HatchTech
INCUBATION TECHNOLOGY

Technical Information

Fluff Production
In Hatchers

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From an environmental standpoint, expelling fluff from hatcheries and more specifically from hatchers is gaining in interest. A number of hatcheries are currently confronted with regulations concerning the amount of dust (or fluff) that can be introduced into the environment.

Fluff production in HatchTech hatchers
The HatchTech R&D Department measured the amount of fluff expelled from both the 28800 and 42240 hatchers. In both machines the production of fluff is approximately 7.7 grams per 1000 hatched chicks. This is the amount of fluff that leaves the machine in the outgoing air. The real production of fluff is actually much higher but the majority remains in the machines and the take off room. It does not leave the machine by the exhaust air.

Fluff production in other types of hatchers
Although chicks from HatchTech machines typically develop a large amount of fluff, HatchTech hatchers do not produce significantly more fluff than other machines. While the average air velocity in HatchTech hatchers is significant, the peak velocities are relatively low as the air velocity is very uniform at every spot in the machine. Traditional machines have a high air velocity around the stacks of hatcher baskets.

This forces the fluff to stay airborne and in motion. This means that in other machines a larger percentage of the fluff produced is actually exhausted with the outgoing air. Visual inspection of plenums shows that HatchTech hatchers do not exhaust more fluff into the plenum than other hatchers, despite the fact that the amount of fluff in the machines itself is significantly increased.

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Amount of air during hatching (period of fluff production)
While production of fluff starts shortly after the first chicks have hatched, the amount is negligible since there are relatively few chicks and they are still wet. Noticeable fluff production starts 3 to 6 hours after the first chick has hatched from the shell. During that time, the typical ventilation volume is approximately 5 m^3 per hour for each 1000 eggs/chicks. Over a period of approximately 12 hours the ventilation increases in a linear pattern to approximately 17 m^3 per hour for each 1000 chicks/eggs. The maximum ventilation is maintained for approximately 12 hours until the chicks are removed from the hatcher and the ventilation is reduced to zero (see: appendix).

The total amount of ventilation for every 1000 chicks during the hatching or fluff production period is:

12 hours x 11 m^3 per hour = 132 m^3 and

12 hours x 17 m^3 per hour= 204 m^3

The total amount of ventilation per 1000 chicks during the hatching period is 336 m^3. This means approximately 350 m^3 of air per 1000 chicks hatched is necessary for ventilation of the hatcher in the period that fluff is produced. This figure will be more or less standard for each modern machine in the field, regardless of brand or type. At this ventilation rate, the CO_2 level will be approximately 3000 to 4000 ppm. Older machines that rely on air for cooling will ventilate substantially more.

Amount of fluff in untreated exhaust air
With a ventilation rate of 350 m^3, every 1000 chicks produce 7.7 grams of fluff in the hatch period. If no plenum or HatchTech CyCleanTM is used, there will be 0.022 g or 22 mg of fluff in each cubic meter of exhaust air.

Amount of fluff in exhaust air when a plenum is used
The HatchTech R&D Department measurements show that a plenum in an ideal situation captures approximately 50% of the fluff in the outgoing air. With a properly functioning plenum, there is 11 mg of fluff per cubic meter of exhaust air leaving the hatchery.

Amount of fluff in the exhaust air with the HatchTech CyClean™

The HatchTech R&D Department measurements show that the HatchTech CyClean™ in the hatcher reduces the amount of fluff in the exhaust air at least 95%. With the HatchTech CyClean™, the amount of fluff in the exhaust air of the hatchers is reduced to only 1 mg per m^3 of exhaust air, 10 mg per m^3 of exhaust air less than a properly functioning plenum.

To summarize:

Amount of fluff per m^3 of exhaust air				
System	**Ventilation during hatch period (m^3)**	**Amount of fluff produced per 1000 chicks (g)**	**Reduction (%)**	**Fluff in exhaust air (mg/m^3)**
No treatment	350	7,7	0%	22
Plenum	350	7,7	50%	11
CyClean™	350	7,7	95%	1

** All data are per 1000 chicks*

In Figure 1 the amount of fluff in the exhaust air is given for a hatcher that has a capacity of 40,000 eggs. This figure illustrates that the total amount of fluff that this hatcher expels (in one hatching period) without plenum or HatchTech CyClean™ is approximately 320 grams, or 22 mg/m^3 of exhaust air. When a plenum is used, the total amount of fluff is 152 grams or 11 mg/m^3 of exhaust air. A hatcher equipped with a HatchTech CyClean™ will produce a total of 16 grams fluff or 1 mg/m^3 of exhaust air.

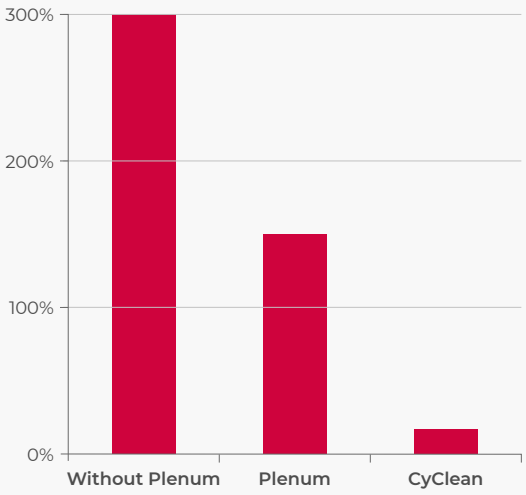
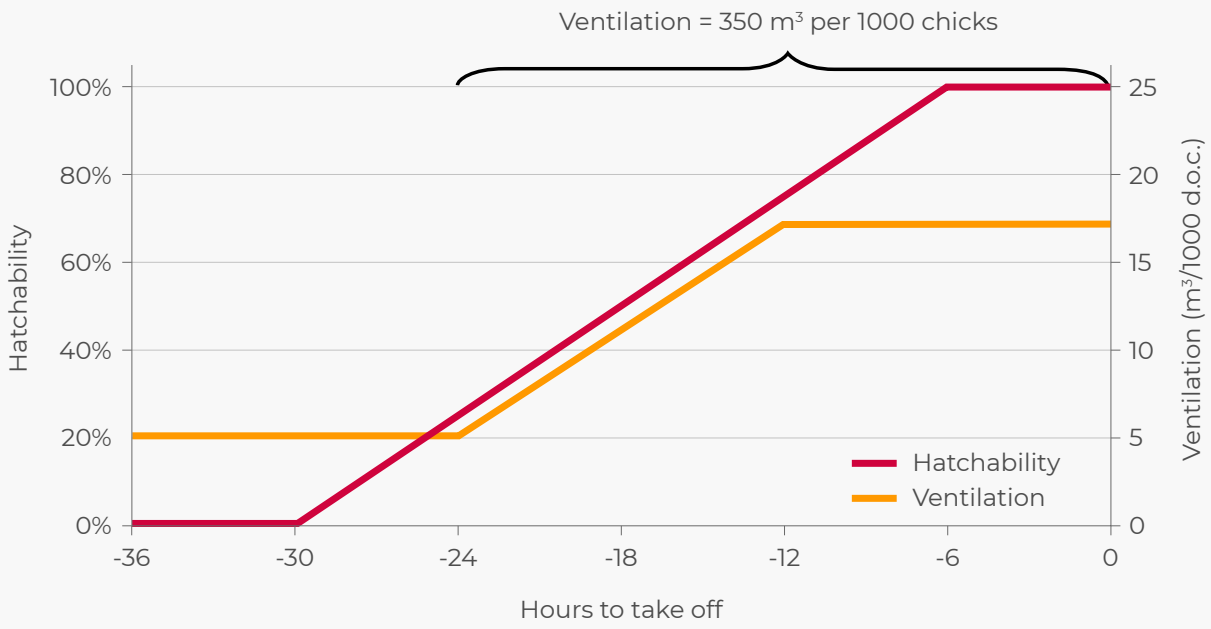


Figure 1: *Total amount of fluff in the exhaust air of a hatcher with 40.000 eggs/chicks capacity*

Total Amount of Fluff in Exhaust Air during Peak Production of Fluff

The above calculations are based on equal production of fluff over time. It also assumes that all of the exhaust air contains the same quantity of fluff. In reality, a peak production of fluff in certain periods can be expected.

For example, suppose the maximum allowed concentration of fluff in every m^3 of air is 5 mg/m^3 of air. With the HatchTech Cyclean™, the maximum allowed exhaust concentration is not exceeded if the peak production of fluff at any given moment is 5 times higher than the average. The HatchTech CyClean™ provides clean air in and around the hatchery, in combination with a significant space and cost reduction.



Appendix: *Hatch pattern and ventilation pattern of a hatcher. Fluff production starts several hours after start hatching*

Source: International Hatchery Practice
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