SmartSense™
NF Series

Adaptive embryonic incubation

Royal Pas Reform has developed a new series of fully connected, data-driven incubators that reliably 'sense' the changing needs of the growing embryo: SmartSense™

SmartSense™ uses a next generation series of intelligent, high-accuracy sensors for both adaptive incubator control and predictive process information. This results in ongoing optimisation of the incubation process, for the highest numbers of best-quality chicks.

Optimal control for embryo wellbeing

Besides using pre-determined incubation programs for day-old chicks, SmartSense™ also evaluates and meets the current requirements of the embryo in each specific fan tower zone. We call this 'Adaptive Embryonic Incubation™' (AEI™).

Adaptive embryonic incubation

SmartSense™, with its industry leading, precise climate control - based on air temperature, relative humidity and CO_2 – also features a next generation series of intelligent, high-accuracy sensors in the SmartSense™ trolley. These constantly and non-invasively measure temperature, together with egg weight loss and heart rate averages (both available soon). The result is that the incubator can automatically adapt the environmental conditions to the actual needs of the growing embryos, further optimising uniformity and maximising post-hatch performance.

The full SmartSense™ incubation series comprises the SmartSense™ setter and SmartSense™ hatcher, combined with the SmartSense™ trolley, SmartSense™ interface and SmartCenterPro™ hatchery management system.

SmartSense™

Homogeneous incubation temperature

Homogeneous temperature distribution is key to successfully incubating today's breeds, each with their own unique temperature 'signature' for embryonic development.

Because even minor temperature fluctuations can significantly impact uniformity and (post) hatch performance, SmartSense™ maintains the minimum difference in eggshell temperature that is feasible in commercial incubation.

Modular design, combined with eggshell temperature, air temperature, and averages of weight loss and heart rate measurements per fan tower zone, integrate to meet this requirement. Set points can be defined separately per fan tower zone, while cooling is uniquely enabled by two circular cooling coils per fan tower to balance cooling capacity uniformly.

With capacities up to 134,640 hen eggs, SmartSense™ setters have the broadest capacity range of any single-stage incubator available on the market today. Combined with its counter-flow ventilation principle, SmartSense's fully sealed cabinet ensures uniform temperature, humidity and CO_2 build up in the initial stages of incubation for a uniform start of the incubation process.

Modular single-stage incubation

The modular design of the SmartSense™ single-stage incubation series allows you to carefully manage the conditions required by the developing embryos in each fan tower zone.

By controlling each zone individually, a range of incubation environments can be created to meet the specific needs of each egg, according to breed, flock, age or storage profile.

Together with the SmartSense™ trolley, the system automatically adapts to specific embryonic needs. The result is maximum uniformity and optimal climate conditions for each batch of eggs at every stage of the incubation process - making specific trolley positioning and transfer redundant.
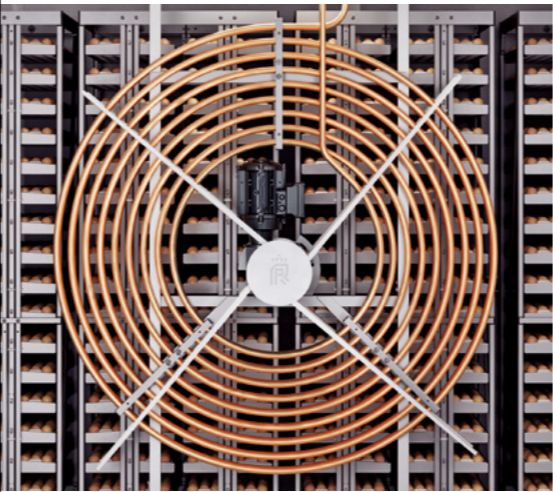
Automatic drop-down seals guarantee
an airtight seal

Adaptive Metabolic Feedback™

Combined air transport and trolley guiding

Fully programmable RPM of the fans

Modular single-stage incubation

SmartSense™ NF accommodates
a wide variety of tray types

Robust, ergonomic design

SmartSense™ Benefits

Fully sealed cabinet

SmartSense™ has a fully sealed cabinet
for optimum control of the incubation
climate. The doors are fitted with both
automatic magnetic closures and drop-
down seals, guaranteeing a secure,
airtight and energy efficient seal. When
shut, the door creates a strong, reliable
barrier against air infiltration and
leakage, enabling the egg pack to heat
up quickly during initial incubation and
preventing the loss of valuable air.

Circular cooling system™

Modern breeds generate more metabolic
heat than in the past. Extensive research
to forecast future developments has
enabled Royal Pas Reform to calculate
cooling capacities, not just for today's
breeds, but for their future offspring too.
SmartSense™ has the highest cooling
capacity of any incubator in the industry,
based on a unique, double coil 'circular
cooling system™' per fan tower. The
circuits are fully integrated with robust,
double fans on either side of the cooling
coils to deliver uniform cooling and
temperature distribution throughout the
cabinet.

Independent turning, in line with airflow

SmartSense™ incubator trolleys are
individually turned in line with the
airflow to ensure superior temperature
distribution throughout the incubator,
whether it holds 4 or 24 trolleys.
A combined air transport and trolley
guiding profile securely positions each
trolley, whilst air connectors integrated
in the profile provide the trolley turning
pistons with optimal air pressure.

ESM™ Energy Saving Module™

SmartSense™ uses Royal Pas Reform's
Energy Saving Module™ (ESM™) for fully
programmable incubator fan RPMs and
energy efficient, frequency-controlled,
direct-drive motors. Combined with the
SmartSense™ trolley, ESM™ becomes
adaptive by automatically adjusting
the fan speed to meet the needs of the
growing embryo.

AMF™ Adaptive Metabolic Feedback™

In a single-stage incubation environment,
achieving the correct weight loss profile
for hatching eggs is critical for proper
air cell development. To achieve this,
SmartSense™ incubators simultaneously
measure and control humidity and
CO_2 during incubation. This Adaptive
Metabolic Feedback (AMF™) accurately
replicates breed or flock-specific weight
loss profiles, preventing excessive
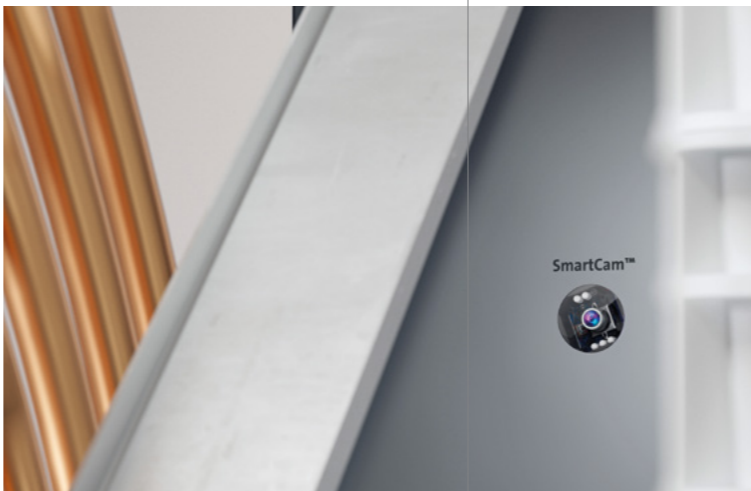ventilation and the loss of expensive,
climatised air.

Easy-to-clean construction

Double coil circular cooling system™ per fan tower zone

Highly intuitive user interface

Optical inspections without disrupting the incubator climate

Total hatchery control via SmartCenterPro™

SmartSense™ NF Hatcher

Optimum hygiene

The SmartSense™ setter and hatcher are constructed of high-quality, smooth-walled, 'food-safe' polystyrene panels and anodised aluminium profiles. Being resistant to strong disinfectants and corrosion, the robust cabinets are extremely durable. The setter and hatcher floor are free from obstacles, while easy access to the open fan tower construction reduces cleaning time after each incubation cycle.

Turning detection

The SmartSense™ setter includes air-pressure based turning detection to provide rapid alarm notification in the unlikely event of a turning failure and the subsequent loss of valuable embryos.

SmartWatch™

SmartWatch™ monitors and adjusts the hatching process automatically, eliminating any need for human intervention. The module finely controls ventilation in the hatcher, based on a programmable CO_2 concentration, from the moment of transfer through to the hatching of the last chicks.

Ergonomic design

SmartSense's™ advanced ergonomic design benefits from decades of practical hatchery experience. Each detail has been thoughtfully engineered to deliver safe and efficient operation, whilst minimising maintenance and reducing the risk of mistakes and labour costs.

SmartSense™ user interface

The SmartSense™ user interface provides total control over every function and setting in each individual incubator. With a large, vertical, high-resolution 15.4-inch colour touchscreen and multi-language intuitive design, it is simple to operate and easily accessible to operators of all skill levels. The SmartSense™ interface also includes an extensive incubation library for customer-specific incubation programs, with ongoing support from Pas Reform Academy.

Integrated webcam

SmartSense™ features a fully integrated webcam, which allows visual inspections without disrupting the incubator climate – not just in front of the machine, but also remotely from anywhere in the world.

Fully connected

SmartSense™ products are fully connected for remote support and updates, giving the hatchery greater control over the incubation process. Data is exchanged with SmartCenterPro™ to deliver detailed hatchery monitoring, analysis and reporting, allowing full track & trace functionality at every level of hatchery operation.

SmartSense™ NF Setter
Technical specifications

Type	Setter NF4	Setter NF8	Setter NF12	Setter NF18	Setter NF24
Capacity hen eggs (36 egg tray / 15 high trolley)	17,280	34,560	51,840	77,760	103,680
Capacity hen eggs (42 egg tray / 15 high trolley)	20,160	40,320	60,480	90,720	120,960
Capacity hen eggs (84 (SST) egg tray / 16 high trolley)	21,504	43,008	64,512	96,768	129,024
Capacity hen eggs (54 egg tray / 16 high trolley)	20,736	41,472	62,208	93,312	124,416
Capacity hen eggs (54 egg tray / 17 high trolley)	22,032	44,064	66,096	99,144	132,192
Capacity hen eggs (165 egg tray / 16 high trolley)	21,120	42,240	63,360	95,040	126,720
Capacity hen eggs (165 egg tray / 17 high trolley)	22,440	44,880	67,320	100,980	134,640
Number of fan towers	1	1	2	2	3
Number of setter trolleys	4	8	12	18	24

Modular design	Heating, cooling, humidification (optional) and ventilation systems in each fan tower zone	Pre-heating module	Full programming for pre-heating time, temperature and ventilation
Heating	Electrical heating per fan tower (integrated heating optional)	Turning programmes	Fully adjustable turning programmes, frequency of turning, start/stop timing, 2 auto-turning positions
Cooling	Water cooling system with double coil circular cooling system™ per fan tower zone	SmartTransfer™ module	Provides programmable turning intervals during egg transfer
Humidification (optional)	Pressurized Air + Water fogging nozzle per fan tower zone	AEI™ (optional)	Adaptive Embryonic Incubation™ (available soon)
Ventilation	Double blade fan system per incubator fan tower; Gasketed, carburetor-style intake and exhaust vents for totally sealed machine and calibrated/controlled ventilation rates	ESM™	Energy Saving Module™, for fully programmable RPM of the fans
		AMF™	Adaptive Metabolic Feedback™, with high precision humidity and CO_2 control
Turning	Individual air piston on each incubator trolley		
Turning detection	Turning failure indication and alarm per machine	SmartCenterPro™ (optional)	Hatchery management system
Set points per zone	Separate temperature set points for each fan tower zone	Housing	Fully sealed cabinet; robust, easy-to-clean construction with mainly stainless-steel structural support and railings; seamless 'Hotmelt' housing with maximum insulation value; magnetic door closures and automatic door-bottom drop down for an airtight seal
Incubator control	SmartSense™ user interface		
Display	High-contrast, 15.4-inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)		
Embryonic reference	Detailed Pas Reform Academy info on the current status of embryonic development		
Performance testing module	To run a performance check on incubators before starting a new incubation cycle		

SmartSense™ NF Hatcher
Technical specifications

Type	Hatcher NF4	Hatcher NF6	Hatcher NF8
165 basket			
Capacity hen eggs (54 egg tray / 16 high)	20,736	31,104	41,472
Capacity hen eggs (54 egg tray / 17 high)	22,032	33,048	44,064
Capacity hen eggs (165 egg tray / 16 high)	21,120	31,680	42,240
Capacity hen eggs (165 egg tray / 17 high)	22,440	33,660	44,880
168 basket			
Capacity hen eggs (36 egg tray / 15 high)	17,280	25,920	34,560
Capacity hen eggs (42 egg tray / 15 high)	20,160	30,240	40,320
Capacity hen eggs (84 (SST) egg tray / 16 high)	21,504	32,256	43,008
Number of fan towers	1	1	1
Number of hatcher dolleys	4	6	8

Modular design	Heating, cooling, humidification (optional) and ventilation systems in each fan tower zone
Heating	Electrical heating per fan tower
Cooling	Water cooling system with double coil circular cooling system™ per fan tower zone
Humidification (optional)	Pressurised Air + Water fogging nozzle
Incubator control	SmartSense™ user interface
Display	High-contrast, 15.4-inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)
Embryonic reference	Detailed Pas Reform Academy info on the current status of embryonic development
Performance testing module	To run a performance check on incubators before starting a new incubation cycle
SmartWatch™	Hatch window module, with high precision humidity and CO_2 control
SmartCenterPro™ (optional)	Hatchery Information System
Housing	Fully sealed cabinet; robust, easy-to-clean construction with mainly stainless-steel structural support and railings; seamless 'Hotmelt' housing with maximum insulation value; magnetic door closures and automatic door-bottom drop down for an airtight seal

Royal Pas Reform

Royal Pas Reform is an international company, which has specialised in the development of integrated hatchery solutions 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.

Royal Pas Reform
Integrated Hatchery Solutions