

VENTILATION WITH HEAT RECOVERY FOR RENOVATION

Principle and Innovation

- Combined fan and heat exchanger (regenerator)
- Counterflow heat exchanger
- Ventilation by using the cross flow fan principle



Advantages

- Flat and compact in size
- Suitable for wall integration
- Humidity recovery
- **No frost protection preheater necessary**
- Less mechatronic components (one motor only)
- High thermal and electrical efficiency



Additional Information

Ventilation is necessary in new constructions as well as in renovated existing buildings to ensure indoor air quality. By the use of heat recovery systems the energy losses can be minimized at the same time. Especially in building renovation ventilation systems should be designed as compact as possible to avoid disturbing influences for users because they were not provided to be implemented in the original building design. Ventilation systems in which one component is responsible for ventilation and simultaneously for heat recovery are particularly suitable for this application area. Already existing systems like the HRCF (Heat Recovery Centrifugal Fan) have a systematically limited performance in ventilation and heat recovery efficiency. These disadvantages still prevent the wide use in building renovation. The modified concept of the CHRF (Counterflow Heat Recovery Fan) allows to increase the ventilation and heat recovery efficiency at the same time by using one cross flow fan for the generation of both flows (outdoor/supply air and extract/exhaust air). In this concept the fan blades work simultaneously as fan and heat exchanger. Through the characteristic property of this fan type it is possible to realize a counterflow regime which is necessary to achieve a highly efficient heat recovery. The advantages of already existing HRCFs are retained. Since only one fan generates both airflows the need of mechatronic components is reduced and the separate component for the heat exchanger can be saved. A further advantage is that the modified concept of the CHRF has the opportunity that there is no need for an anti-freeze protection system. Condensate which is produced at the fan blades by cooled extract air can be absorbed immediately by warmed outdoor air. Through the increased heat recovery and the flow conduction moisture can thus be recovered if the outdoor air conditions are cold enough to produce condensate at the cooled extract air flow. Additionally, through this property the condensate drain is no longer needed if the entire condensed water is immediately absorbed. With these advantages combined with highly efficient ventilation and heat recovery properties, the CHRF is very well suited for decentralized ventilation in the building stock. The compact design is suitable for wall/envelope integration and the already mentioned system properties allow low manufacturing, maintenance and running costs at the same time.

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