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Brief history of ITB Climate

- ✓ Founded in 1982 as installation company of heating and sanitary in farms
- ✓ 1982/1983: started production of ventilation chimneys and tube heat recovery units

- ✓ 1987: Specialisation in development and production of climate systems
- ✓ Focus was on pig- and poultry farms

- ✓ Developed products:
- ✓ Mid 1990s: Geothermal system
- ✓ 2002: GreenVent system for Greenhouses
- ✓ 2003: Air Scrubbers (NH₃ and odour reduction)
- ✓ 2006: Air2Pigs heat recovery unit for air scrubbers
- ✓ 2012: Air2-DS heat recovery unit
- ✓ 2018: Fine dust filters for poultry houses



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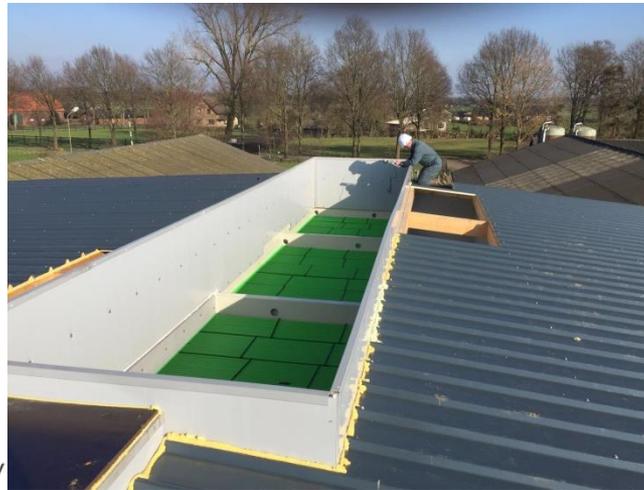
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ITB heat exchangers (different types)

- ✓ Air to Air heat exchangers with tubes or 8m planks
- ✓ Completely from plastic, optimized for agriculture
- ✓ High efficiencies (60 – 85%) and low maintenance
- ✓ Short ROI (approximately 3-4 years)



Air2-DS heat exchanger



Air2-pigs tube heat exchanger (on top of air scrubber)

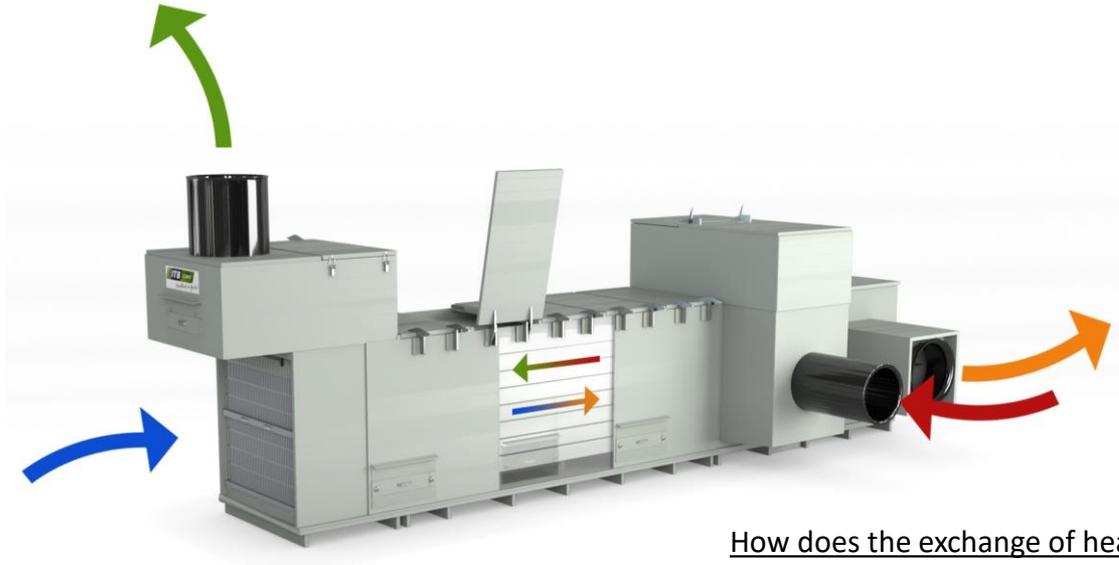


Air2 tube heat exchanger



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Air2-DS Heat exchanger (the working principle)



-  Cold ambient air
-  Inlet air, heated with HE
-  Warm extract air from house
-  Exhaust air

How does the exchange of heat takes place:

Cold ambient air is transported through the 8 meters long hollow pvc planks with a air supply fan. Warm air is being extracted from the house and moves on the outside of the planks in the opposite direction. Over these 8 meters the energy transfer takes place between the warm extracted air and the cold ambient air. This results in a thermal efficiency of more than 80% for the ITB Air2-DS heat exchanger.



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Air2-DS Heat exchanger (some attention points)

- ✓ Air to Air heat exchanger
- ✓ Housing made from 50mm UV resistant PolyPropylene sandwich panels with enclosed air layer for insulation. Panels are welded together, water tight, no silicone sealants are used
- ✓ Heat exchanging hollow pvc planks with a length of 8 meters
- ✓ High thermal efficiencies (**more than 80%**) and low maintenance
- ✓ NO CORROSION of the heat exchanger possible!!
- ✓ Short ROI (approximately 3-4 years)
- ✓ Automatic spraying system with nozzles to clean the planks (In case of broilers, we advise to clean the planks manually with a high pressure hose after every round. In case of laying hens we advise to clean the planks additionally during the round, depending on the pollution of the planks.



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Air2-DS Heat exchanger (different sizes)



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Air2-DS Heat exchanger (some details)



Spraying nozzles for automatic cleaning



Temperature sensor inlet air



Service openings for cleaning bottom unit



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Air distribution 1

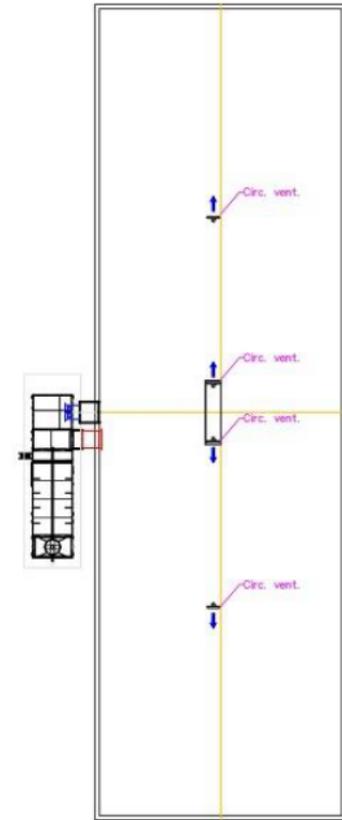
- ✓ Air inlet with inlet louver in side wall:



- ✓ Air catcher in the ridge of the house:



- ✓ Air distribution in the house with air catcher and circulation fans:



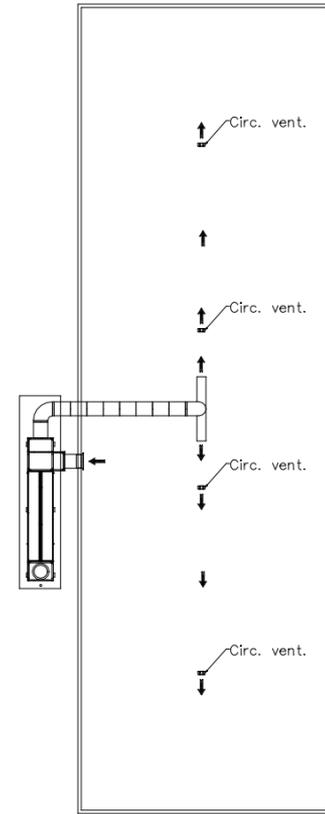
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Air distribution 2

- ✓ Air inlet with ducts over the roof:



- ✓ Air distribution in the house with circulation fans:



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Air2-DS Heat exchanger (main reasons for using)

Main reasons for Dutch farmers to use the plate heat exchanger:

- ✓ Fine dust reduction: 13%, 37% and 50% (depending on amount of extracted air through the heat exchanger per bird).
See also BWL 2012.03.V6, BWL 2017.03.V3, BWL 2018.05.V2 (Dutch version only)
- ✓ Ammonia reduction, 30% (for broiler houses: 0,35 m3/h/bird, in combination with circulation fans).
See also BWL 2010.13.V7
- ✓ Recovery of energy, more than 80% efficiency
- ✓ Improve the climate in the house
 - ✓ Better growth
 - ✓ Healthier animals



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Calculation example energy savings heat exchanger

Savings on energy costs due to use of heat exchanger:		
Capacity heat exchanger	21000	m ³ /h
Average operating % of maximum capacity	67%	
Average air flow	14000	m ³ /h
Average annual ambient temperature	9,8	°C
Average room temp. broiler house during use of heat exchanger	30	°C
Efficiency heat exchanger	80%	
Air inlet temperature in house	25,8	°C
Heating capacity	75	kW
Number of production days per week	7	days
Number of production hours per day	24	hour
Average number of production weeks per year	21	weeks
Number of months when heating/year	12	months
Number of heating hours per year	3528	hour
Required energy per year	264.741	kWh
Required energy per year	953.068	MJ
Heating value of natural gas	33,41	MJ/m ³
Annual use of gas:	28.526	m³
Total cost price of natural gas:	€ 0,50	
Yearly savings on use of natural gas:	€ 14.263,22	

Electricity consumption heat exchanger vs. electricity consumption roof- or wall fan					
Heat exchanger (21.000 m ³ /h)			Wall fan (21.000 m ³ /h)		
Maximum fan power (2 fans)	5,6	kW	Maximum fan power	1,05	kW
Average consumed fan power	35%		Average consumed fan power	35%	
Average consumed fan power	1,96	kW	Average consumed fan power	0,3675	kW
Number of running hours per year	3528	hour	Number of running hours per year	3528	hour
Total consumed fan energy	6914,88	kWh	Total consumed fan energy	1296,54	kWh
Extra consumed fan energy heat exchanger:	5618,34	kWh			
Cost price of 1 kWh electricity	€ 0,10				
Extra costs due to fans heat exchanger	€ 561,83				
Total yearly energy savings heat exchanger			€	13.701,38	



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