

Hatchery Sanitation: Basics and Innovations

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Hatcheries are changing worldwide to meet current and future demands. Today hatcheries are recognized as a key step in the food production chain. The hatchery hygiene standard must be very high to meet these demands. Innovation in hatchery design, ventilation systems, and sanitation are the keys to achieving high-level hatchery hygiene.

There are two main considerations in designing and maintaining a high-level hygiene hatchery:

- Incubation equipment
- Machine and ventilation design

Incubation equipment

A critical control point in hatchery sanitation is the incoming egg sanitation. Eggs that enter the hatchery are dirty until they are fumigated. HatchTechnology hatcheries have a sealed fumigation chamber to sanitize the eggs before they enter the hatchery egg room. The HatchTechnology controller and software control the fumigation cycle to ensure efficacy. HatchTechnology fumigation chambers are gas sealed to prevent leakage of the formaldehyde into the environment.

Single stage incubators are cleaned between every set. In contrast, multistage incubators are not designed to be cleaned between sets. Multistage incubators are incompatible with a high-level hygiene hatchery.

Ultimate machine sanitation

HatchTechnology single stage incubation equipment incorporates Ultimate Machine Sanitation™ (UMS™). The most difficult part of a sanitation program for incubators and hatchers is to consistently remove all organic matter from the surfaces. Organic matter makes it impossible to kill the microorganisms hidden beneath the organic matter. Organic matter such as fluff, blood, shells, meconium and dirt inactivates disinfectants.

Innovations in Hatchery Sanitation

- HatchTechnology Fumigation Room for effective egg sanitation
- UMST™ Technology for simple and effective machine sanitation
- Uniform Embryo Activator™ Technology for full control of the preheat cycle to eliminate contamination caused by egg condensation
- CyClean™ for clean air around the hatchery and preventing cross contamination by reintroduction of discharged fluff
- Machine and ventilation design to effectively prevent contamination
 - Fresh air supply, no return air
 - Directly ducted pressurized fresh air supply to the machines
 - Gas sealed machine design
 - Technical area isolation
 - Automation friendly equipment
- Controlled biosecure work and airflows

After cleaning and disinfection is finished, the UMST™ Program uses a combination of heat and formaldehyde to ensure effective sanitation on all surfaces. The hot air and formaldehyde effectively disinfect the difficult areas that are often missed in normal cleaning and sanitation. The UMST™ Program is effective against contaminants that are resistant to heat sanitation such as fungi and spores.

Condensation

Condensation on eggs allows bacteria to enter the eggshell, where they can grow and multiply. This occurs when eggs are prewarmed in the setter hall or moved directly into an incubator at operating temperatures. The only way to prevent

condensation when eggs are moved from the egg holding room into the incubation process is to control the environment.

The HatchTechnology Uniform Embryo Activator™ prevents condensation on the eggs. Eggs are placed in the incubator and the Uniform Embryo Activator™ technology controls the progression of egg temperatures from the egg holding to the incubation temperature. In HatchTechnology, prewarming prior to setting the eggs is not necessary. Eggs are held and preheated in the controlled environment of the incubator. There is no condensation on the eggs since the increase in temperature is step wise and controlled.

Machine and ventilation design

The most difficult problem in hatcheries is the daily prevention of cross contamination. The key in maintaining high-level hatchery hygiene is in the machine and ventilation design of the hatchery. The airflow must be controlled by pressure in each area and must flow from clean areas to dirty areas. The machines and the ventilation system must be designed to prevent cross contamination. HatchTechnology prevents cross contamination in the hatchery with seven design features:

- Return air must not be used. Return air is air that is captured for reuse before it is discharged from the hatchery. In machines that use air for cooling, the volume of air needed is large and therefore the cost of conditioning the air is very expensive. To minimize operational costs, return air is used. Return air allows aspergillus and bacteria to become established in a hatchery. In HatchTechnology incubation equipment, the cooling is in the radiators. Air is not used for cooling, so there is no economic demand to use return air.

- The air supply is pressurized and is directly ducted from the air handling unit to the incubator and hatcher. The movement of the air into the machines is controlled. There is no machine air intake from a common hall.
- HatchTechnology incubators and hatchers are gas sealed. This means that there is no leakage of air from inside the machine into the common hall.
- Cross contamination in the hatchery often results from discharged fluff being pulled back into the hatchery by the ventilation system. In a typical one million day old chicks a week hatchery, 200kg of fluff a year is exhausted to the environment by a typical plenum exhaust system. The HatchTechnology CyClean™ prevents this problem by trapping 95% of the fluff that is exhausted by the hatchers. It prevents reintroduction of the fluff to the hatchery and creates a clean air biosecurity around the hatchery.
- In good hatchery design, the area on the top of the machines is sealed from the “dirty” production areas. This prevents fluff and bacterial contamination from establishing on the hard to clean tops of the machine. In HatchTechnology, the technical area of the machine is located on the top of the machine. Maintenance can be carried out without entering the production area.
- The hatchery design must maintain separate personnel, egg and chick movement to prevent cross contamination. The most effective design from a biosecurity and sanitation

perspective is a rectangle. In this simple design, the eggs are brought in at one end and the chicks are sent to the farm from the opposite end. Hatchery personnel are divided into two groups, one works on the incubator side and the other group works on the hatcher side.

- Appropriate use of automation in the hatchery means that equipment can be sanitized online at every critical control point. This minimizes labor and cross contamination. HatchTechnology equipment is “automation friendly”.

Conclusion

In conclusion, a high level hygiene hatchery must have the following included in the design and operation of the hatchery:

- Effective egg sanitation
- Single stage incubation
- Effective machine sanitation
- Prevention of egg condensation
- Directly ducted pressurized air supply to machines
- Only fresh clean air usage
- Gas sealed machine design
- Fluff capture from hatcher exhaust
- Technical area isolation
- Automation friendly
- Controlled biosecure work and airflows

Hatchery hygiene begins with design and continues on a daily basis with the sanitation program. A well-designed hatchery, incubation equipment, and sanitation program are the cornerstones to preventing detrimental mold and bacterial challenges to the chicks, embryos, and eggs. The return on investment in hatchery hygiene is in quality, hatchability, and field performance of the chicks.