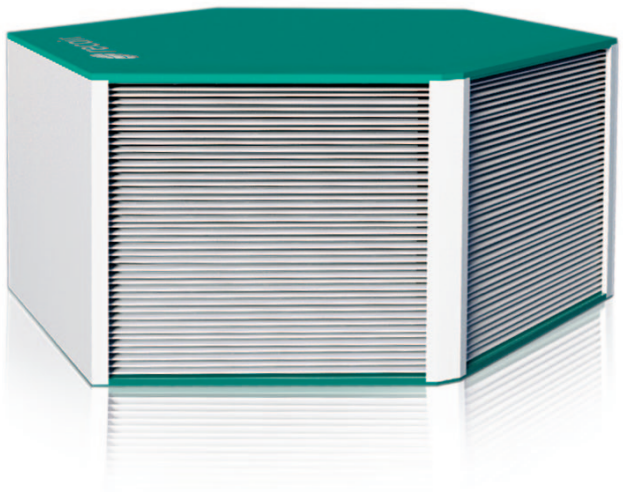
recair

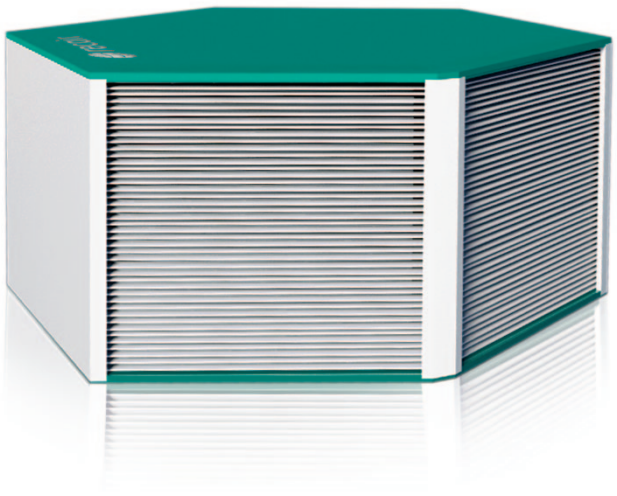
Recair Sensitive RS160

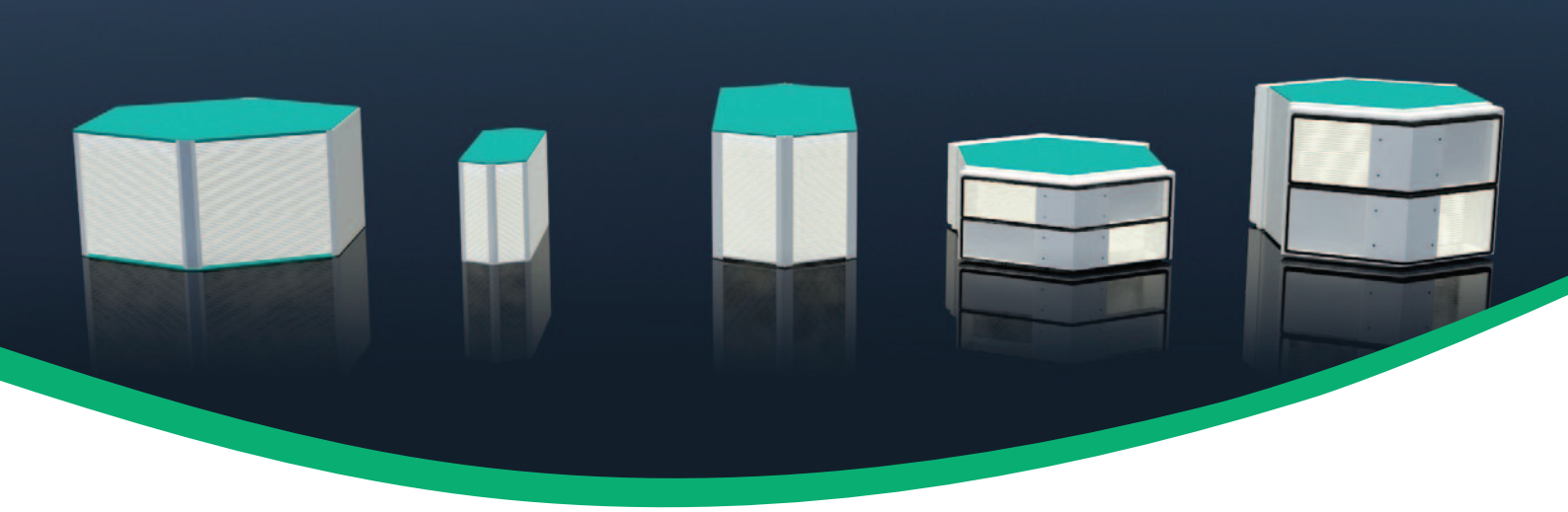


saving energy in comfort

Recair Sensitive RS160

Recair Sensitive is a unique, patented recuperator specially designed for air-to-air heat recovery in balanced ventilation systems for homes and offices. It is a true breakthrough in ventilation technology, making it possible to recover and efficiently reuse energy generated for heating or cooling rooms, while optimising the ventilation that is so crucial for a healthy, indoor climate. Recair Sensitive can be used in almost any ventilation system to maximise indoor comfort and air quality while substantially reducing basic energy requirements and costs. This benefits end-users by increasing their wellbeing and reducing their energy bills. And, by reducing the need for fossil fuels, it also benefits our environment.



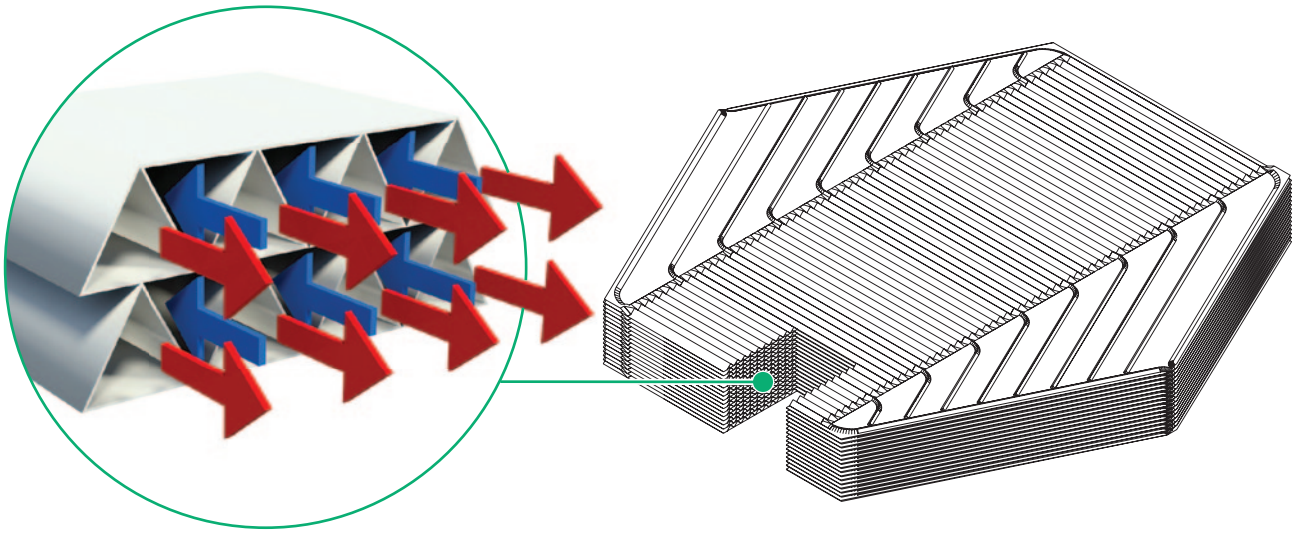


The Recair recuperation principle

Good ventilation is very important, but when the outside air temperature differs considerably from the indoor air temperature, ventilation results in a great deal of energy loss. The key to Recair recuperation technology is that it enables and maximises the exchange of energy between the incoming and outgoing airflows before the energy dissipates in the atmosphere. Optimum recuperation (i.e., 100% thermal effectiveness) is achieved when the air temperature at the end of the cooling trajectory is equal to the counterflow at the beginning of the heating trajectory, and vice versa. It is impossible to realise this ideal situation in practice, but Recair Sensitive makes it possible to achieve thermal effectiveness of between 90-98%, thanks to its unique, patented design. The triangular ducts in the recuperator are arranged so that each one is surrounded by parallel ducts in which the air is in counterflow (see Fig. 1). Each fresh-air duct is surrounded by three ducts filled with warmer exhaust air.

Likewise, each duct with exhaust air is surrounded by three fresh-air ducts. This maximises the surface area over which energy can efficiently be transferred, recaptured and reused. This design principle is what makes the Recair Sensitive's outstanding performance possible. In comparison with conventional cross-flow recuperators of the same size, the Recair Sensitive's thermal effectiveness is at least 33% better. The unique duct system design even gives the Recair Sensitive an advantage over counterflow plate recuperators: with air-flow space being the same, it has a heat exchange capacity that is almost 3,5x higher.

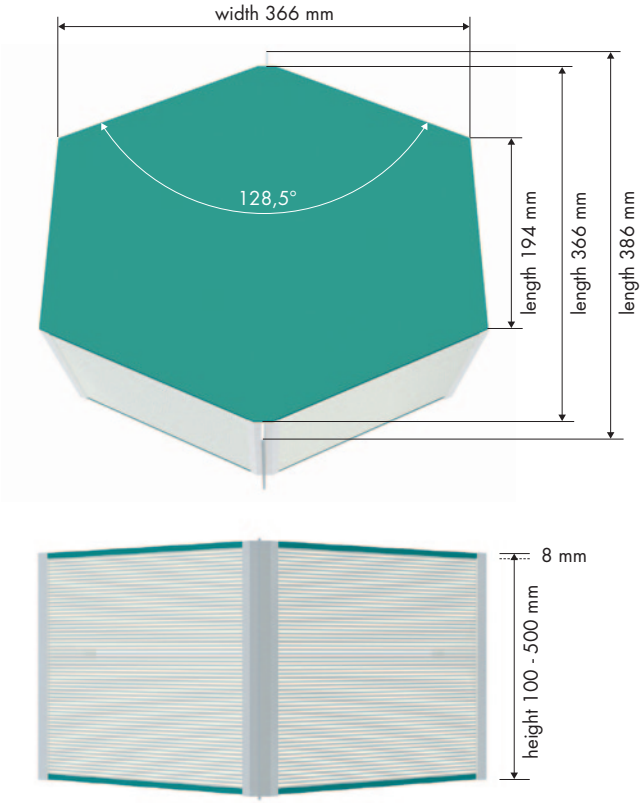
Figure 1: Triangular ducts principle.



Construction and dimension

The Recair Sensitive can be used for air temperatures between -30 and +50 °C. The recuperator is constructed completely from polystyrene - from the foils to the casing. Only solvent-free elastic adhesives are used. The Recair Sensitive has a width and length of 366 mm, and the height can vary from 100 mm to 500 mm (see Fig. 2). It is also possible for several recuperators to operate in parallel. The largest recuperator (500 mm) weighs 5 kg, and has a heat exchange surface of ±36 m^2, and a volume of 51 liters.

Figure 2: Dimensions.



Efficient performance

The effectiveness and pressure drop as a function of the airflow is illustrated in Fig. 3/4 (Note: this diagram is based on a dry return air temperature of 20 °C and an mass balance). These values have been confirmed in tests by the Eindhoven University of Technology as well as the Netherlands Organisation for Applied Scientific Research TNO. Please note that there is no direct linear relationship between the supply-air temperature and the outside-air temperature when it comes to effectiveness: In fact, effectiveness will increase even further under conditions of high indoor relative humidity, with a potential of reaching up to 98% thermal effectiveness (see Fig. 5). At extreme condensation, the pressure drop in the return air may double. The overall result is a very small difference in temperature between the supply and return air, leading to greater indoor comfort and lower basic energy requirements.

Reduced freezing

When outside air temperatures are very low, freezing may occur at the end of a recuperator's return-air duct if the temperature of the exhaust air drops below 0 °C. In the Recair Sensitive, the condensation heat of the moisture in the return air helps keep the exhaust air above the freezing point, even when the outside air is much colder (see Fig. 6). The annual number of hours that the recuperator will freeze is therefore much lower than the actual number of hours of outdoor freezing temperatures. Manufacturers can also reduce the number of freezing hours even further by adjusting air intake, mass balance and recirculation.

Figure 3: Pressure loss as a function of airflow.

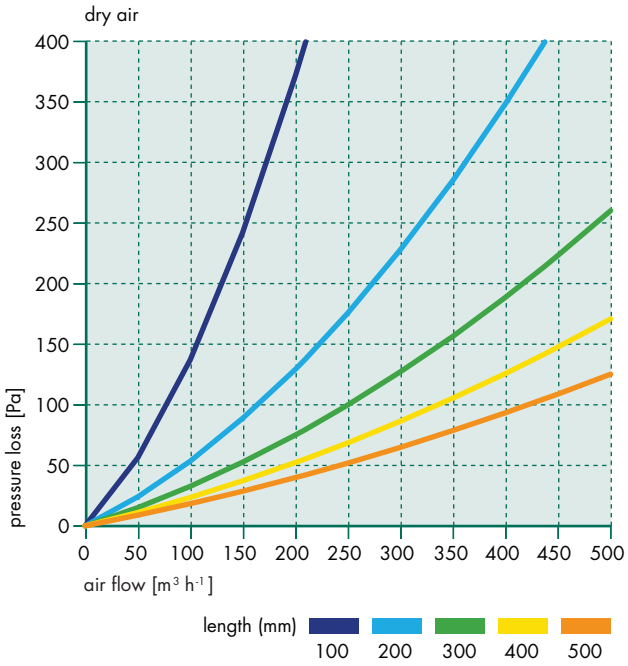


Figure 4: Effectiveness as a function of airflow.

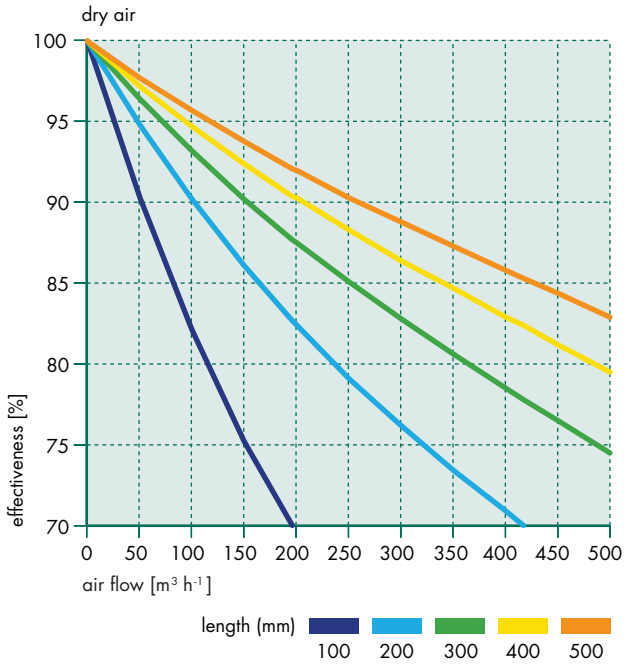


Figure 5: Influence on effectiveness due to condensation heat.

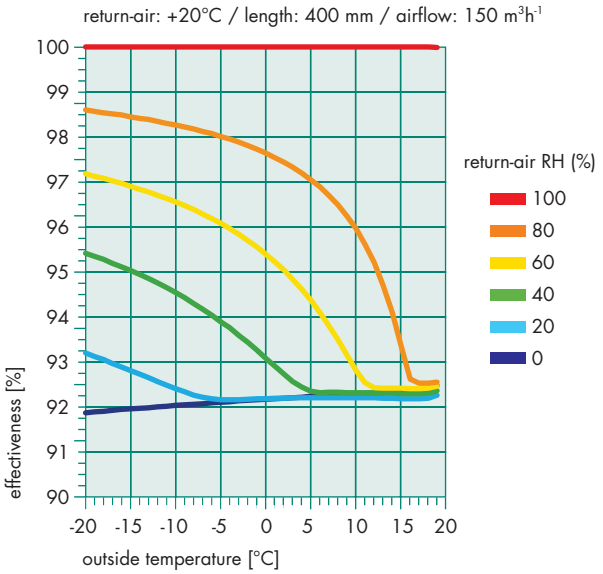
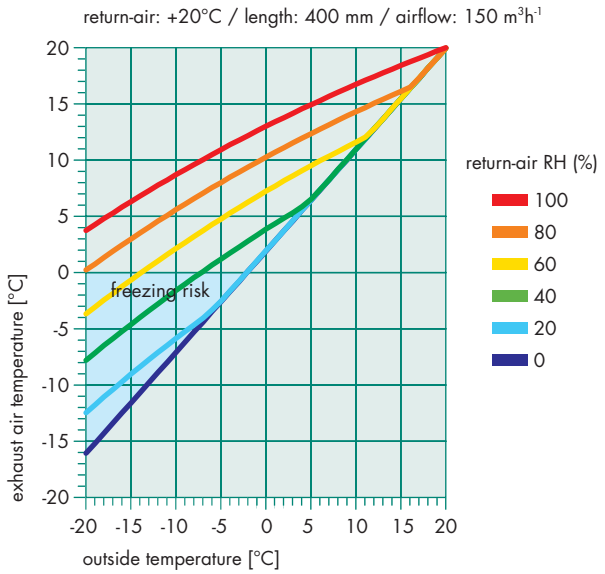


Figure 6: Exhaust air temperature as a function of the outside temperature.



Easy, efficient mounting

The Recair Sensitive has flat sides, side-profiles and flanges around the inlet- and outlet-air connections that allow easy and airtight integration into the heat recovery unit. For optimum drainage of condensed moisture from the heat exchanger, the exchange channels should be positioned horizontally or vertically, and the flow direction downwards (see Fig. 7).

Directions for storage, assembly and use

1 Avoid any exposure to direct or indirect UV light, e.g. sunlight.
2 Recair heat exchangers are made of Polystyrene. Polystyrene is not known for its resistance against chemicals, avoid explicit contact of chemicals with the Recair heat exchanger.
3 Operating temperatures: Recair Sensitive air to air heat exchangers may be exposed to temperatures between -30 and +50 °C.
4 Heat exchangers may only be removed from the apparatus by pulling the plastic strip running over the heat exchanger.
5 Exhaust and fresh air should be filtered at G4 class to keep the exchanger interior clean from pollution.
6 No cleaning with fluids (including water); only careful dust removal from air intake surfaces with a household vacuum cleaner.
7 Recair Sensitive heat exchangers can reveal internal leakage up to 25 litres of air at a pressure of 100 Pa. Under certain conditions this leakage of air could also result in some leakage of condensation. For this reason, the air flow that loses heat should always be pointed downwards. In this way, the condensation will quickly be removed.
8 Pressure difference between the two flows may not exceed 2000 Pa to avoid irreversable mechanical damage to the heat exchanger.

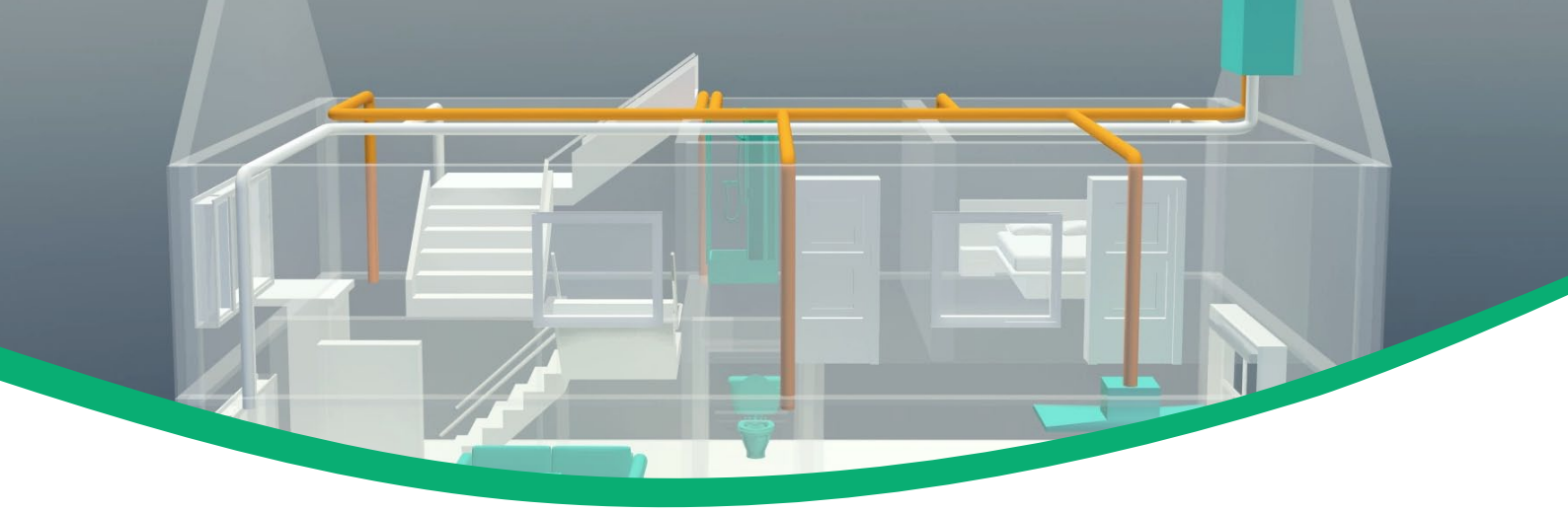


Figure 7: Mounting orientation "on the noses"

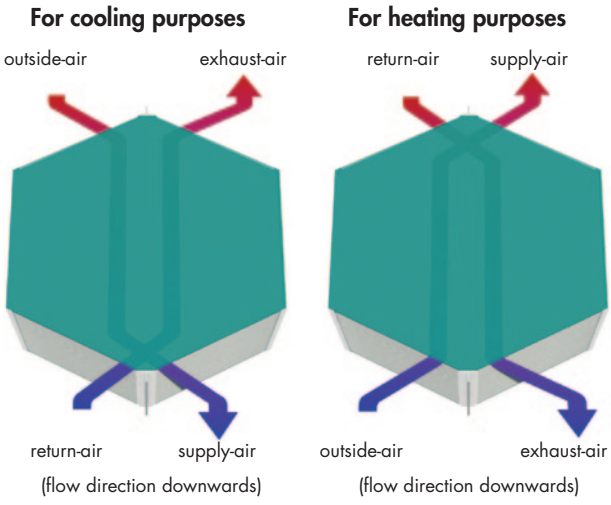


Figure 8: Mounting orientation "on the (white) side panels"

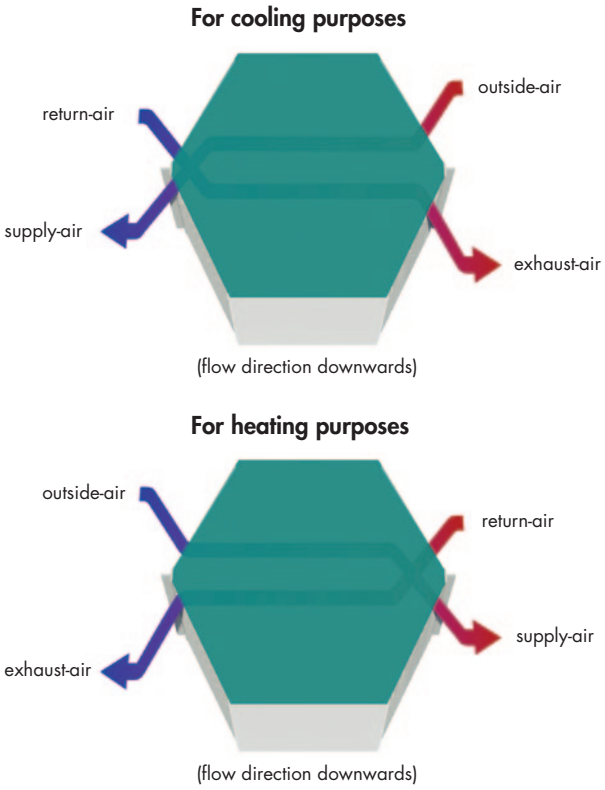
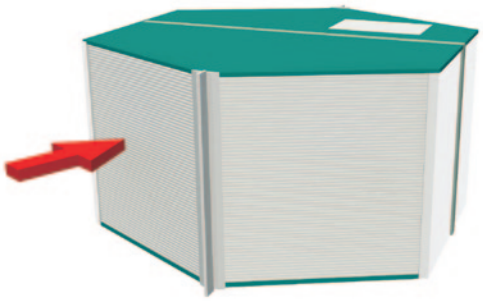


Figure 9: Mounting orientation "on the (green) lids"



(flow direction of airflow losing heat)

Entrance always left from the nose and tag always on top!

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