



Big Dutchman®



Earny Heat Exchanger

saves heating costs, improves the house climate and reduces emissions

Earny – the innovative heat exchanger

The **Earny** heat exchanger developed by Big Dutchman is used to recover heat from the exhaust air of broiler houses. Depending on the location and the respective conditions on site, it is possible to

save between 35 and 60 percent of heating costs! Apart from the energy savings and an improved house climate, there is an additional aspect whose importance is

steadily increasing: the reduction of emissions such as dust, odour and ammonia.



New: Earny type 40,000 now with the highly energy-efficient ECblue ZN80 fan!



DLG test report 6140F

Set-up of the Earny heat exchanger

Mode of operation and technical specifications

Earny is a cross-flow heat exchanger. This means that warm house air (1) and cold fresh air simultaneously pass through the exchanger bundle without mixing. The filter unit (2) ensures that the exhaust air is cleaned before it enters the heat exchanger and achieves a separation rate of dust of up to 99 percent. This way there is no danger of a drop in performance of the exchanger during the grow-out. The filter cartridges are cleaned fully automatically (3) by means of compressed air. The exchanger element (4) is made of aluminium and has a ruffled structure, thus

ensuring a high heat transfer rate. A special coating protects the material against ammonia and CO₂. The warmed

fresh air flows directly into the house via the shortest route (5), another important advantage of the system.

Earny	Type 20,000	Type 30,000	Type 40,000
Max. air capacity (m ³ /h)	12,000	16,000	25,000
Max. recovery capacity (kW)	81	110	170
Fresh air fan (400 V, 50/60 Hz)	FN063	FN063	ZN080**
Exhaust air fan (400 V, 50/60 Hz)	FN063	FN063	FN063
Length x width x height (m)	5.20x1.45x2.30	5.20x1.76x2.30	5.20x2.30x2.30

* depending on structural conditions and the selected inlet opening

** innovative EC blue fan with guide vane → energy savings of up to 20 percent

The advantages at a glance

- ✓ energy savings between 35 and 60 percent depending on the location and conditions on site;
- ✓ heat recovery rate of up to 170 kW;
- ✓ minimum assembly requirements: Earny is delivered ready for installation;
- ✓ intelligent control via ViperTouch climate computer or amacs;
- ✓ no unhygienic pipe systems, no energy loss: extremely short distances between house and heat exchanger;
- ✓ optimal house climate → healthy animals;
- ✓ dry litter → healthy feet, better production results;
- ✓ reduction of emissions (ammonia, dust, odour) from the house;
- ✓ reduction of CO₂ emissions;
- ✓ fully automatic cleaning of the filter unit during the grow-out → no performance loss;
- ✓ easy wet cleaning of the filter unit after the grow-out; in case of freezing temperatures, the filter can be disassembled easily and quickly and cleaned inside the house;
- ✓ can be retrofitted in old or refurbished houses.

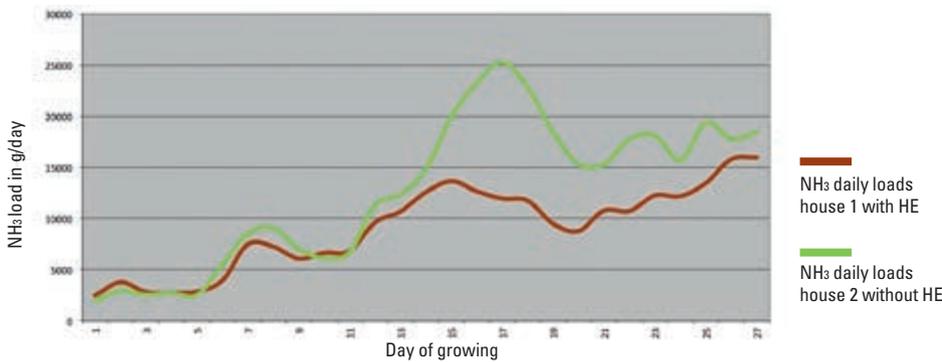
Earny significantly contributes to emission reduction

Reducing emissions from livestock housing facilities will become more and more important in the future. In order to obtain a building permit for a poultry house, public authorities more often than not require the installation of an exhaust air cleaning system. The focus is put on ammonia,

odour and dust. Depending on where the poultry house is located, the emission mixture might differ. With the Earny heat exchanger (HE) by Big Dutchman, your contribution to the reduction of emissions can be significantly increased!

Measurements carried out by the LUFA North-West (accredited German Agricultural Analysis and Research Institute) for a period of 44 days at a broiler growing operation with 41,100 birds per house (house 1 with HE, house 2 without HE) showed the following results:

1. Ammonia – 29 % less ammonia emissions



Ammonia emissions

The diagram shows the daily ammonia loads of houses 1 and 2. During the test period, NH₃ emissions amounted to 308 kg without HE, while they were at 219 kg with HE – a reduction of nearly one third!

2. Odour – 33 % less odour emissions per year

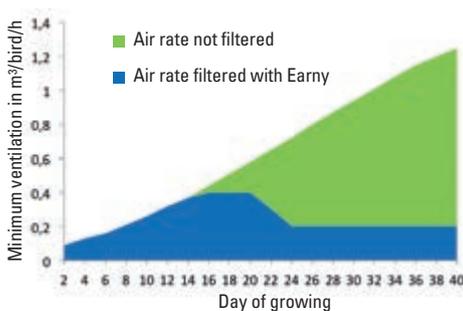
Day of growing	House 1 (with heat exchanger) [MOU/LU]*	House 2 (without heat exchanger) [MOU/LU]*
28	624	806
29	431	885
35	560	633
36	509	864

* Mega odour unit/Livestock unit

Odour emissions (olfactometric measurements)

Odour emissions from house 1 are clearly lower than those of house 2. The average mean values of all measurements show that odour emissions were reduced by one third (33 percent)!

3. Dust – 11 to 28 % dust separation per year



Dust separation (measured at the outlet of the heat exchanger)

The exhaust air that flows through the heat exchanger is completely cleaned from dust by means of the integrated filter unit. Measurements of total dust have shown a dust separation rate of up to 99 percent. The exhaust air was furthermore tested for fine dust (PM₁₀; PM_{2.5}). The results showed similarly high degrees of efficiency.

In terms of energy saving measures, the

heat exchanger should be operated in stand-by mode after the end of the heating period. This means the HE operates with reduced output. When the humidity in the house is higher than the set value, the heat exchanger automatically increases the ventilation level. Depending on the mode of operation of Earny, the fine dust separation rate lies between 11 and 28 percent per year.



Using Earny saves heating costs and improves the house climate at the same time! Ammonia and odour

emissions from the house are reduced by approx. 30 percent and the exhaust air filtered by the heat

exchanger has a dust separation rate of 99 percent.

Reduction of bioaerosol emissions – we provide solutions!

In regions with a high livestock density, bioaerosols are increasingly moved into the focus of public attention. The term bioaerosols comprises airborne micro-organisms such as fungus, bacteria and viruses. They occur everywhere in nature and are also part of the exhaust air of

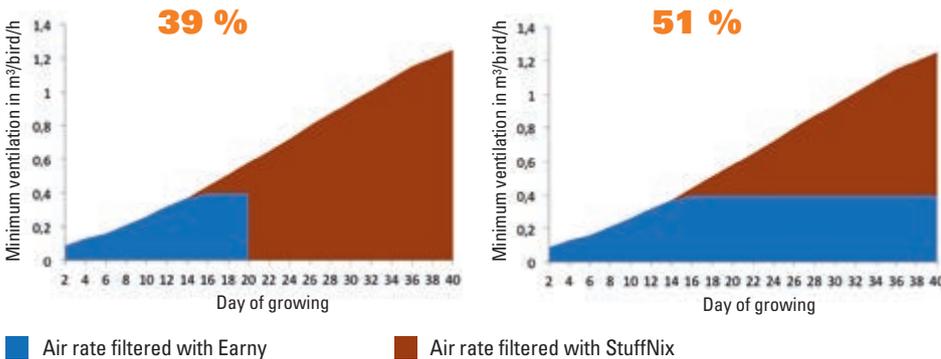
livestock production facilities. As there is a danger that bioaerosols might cause infections and allergies, Big Dutchman has taken on the responsibility to search for efficient and at the same time economic solutions to reduce their occurrence.

Using Earny means you will not only save heating costs but also reduce fine dust emissions. In combination with the StuffNix dust filter, up to **51 percent** of fine dust and bioaerosols can be filtered from the house air!



Use of the StuffNix dust filter in a broiler house – qualified measurements determined a total dust separation rate of up to 70 percent and a separation rate of fine dust of 32 percent.

Reduction of fine dust and bioaerosol emissions by 39 to 51 %



The calculated annual separation of fine dust in a broiler house with approx. 40,000 birds and a production cycle of 42 days is:

- 11 to 28 percent with Earny, depending on the mode of operation

- approx. 32 percent with the StuffNix dust filter.

These values can be increased significantly when both systems are combined: In this case, you can achieve 39 percent if Earny

is active for the first 20 days of growing or a maximum of 51 percent if Earny is active for the entire grow-out. The remaining exhaust air is cleaned continuously by means of the StuffNix dust filter.

Advantages of StuffNix

- ✓ high storage potential thanks to the V-shaped sedimentation chambers outside of the air flow;
- ✓ stable flow resistance as the air flow remains unobstructed;
- ✓ good dimensional stability of the filters due to their geometrical structure;
- ✓ long service life of the plastic filters;
- ✓ fast assembly: the filter elements can simply be fitted and fixed to the required size;
- ✓ StuffNix is a dry filter → use of water is not necessary;
- ✓ much lower investment, operating and maintenance costs as compared to wet-type exhaust air cleaners.



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