



Big Dutchman®



Heat exchanger **Earny**

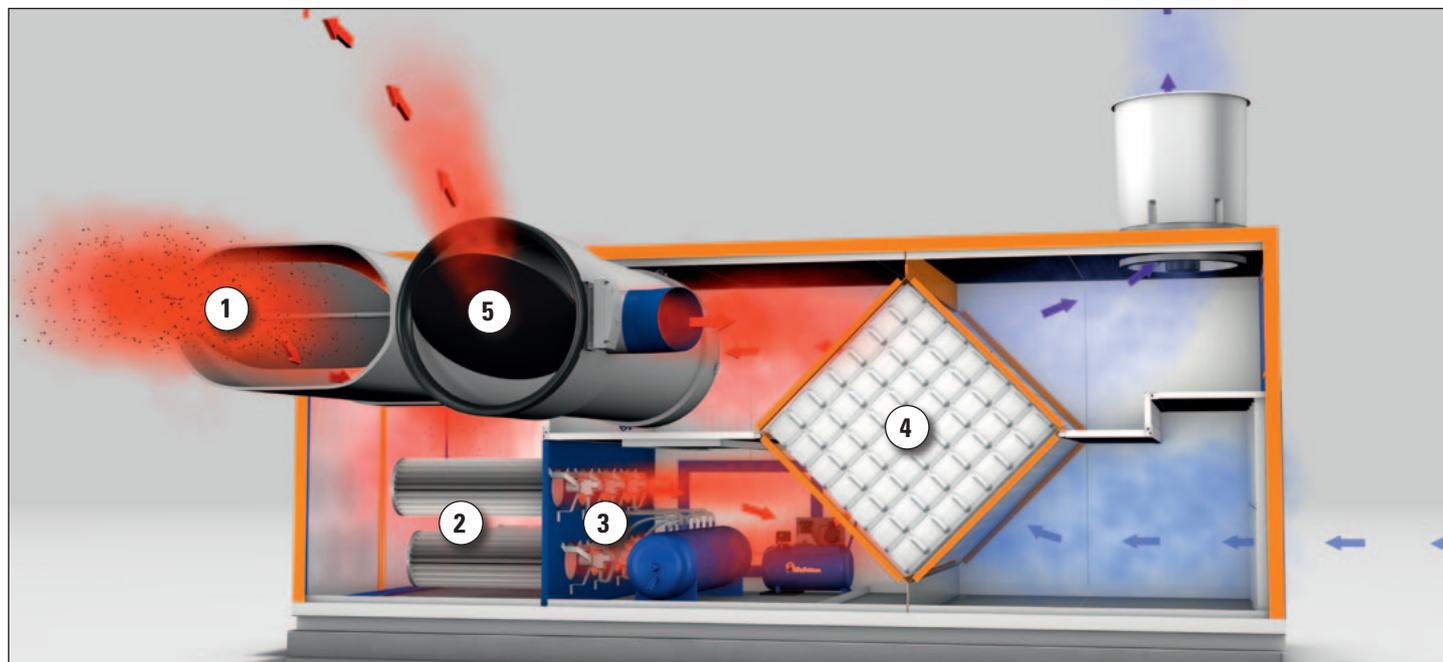
saves heating costs, improves the house climate and
reduces emissions

Earny – the innovative heat exchanger

The heat exchanger **Earny** developed by Big Dutchman is used for heat recovery from exhaust air of broiler houses. Depending on the location and the respective

conditions on site, it is possible to save between 35 and 60% of the heating costs! Apart from saving of energy and an improved house climate, there is an

additional aspect that will become more important in the future: reduction of dust, odour and ammonia emissions.



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 bundles without mixing. A filter unit (2) ensures that the exhaust air is cleaned before it enters the heat exchanger. The filter unit achieves a separation rate of dust of up to 99 %. 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. This ensures a high heat transfer rate. A special coating protects the material against ammonia and CO₂. An additional important advantage

is that the fresh air flows into the house via the shortest route directly through the side wall (5).

Type	Earny 12000	Earny 16000	Earny 25000
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)	FC063	FC063	FC080
exhaust air fan (400 V, 50/60 Hz)	FC063	FC063	FC063
length x width x height (m)	5.20x1.45x2.30	5.20x1.76x2.30	5.20x2.30x2.30

* depending on structural conditions and chosen inlet opening

The advantages at a glance:

- ✓ energy-savings from 35 to 60 % based on the location and conditions on site;
- ✓ heat recovery rate of max. 170 kW;
- ✓ Earny is delivered ready for installation on a concrete base and ready for connection → min. assembly requirements;
- ✓ intelligent control via climate computers ViperTouch or amacs;
- ✓ extremely short distance between house and heat exchanger → no energy loss, no unhygienic pipe systems;
- ✓ optimal house climate → healthy birds;
- ✓ 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 easily and quickly be disassembled and cleaned inside the house;
- ✓ can easily be retrofitted in old or refurbished houses.

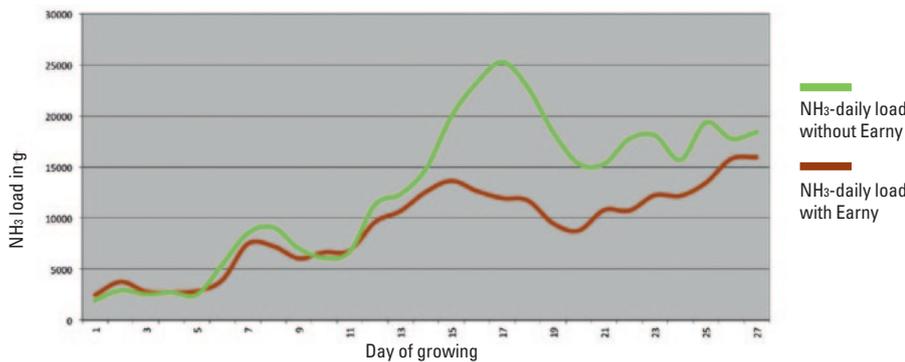
Earny contributes to emission reduction

Reducing emissions from livestock housing facilities will become more and more important in the future. In order to get a building permit for a poultry barn, 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 its heat exchanger (HE) Earny, Big Dutchman can help you to reduce emissions, depending on the type of production. Measurements carried out by the

LUFU Northwest for a period of 44 days at a broiler growing operation with 41,100 birds each per house (house 1 with HE, house 2 without HE) showed the following results:

1 Ammonia – 29% less ammonia emissions per year



Ammonia emissions

The measured difference for the indicated time frame is 219 kg NH₃ in a house with HE compared to 308 kg NH₃ without HE. The diagram shows the daily ammonia load of house 1 with HE and house 2 without HE.

2 Odour – 33% less odour emissions per year

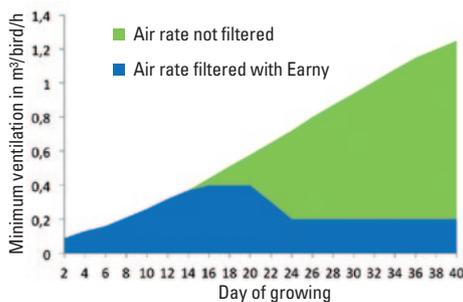
Day of growing	House 1+ (heat exchanger) [MOU/LU]*	House 2 (without heat exchanger) [MOU/LU]
28	624	806
29	431	885
35	560	633
36	509	864

*Mega odour unit/Livestock unit

Odour emissions (olfactometric measurements)

Odour emissions from house 1 with HE are lower than those of house 2 without HE. The average mean values of all measurements show that house 1 with HE has 33% less odour emissions than house 2.

3 Dust – 11 to 28% dust separation/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% at the outlet of the HE. The exhaust air was furthermore tested for fine dust (PM₁₀; PM_{2.5}) where a similar high degree of efficiency was measured.

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 its ventilation. Depending on the mode of operation of Earny, the fine dust separation lies between 11 to 28% per year.



With Earny you can save heating costs and improve the house climate at the same time.

Ammonia and odour emissions from the house are reduced by approx. 30%. The exhaust air which is

filtered by the heat exchanger has a dust separation rate of 99%.

Reduction of emission of bioaerosols - we provide solutions!

In regions with a high livestock density, bioaerosols are increasingly put in 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

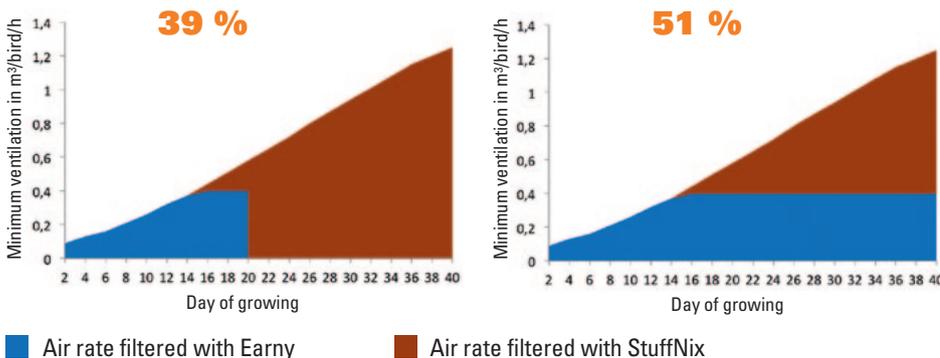
livestock production facilities. As bioaerosols might cause infections and allergies, Big Dutchman has taken on the responsibility to search for efficient and economic solutions to reduce their occurrence. With Earny you will not only save heating costs but also reduce dust

emissions. In combination with the StuffNix dust filter up to **51 %** 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 % and a separation rate of fine dust of 32 %.

Emission reduction of fine dust and bioaerosols 39 to 51 %



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

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

- approx. 32 % with StuffNix dust filter
- These values can be increased significantly when both systems are combined. In this case you can achieve 39 % if Earny is active for the first 20 days of growing or max. 51 % 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 as 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.



Big Dutchman

Germany:
Big Dutchman International GmbH
 Postfach 1163 · 49360 Vechta
 Tel. +49(0)4447 801-0 · Fax -237
 big@bigdutchman.de
 www.bigdutchman.de

USA: Big Dutchman, Inc.
 Tel. +1 616 392 5981 · bigd@bigdutchmanusa.com
 www.bigdutchmanusa.com

Brasil: Big Dutchman (Brasil) Ltda.
 Tel. +55 16 2108 5300 · bigdutchmanbrasil@bigdutchman.com.br
 www.bigdutchman.com.br

Russia: 000 "Big Dutchman"
 Tel. +7 495 2295 171 · ikotov@bigdutchman.ru · www.bigdutchman.ru

Asia/Pacific: BD Agriculture (Malaysia) Sdn. Bhd.
 Tel. +60 3 3361 5555 · bdasia@bigdutchman.com · www.bigdutchman.com

China: Big Dutchman (Tianjin) Livestock Equipment Co., Ltd.
 Tel. +86 10 6476 1888 · bdcnsales@bigdutchman.com
 www.bigdutchman.cn

