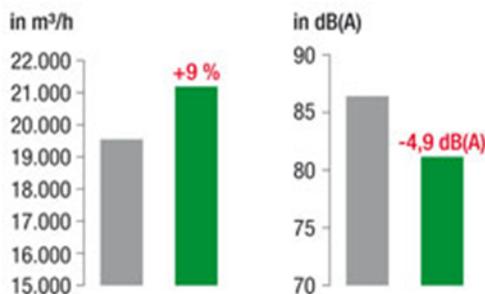
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The scale of possible energy savings - or efficiency enhancement and noise reduction that can be achieved with an optimal diffuser and a commercially available heat exchanger is substantial. By simply replacing a standard fan with guard grille for one with support arm, guard grille and AxiTop diffuser, savings of up to 27% can be achieved in terms of power consumption, while operating noise is reduced by up to 7.2 dB(A).



Operated at the same operating point, energy savings of up to 27% and 7.2 dB(A) less noise development are possible, depending on the application. (measured on size 800 mm)

Alternatively, just going for the greater efficiency of the fan with the AxiTop diffuser, air flow increases by up to 9% at the same input power, with noise emissions being reduced by about 4.9 dB(A) as well. These values can vary according to the operating point and application. Depending on the individual configuration, the optimised efficiency can be used either to reduce power input or to increase air performance.



Operated at maximum speed, the blower output can be increased by up to 9% and noise development reduced by up to 4.9 dB(A), depending on the application. (measured on size 800 mm)

For new build or upgrade – the AxiTop diffuser fits the bill

The AxiTop diffuser has been developed to fit the ebm-papst range of HyBlade axial fans as supplied to all the major refrigeration plant manufacturers. It is also ideal for retrofit providing a simple solution to upgrade existing fans installed across the estate. An upgrade that reduces the noise, decreases the power consumption and increases the fan performance.