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Save energy and still have excellent indoor air quality

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By using balanced, mechanical ventilation with a high efficiency regenerative heat exchanger it is possible to achieve twice the ventilation rate required by the Norwegian Building Code, and still consume less than half the normal amount of energy. This is the conclusion drawn from extensive measurements made in a Norwegian single family home last winter. The measurements were made by the EMTEK-programme, which is a Norwegian government programme to promote the introduction of energy efficient products.

The reason for these results is the regenerative heat exchanger, which is a key component of the Norwegian ventilation system ENERVENT TS, made by the Norwegian company Ener-Product A.S. The system is designed for use in single family homes, semi-detached houses, small kindergartens etc. The regenerative heat exchanger is made up of two

cassettes filled with corrugated aluminium sheets. An alternating flow of supply and exhaust air flows through the cassettes. One of the cassettes is "charged" by warm exhaust air, while the other is "discharged" by preheating supply air (outdoor air). Every 55 seconds a damper changes position and the cassette which was charged is discharged and vice versa.

Figure 1 explains the principle of the regenerative heat exchanger. The system is designed for easy removal and cleaning of the aluminium filling of the cassettes at appropriate intervals (usually twice a year). The cleaning is done with water from a garden hose. The system also has an easily replaceable supply air filter.

The measurements proved that the heat exchanger has a temperature efficiency of 85-90%. This is the reason why the 100 m² single family house can be ventilated with an air exchange rate of 1.0 h⁻¹ (i.e. 240 m³/hour) and still use less than half the amount of energy for ventilation compared to the Norwegian Building Code (mechanical extraction system with air exchange rate of 0.5 h⁻¹).

For a new 100 m² house, taking ENERVENT TS into account from the start, the extra installation costs compared to a standard mechanical extraction system are less than USD 2000. With the average price of electricity in Norway being USD 0.07/kWh the extra investment has a payback period of approximately three years. For larger houses, or in countries with higher electricity prices, the payback period will be shorter.

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Figure 1: Schematic drawing of the ENERVENT TS ventilation system with regenerative heat exchanger.

