



SmartCount™

Integrating Vision Technology for high capacity counting, vaccination and the analysis of day old chicks



Pas Reform
Hatchery Technologies





Demand drives automation

Growing demand for high quality day old chicks is driving expansion for hatcheries around the world. To deliver increased numbers, reduced 'throughput time', improved traceability and animal welfare requires innovation in hatchery automation.

Market demand for modular, single stage incubation has increased substantially in recent years, with growing recognition in the poultry industry that a short hatch window and uniform, robust chicks are critical to obtaining the best performance. The impact of effective single stage incubation strategies, expressed in terms of hatchability, growth rate and feed conversion ratios, is felt throughout the poultry value chain.

To keep pace with growing demand for high-quality chicks, hatcheries large enough to produce more than two million day old chicks per week are no longer unusual.

These growing hatcheries have become highly automated to handle chicks in such large numbers. This promotes short throughput time, another key measure of chick quality for its influence on post hatch performance. The case for automation is further strengthened by the growing cost and reduced availability of qualified labour.



At the core of these transitions in the poultry industry, lies a duty of care from the retailer and ultimately to the consumer, to deliver the highest standards of animal welfare and offer complete traceability, from egg production and hatchery all the way down the chain.

Together, these factors create increasing demand for innovation, to support and improve standards of animal welfare - and to increase the availability of information from source.

In response, Pas Reform Academy has looked for more intelligent, innovative ways to handle valuable day old chicks, with minimum impact on their health and well-being, while at the same time reducing their throughput time.

This focus has placed Vision Technology at the heart of a new system for chick counting and quality analysis, to produce significant increases in efficiency, chick uniformity and standards of animal welfare. Pas Reform has named this latest innovation SmartCount™.

Patent pending with worldwide Intellectual Property Rights

SmartCount™

Accurately 'sees', counts and vaccinates day old chicks. Combine with SmartCenterPro™ - and the hatchery produces the most detailed data analysis, for complete traceability and performance reporting.



SmartCount™ applies Vision Technology, a complex pairing of digital imaging and pre-defined algorithms, to count and analyse groups of day old chicks.

Image sequences are interpreted using these criteria, pre-set by Pas Reform Academy, to process the chicks in stress-free conditions. With an accuracy of two chicks per thousand, SmartCount™'s nett system capacity is 75,000 chicks per hour.



The same level of intelligence and accuracy defines a range of key parameters, including smart pattern recognition for even, gentle distribution in the right numbers into the chick boxes at the end of the conveyor, and precise, optimised spray vaccination.

SmartCount™'s chick analysis system incorporates calculations for uniformity scoring – and by integrating SmartCount™ statistics with SmartCenterPro™ hatchery information system data, the hatchery is equipped with the most detailed level of data analysis and batch reporting available today.



Counting and dosing

Stress-free conditions for the accurate counting and precise, gentle dosing of day old chicks into chick boxes.

Accurate counting and stress-free chicks

Unlike conventional chick counters, SmartCount™ does not require unnatural acceleration to separate the chicks. The system analyses sequential images of multiple birds.

Low transport speed allows the chicks to remain upright, in control and free of stress at all times on the conveyor.

As an adaptive technology, SmartCount™'s Vision system is optimised to perform accurate counts at all times, and to recognise chicks from other background information, such as pieces of eggshell.

There is no need to change settings per flock. If the average size of chicks changes during operation, SmartCount™'s intelligent control software automatically adjusts key parameters, based on individual day old chick volume calculations, to maintain accuracy in all conditions.



Precise dosing into chick boxes

SmartCount™ uses Vision not only to count individual chicks, but also for pattern recognition, to deliver precise dosing of the day old chicks into chick boxes. The system's intelligent software adjusts conveyor speed based on numbers of chicks, to maintain accurate dosing in any conditions.

SmartCount™'s Vision Technology locates the day old chicks passing the Vision camera, to control the number allowed to glide into a predetermined chick box.

At the same time, the system's vision assisted software configures a 'dosing curtain', by drawing 'lines' between the chicks, to select and distribute the day olds gently and precisely into the correct chick box at the end of the conveyor.

It is a conscious choice not to separate clusters of chicks from each other for dosing purposes. In the context of animal welfare, this means that a chick's natural acceleration is disrupted as little as possible.

Batch scoring and vaccination

Vision Technology assisted batch uniformity scoring and fully optimised, uninterrupted spray vaccination.



Uniformity scoring for batches of chicks

SmartCount™ analyses individual chick weight and derives a uniformity score using the coefficient of variance (cv), to collect data for evaluating the hatchability, average day old chick weight and uniformity scoring of different flocks.

The system calculates the average weight of a batch of chicks, using day old chick volume as a key index. This complex calculation cannot be interpreted reliably from just one image. SmartCount™'s Vision Technology combines a

sequence of images to estimate batch average day old chick weight and its subsequent coefficient of variation (cv) as a batch uniformity score.



Integrated, accurate spray vaccination

Pas Reform Academy has worked with leading vaccine manufacturers, to develop a fully optimised spray system that delivers the correct droplet size for accurate vaccination.

Too small a droplet can intensify the dose, provoking a serious reaction in the day old chicks, while too large a droplet size may provide inadequate protection. A transparent drift guard ensures an ideal spray-image, avoiding vaccine drift and wastage.

Double auto-changeover vaccine containers include a small reservoir, weighed while vaccination is in progress, and a larger reservoir that can be refilled while vaccination continues.

Placed in a central console, the vaccine containers are easy to access, with a system warning that indicates when a refill is required for uninterrupted operation.

SmartCount™'s vaccine spray system is efficient, clean and extremely user-friendly.



Data analysis and reporting

SmartCount™ and SmartCenterPro™: a powerful combination of Vision Technology, batch information and track & trace data, to produce the most detailed batch reporting for uniformity and quality of management in the hatchery.

By integrating the data and statistics generated by SmartCount™ with SmartCenterPro™ hatchery information system, the hatchery manager can produce detailed data analysis and batch reports.

SmartCount™'s user-friendly data entry module makes a simple task of entering batch related information into the system. In conjunction with SmartCenterPro™'s track & trace module, the integration of SmartCount™ data produces

batch reporting that displays flock identity, hatchability, average chick weight and uniformity scores - all referenced to originating setter and hatcher incubation profiles.

Together, SmartCount™ and SmartCenterPro™ deliver unrivalled uniformity and quality of reporting practice in management and operations at every level.

SmartCount™

A summary

- Animal Friendly: unnatural acceleration of the chicks is no longer necessary. The sequence analysis of images of multiple birds avoids the stressful separation of day old chicks.
- Sequences of images are interpreted using pre-defined criteria set by Pas Reform Academy, to ensure accurate counting, dosing and chick analysis.
- Smart pattern recognition registers the number of chicks per box and produces precise dosing per box, also allowing for four-compartment filling.
- Integrated chick analysis system incorporates batch uniformity scoring.
- Self-adapting software: SmartCount™ adjusts key parameters according to the size and numbers of chicks, to maintain accuracy under any conditions.
- Full integration of SmartCount™ statistics with SmartCenterPro™ hatchery information produces detailed data analysis and batch report generation.
- SmartCount™ spray vaccination system's spray nozzles guarantee optimum droplet size for precise vaccine administration.
- Auto change-over double vaccine containers ensure uninterrupted operation.
- Multi language user interface design for simple, easily accessible operation at every skill level, from experienced hatchery managers with specific control needs, to fully automated hatchery operations.
- Designed with day-to-day hatchery hygiene practice in mind. Stainless steel and synthetic construction, with open profiles, no sharp edges, removable guides and conveyor construction that enable easy cleaning.

The combination is a real asset to decision-making in the day-to-day operations of the modern hatchery, producing the most detailed levels of data analysis and batch reporting available today.

Pas Reform Hatchery Technologies

Pas Reform is an international company, which has specialised in the development of innovative hatchery technologies for the poultry sector since 1919. The company has earned its position as one of the world's leading hatchery equipment manufacturers, through decades of research into the biological and physiological aspects of embryo development, combined with a thorough understanding of all aspects of the poultry production chain – and a dedicated focus on the future.



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Pas Reform
P.O. Box 2
7038 ZG Zeddam
The Netherlands

Phone +31 314 659 111
Fax +31 314 652 575
E-mail info@pasreform.com
Internet www.pasreform.com

Technical specifications

Capacity	With an accuracy of two chicks per thousand, SmartCount™'s nett system capacity is 75,000 chicks per hour.
Power	Standard 380V, 3 phase, earth and 0, 50/60Hz
Power consumption	4 kVA
Air consumption	1.7 litre per chick box
Air pressure	6 bar
Dimensions (l x w x h) (mm)	7000 x 2000 x 1700, excl. take-off table
Colour video camera	70 images per second
Digital input colour imaging system	Produces a sequence of images of multiple chicks. Each image is processed and subsequently stored in a Machine Associative Memory (MAM), which provides the 'memory' for the interpretation of the incoming data streams. Analysis is based on high-speed algorithms that process 70 images per second.
Vaccine drift guard	Avoids drift, retains application dosage and prevents vaccine wastage.
User interface	Large 10.4" colour LCD user interface screen, with Projective Capacitive Touch Screen (PCT) technology and ergonomic user interface viewing angle. Interchangeable with the SmartPro™ incubator user-interface, delivering full flexibility in maintenance and the optimisation of spare part stocks.
Material	Stainless steel AISI304 (1.4301), engineering plastics, sanitary belting
Spray vaccination tanks	19.5 litre and 5.7 litre
Vaccine containers and nozzles	Made of food-safe materials NSF-51, with no brass or copper, to allow thorough cleaning and disinfection without damaging parts.
Couplings spray vaccination	NSF-61 for drinking water, NSF-51 for food and FDA for food and beverage
Options	As a modular system, SmartCount™ can be used in conjunction with a separator or a manual chick take-off system and various chick box stackers, destackers and conveyors, for transport to and from the counting system.