

Air coolers: Güntner Streamer tested



GHF high efficiency evaporator with Güntner Streamer

The characteristics of the Streamer guide wheel developed by Güntner have been tested in depth at the Institute for Air and Cooling Technology (ILK) in Dresden. The summary of the results shows the advantages of the Güntner Streamer in the operation of standard air coolers.

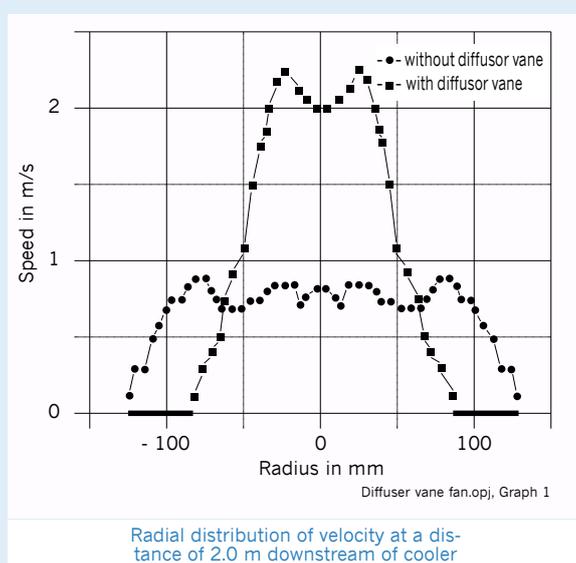
The efficient performance of modern air coolers means that more and more smaller air coolers are being used for large refrigerated rooms. The result is that coolers in this environment have to achieve a greater range and deeper air penetration, in order to avoid thermal short circuits in the cooler and localised excess temperatures in the refrigeration room. Compared to the familiar grilles in front of the fan, this requirement can be fulfilled more effectively by so-called after-guide wheels, whose air-flow optimised blades divert the air current in an axial direction. To demonstrate the improvements that can be achieved with the Güntner Streamer, the ILK Dresden carried out

systematic measurements on two air coolers with fans (nominal diameter 315 mm and 650 mm, respectively) and guide wheels. The measurements included the mechanical flow characteristic, the noise level, and selected speed distributions.

Characteristic measurement

For the purposes of the experiment in the test chamber at the ILK, the fan and its nozzle and protective grille were connected to the fan chamber with and without the afterguide wheel. The combination of fan and cooler was then measured. The characteristic was measured using a PC-based metrics system. The result was that, even with the small fan, the measured characteristic with the after-guide wheel showed a greater throughput at the point of work with the after-guide wheel than without it. In the case of icing up or extreme constriction, the advantages of the after-guide wheel become even more apparent. Perform-

mance under partial load is also improved, the stall threshold being altered in the direction of lower flow volumes. In the tests with the larger fan and cooler, two different guide wheels with 8 and 16 blades were investigated. The optimum point of this configuration was shown to be around 5000 to 6000 cu. m. per hour, and here the use of the guide wheels led to a clear improvement in overall efficiency.



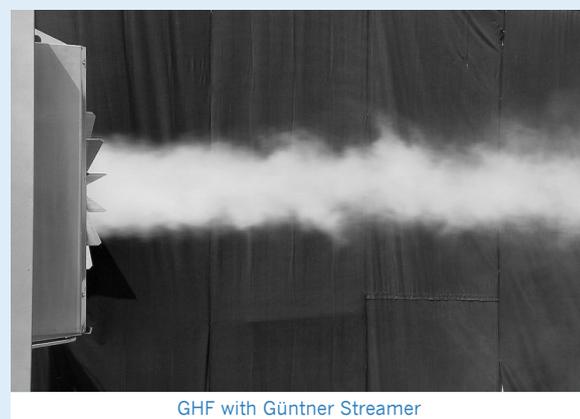
Acoustic measurements

With regard to noise level, the measurements on the smaller cooler showed it to be 0.4 dB quieter with the guide wheel, and that the noticeable peak at about 200 Hertz was removed when the guide wheel was used. With the large-fan air cooler (external diameter 650 mm), the noise level rises with the number of blades by 1.3 dB, with a corresponding rise in the noise level across all frequency ranges.

Flow visualisation

The speed measurements were made with a hydrometric vane anemometer. The starting point for the evaluation of the measurements was that the greater the ratio between the maximum speed in the measured plane and the mean axial speed, the greater the range and penetration will be. The measured profile clearly demonstrated the positive effect of the guide wheels. Additional smoke experiments provided information on how the current mixes with the surrounding air in a large room

when blown in horizontally, and what effects may be expected with regard to penetration into the refrigerated room. Short mean and exposure times of the photographic documentation of these tests showed that the after-guide wheel causes a focussing at the work point of the cooler, thus increasing the penetration by the free current of air.



Conclusion

Overall, the tests at the ILK Dresden demonstrated that clearly improved cooling is possible with the Güntner Streamer without increased electrical power consumption. The characteristic measurements showed that when operating in the region of maximum efficiency, the flow volume increases while power consumption remains constant. Although the guide wheels are an additional source of noise, damping or only a slight increase of the noise



level occurs in the greater part of the frequency range. The flow visualisation shows clearly that the use of guide wheels results in significantly increased range and penetration.