
# 01 HELPING OUR CUSTOMERS

The current poultry market is driven by a strong worldwide trend to increase broiler production globally in order to feed the increasing population of the world. Poultry production is becoming more and more competitive in recent years as a response to this trend.

In this scenario, hatchery automation becomes a very relevant player, as it is a perfect tool to help hatchery producers to achieve two major goals: minimise operational costs and maximise productivity. In other words, hatchery automation helps to produce more chicks and better quality chicks at a lower production cost.

On top of that, automation helps to solve two major problems of the modern hatchery industry: labour requirements and animal welfare. The market is demanding more and more that animals are well treated and free from stress and antibiotics. Automation is a natural facilitator of animal welfare and reduces the risk of cross contamination by improving biosecurity and hygiene.

Labour requirements represents one of the major headaches of hatchery production. There is traditionally a very high turnover of staff and it is becoming more and more difficult to find good quality workers and to keep them for long periods of time. Skills and know-how are hard to capitalise on. Automation becomes essential to overcome this problem.

In forthcoming issues we will cover the important factors of automation in the hatchery, focusing on the benefits that automation brings to the producer in terms of quality and quantity, but also reliability and flexibility. We will cover all hatchery activities susceptible to automation, area by area, to offer you a technical and objective guideline on how to improve hatchery productivity and minimise operational costs.

Areas to be covered by this series include the egg room; candling; transfer; egg/chick handling; washing; waste management; and vaccination.

As a world leader in hatchery automation for more than 10 years, ECAT helps hatchery producers to overcome day-to-day difficulties by offering a complete range of products to equip the hatchery and optimise the production process.

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# 02 CAROUSELS: VACCINATION & SEXING

The very first step in automation is having an automatic flow for trays, hatcher baskets, or chicks boxes, in order to minimise manual handling. Thus, staff can concentrate on sexing carousels or vaccination lines, keeping in mind that the main concern for the industry remains the management of chick flow, chick quality, animal welfare, biosecurity and labour costs.

The carousels have the capacity to optimise the space used inside the hatchery designated for sexing and vaccination activities:

- Increasing significantly the speed of the process and saving time.
- Reducing the unnecessary handling of the DOCs, eliminating biosecurity risks and reducing chick stress.

The most adapted type of carousel contains 5-16 operators, within a circular design carousel. For major capacities, on-line carousels are recommended. Considering the flow of DOCs, there are mainly two types of carousels available:

- Putting the chicks directly into the boxes (5-7 operators).
- Directly connected to a chick counter, right after vaccination: for high capacities (more than 7 operators).

The DOCs are normally guided to the carousels by a transport conveyor that turns in front of the operators. These carousels are ergonomic and designed to minimise the risk factors and increase safety, comfort, efficiency and productivity, for a better working environment. The operators do not need to move around to take new boxes of chicks as they do with a standard vaccination table. It optimises the movements of the operators and also reduces the stress of the chicks with a smooth process.

On stations mounted on carousels, the operators can individually vaccinate at speeds that can reach up to 3,000 birds per hour with efficiency of 98% or more. **Vaccination process speed is, on average, twice as fast with carousels than with manual DOC crate handling, considering crate handling and dead-times.** Even so, the quality of the chicks is still much better due to reduced handling. For sexing carousels, it is possible to achieve process speeds of around 3,000 birds per hour, depending on the skills of the workers.

Finally, when selecting a carousel, it is fundamental to keep in mind that the equipment must be easy to maintain, clean and disinfect; it should not contribute to cross contamination; and it must be user friendly.



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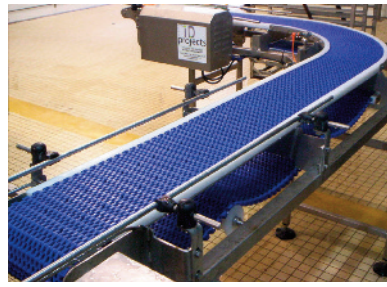
# 03 BIOSECURITY: AGRO-FOOD DESIGN

The issues surrounding effective biosecurity measures remain one of the key concerns for modern hatcheries today. In an industry which involves many elements of machinery processing large volumes of eggs and chicks, cross contamination is the main threat to safe and hygienic working practices. This hazard can present itself either between products i.e. egg-to-egg or chick-to-chick, or through hatchery machinery itself, with contaminative material remaining in areas which are difficult to clean efficiently.

One of the most effective ways to enhance biosecurity within hatcheries is through the use of equipment which has been meticulously designed to address contamination risk factors. ECAT and iD Projects utilises this 'agro-food' design standard in its hatchery equipment to protect from the risk of contaminants while maintaining high levels of performance. Crucial factors for effective agro-food design, include:

- The nature and quality of the materials used – mostly stainless steel, plastic, anodised aluminium and PEHD.
- Maximum water drainage coupled with non-accumulation/ retention areas to avoid deposits that might lead to cross-contamination.
- Robustness for use in a tough environment which includes washing, detergent, high speed of operation and a humid operating environment.
- Mindfulness of animal welfare and the subsequent application of constraint in factors such as drop height to prevent any injury.



An example of agro-food design can be seen in iD Projects' conveyors, which are designed with open sides, allowing for ease of cleaning under the belts. The conveyor frame has also been created so there is no retention of water on the corners and cross-sections. Other design issues for consideration include:

- Operator safety – the equipment must not create new risks for its operators.
- Ergonomic work stations – through the provision of low sound level, user friendly machinery including the use of IHM touch screens.
- Scalability – including the flexibility to adapt to potential hatchery evolutions and respond to market requirements.

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# 04 BIOSECURITY: HYGIENE STANDARDS

In our last issue, Ecat-iD outlined its approach to improving biosecurity through the use of agro-food design in its hatchery equipment. Here, we look at how maximising hygiene levels is also an important consideration.

## The challenges

For all hatcheries, meticulous attention to hygiene is crucial to guarding against damaging pathogens such as E. coli, salmonella and mycoplasma, and avoiding an environment which is attractive to vermin.

But, maintaining a clean environment is often a challenge. Hatcher baskets, for example, regularly hold chicks for several hours, resulting in them becoming heavily soiled with dried faeces, 'glued' feathers/fluff and shell fragments. The design of hatcher baskets also makes their cleaning more difficult than cleaning chicks boxes or setter trays and in general, more than any other boxes used in the industry. Logistical factors – such as different cleaning standards by different hatchery staff members – can pose additional challenges.

## The solution

Ecat-iD has developed a new range of washers which feature specific settings to handle the whole range of boxes used within hatcheries – including hatcher baskets, setter trays, chicks boxes and trolleys.


This new range of technologically-advanced washers offers a unique solution by allowing the tailoring of a washing program to the specific box being cleaned. The main feature is the ability to vary the speed of the wash, crucial for effective cleaning as a slower transit through the washing process gives better results on dirtier boxes. Other features, such as adjustable water pressure, temperature control and disinfection solutions ensure the best results on even the most soiled of hatcher baskets.

Ecat-iD Sales and Marketing Director, Vincent Fevrier, comments: "Adapting our new range of washers to tackle specific industry challenges has meant that we can continue to champion hatchery best practice, and help hatchery operators to continually improve their hygiene and performance levels."

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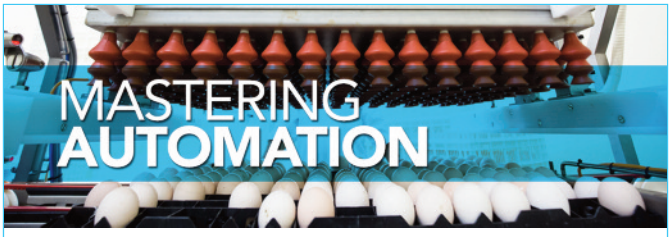
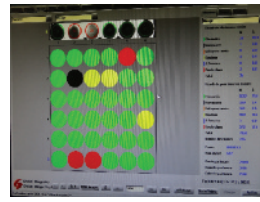



# 05 INNOVATIVE DESIGN: BEST PRACTICE

For any hatchery owner, overcoming the many challenges of the hatchery environment to maximise the level of successful incubation is critical to business success. But, today's hatcheries need to take a step further in the control of biosecurity considering the requirement to supply animals free from antibiotic treatments.

Starting at the beginning of the process, Ecat-iD's state-of-the-art candling system, iD Visio, is an example of how innovation can maximise incubation success. The equipment, with its compact and hygienic design, enables the early candling of eggs at just 10 days and is capable of processing up to 100,000 eggs per hour, depending on the setter configuration. The iD Visio system uses Visio Nerf's patented artificial vision (AV) detection equipment to achieve this, taking 1,200+ surface measurements across the full surface of the egg top which results in 100% reliable detection of infertile eggs and 98%+ detection of embryos that have died during incubation.



In an industry which involves many elements of machinery processing large volumes of eggs and chicks, cross contamination is the main threat to safe and hygienic working practices. One of the most effective ways to enhance biosecurity within hatcheries is through the use of equipment which has been meticulously designed to address contamination risk factors – an essential tool for the modern hatchery.

The Ecat-iD Research and Development team is continuously working on finding new solutions to improve hatchery hygiene and biosecurity. Historically, the main benefit of candling has been the removal of clear eggs at transfer to ensure that these do not break on chicks during the take-off process, as well as reducing waste at take-off and allowing the treatment of clear eggs separately from the non-hatch eggs.

Now, by applying the latest in vision technology to the candling process, the Ecat-iD R&D team is able to improve biosecurity by separating the live embryos from contaminated eggs automatically at 18 days of incubation, without compromising the speed of the process. In addition to addressing issues of cross-contamination and improving overall hatchery sanitation, the technology also provides precise information per flock on the number of live, dead embryos and clear eggs, allowing better management of breeder farms and incubation processes.

Ecat-iD Sales and Marketing Director, Vincent Fevrier, comments: "By using equipment design to tackle specific industry challenges, we can continue to champion hatchery best practice and help hatchery operators to continually improve their performance levels."

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# 06 QUALITY ASSURANCE: CANDLING

Monitoring incubating eggs by candling is essential to maintain quality assurance and analyse hatches. Isolating infertile or spoiled eggs and dead embryos early on in the incubation process helps to increase efficiency and profitability.

As much as the term 'candling' still refers to the use of light to determine the quality of eggs, or viability of the embryo in a fertilised egg, the technology now used in the 21st century is substantially more refined from the original candle technique.

Standard candling involves the use of infra-red sensors, or cameras, to determine the transparency of the egg. While a good indicator to determine early on if an egg contains an embryo, this method fails to pick out eggs that are contaminated, or where the embryo dies at a later stage.

Another way of monitoring the egg is provoking and measuring movement of the embryo in the egg. This method can be unreliable, as movement varies according to the age of the incubation and equipment vibrations can give false positives.

The latest development in candling technology from Ecat-iD is the new Laser life. This uses a dual identification system combining laser technology and an infra-red camera to measure the heat emission from the embryo. The basis of the technology is that fertilised eggs are endothermic (absorbing heat) for the first nine days before they become exothermic (radiating heat).

Through careful analysis of heat emission, in addition to an infra-red scan, up to 99.9% of fertile embryos can be accurately identified at 18 days of incubation. The system is 100% reliable for identifying and removing clear eggs. It can also identify and remove rotten eggs, and those with dead embryos. The scan accurately measures the heat emitted by the embryo in the egg without touching it. The readings neither depend on the flock, nor are they influenced by the ambient temperature. This makes the result very reliable and repeatable.

Through this advance in reliability this new candling technology gives hatcheries the confidence to increase throughput speeds up to 90,000 eggs per hour and therefore efficiency. Separating live embryos from contaminated eggs as early as possible ensures compliance with the highest biosecurity and safety standards. Delivering accurate and reliable candling results in the 21st century.

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# 07 POSITIONING: ALWAYS RIGHT SIDE UP

While a healthy flock and good quality eggs are the basic requirement to produce healthy chicks, correct and careful handling of the egg throughout the hatching process is also essential. This includes positioning the egg the right way up during storage and transport from farm to hatchery.

The egg is perfectly designed to protect the chick during incubation. Shell shape and material, including the inner membranes and fluids, ensure that the chick develops correctly and has the strength to break the shell to hatch at exactly the right stage in its development.

After the egg has been laid, an air pocket will develop between the inner and the outer membrane at the wider end of the egg. Around day 18 of incubation, the chick will break the inner membrane with its beak and uses the air pocket to breathe.

This is a crucial stage in the incubation process, with major impact on embryo development. As a result, approximately only 60% of upside down eggs will hatch and those that do will be lower quality, less healthy chicks.

Currently, around 3-8% of eggs received by hatcheries from farms are upside down. A modern hatchery processing over 300,000 eggs and chicks per day, could have up to 24,000 upside down eggs each day. This is mainly due to human errors by loading the setter trays incorrectly.

Another reason can be that the eggs are shaped in a way that sometimes makes it difficult to distinguish the narrow from the wider end. From our experience, even when using automatic 'point-down' setting machines at the farm, up to 3% arriving at the hatchery are upside down eggs.

Not only are upside down eggs 40% less likely to achieve a good hatching rate, they also have a very high risk of producing lower quality or malformed chicks. Another risk is the accidental killing of chicks during the in ovo vaccination process.

Ecat-iD has developed a solution to save these misplaced eggs currently being processed each day, with the new Upside-down detector. This modern technology can identify up to 99.8% of upside down eggs before they enter the hatchery. Therefore, a medium sized hatchery, processing around 300,000 eggs each day, could correct over 24,000 eggs per day through using the Upside down detector – resulting in an increase in the number of good quality chicks being processed.

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