

How to capture chick fluff 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.

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 7.7g per 1,000 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.

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 traditional 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.

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 three to six hours after the first chick has hatched from the shell.

During that time, the typical ventilation volume is approximately 5m³ per hour for each 1,000 eggs/chicks.

Over a period of approximately 12 hours the ventilation increases in a linear pattern to approximately 17 m³ per hour for each 1,000 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 Fig. 1).

The total amount of ventilation for every 1,000 chicks during the hatching or fluff production period is:

$$12 \text{ hours} \times 17 \text{ m}^3 \text{ per hour} = 204 \text{ m}^3.$$



HatchTech CyClean.

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The total amount of ventilation per 1,000 chicks during the hatching period is 336m³.

This means approximately 350m³ of air per 1,000 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 carbon dioxide level will be approximately 3000-4000ppm. Older machines that rely on air for cooling will ventilate substantially more.

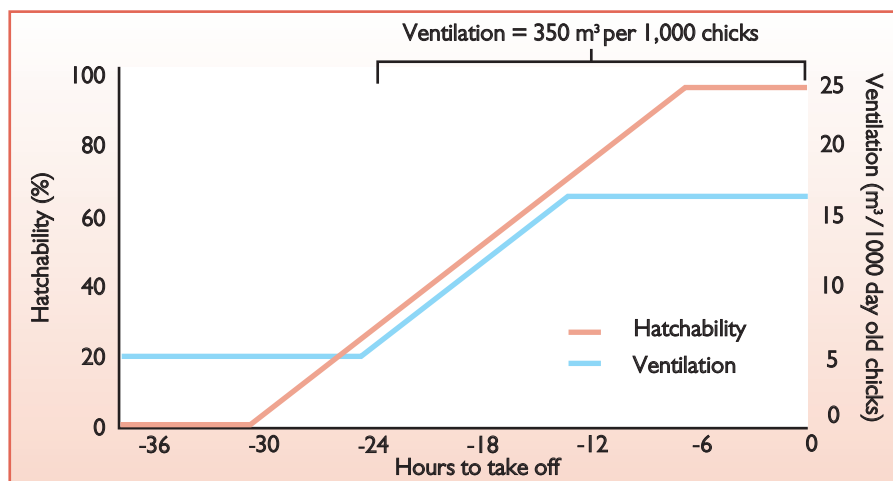
Untreated exhaust air

With a ventilation rate of 350m³ every 1,000 chicks produce 7.7g of fluff in the hatch period. If no plenum or HatchTech CyClean is used, there will be 0.022g or 22mg of fluff in each cubic meter of exhaust air.

The HatchTech R&D Department measurements show that a plenum in an ideal situation captures approximately 50% of the fluff in the outgoing air.

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Fig. 1. Hatch pattern and ventilation pattern of a hatcher. Fluff production starts several hours after start of hatching.



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With a properly functioning plenum, there is 11 mg of fluff per cubic meter of exhaust air leaving the hatchery.

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 hatcher is reduced to only 1 mg per m³ of exhaust air, 10mg per m³ of exhaust air less than a properly functioning plenum (see Table 1).

In Fig. 2 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

System	Ventilation during hatch period (m ³)	Amount of fluff produced per 1,000 chicks (g)	Reduction (%)	Fluff In exhaust air (mg/m ³)
No treatment	350	7.7	0	22
Plenum	350	7.7	50	11
Cycleclean	350	7.7	95	1

*All data are per 1,000 chicks

Table 1. Amount of fluff per m³ of exhaust air.

of fluff that this hatcher expels (in one hatching period) without plenum or HatchTech CyClean is approximately 320g, or 22mg/m³ of exhaust air.

When a plenum is used, the total amount of fluff is 152g or 11 mg/m³ of exhaust air. A hatcher equipped with a HatchTech CyClean will produce a total of 16g fluff or 1 mg/m³ of exhaust air.

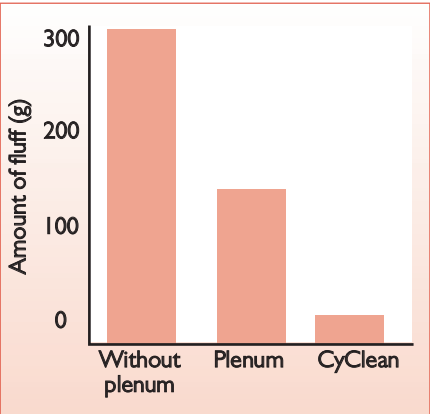


Fig. 2. Total amount of fluff in the exhaust air of a hatcher with 40,000 eggs/chicks capacity.

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 m³ of air is 5mg/m³ of air.

With the HatchTech Cycleclean, the maximum allowed exhaust concentration is not exceeded if the peak production of fluff at any given moment is five 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. ■

