

SmartPro™

**Next generation
design for the
future-focused
hatchery**



- Blood ring
- Heart beats
- Head is turned to right



Blood ring



Pas Reform
Hatchery Technologies

SmartPro™

After three years of intensive research and development, Pas Reform is introducing SmartPro™ - its latest and most advanced development for modular, single-stage incubation to date: a solution that enables Circadian Incubation™



The modern hatchery manager's goal is to produce large numbers of uniform, robust day old chicks. Robustness is a health criterion, originating in the embryonic life stage of the chicken – and correlating directly with the performance and resistance of individual chicks under differing farm conditions.

Detailed research has shown that robustness can be achieved by stimulating the embryo with a specific trigger, i.e. stimulation by heat or cold, during critical periods of the incubation process. This causes so-called 'embryonic imprinting' on a physiological level, to produce a chicken that will thrive in its farm environment.



Such daily short-term thermo-conditioning is at the heart of Circadian Incubation™ – and known to improve hatchability, for long-lasting effects that include 1-2% increase in final body weight and 1-2 points better feed conversion rates. Batches of uniform, robust day old chicks also deliver uniformity at slaughter age, thereby improving processing yields, efficiency and performance throughout the entire production chain.

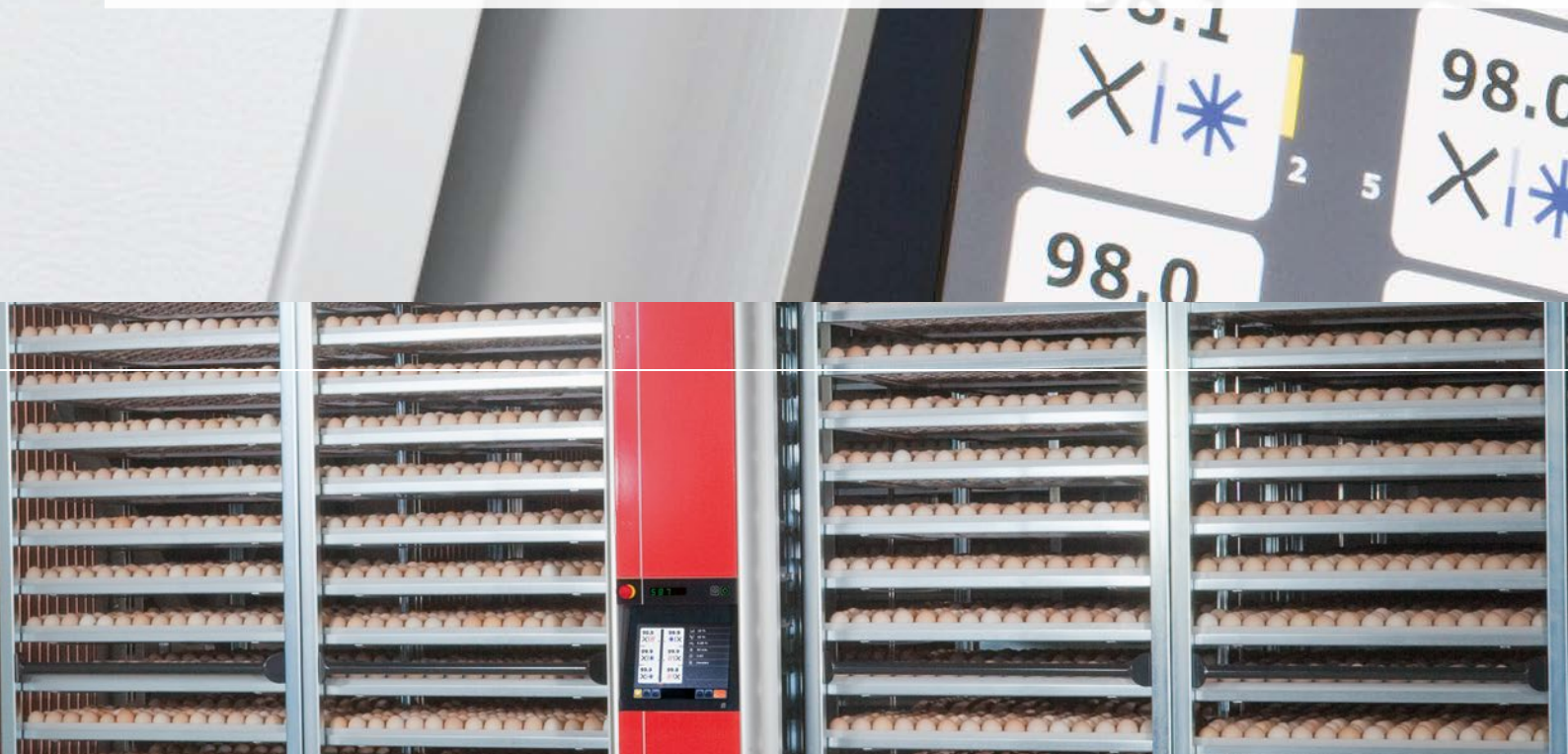
To support the use of Circadian Incubation™, the incubator must deliver precise climate control. To achieve truly homogeneous temperature distribution, the challenge is to exchange energy, CO₂/O₂ and moisture – without affecting temperature uniformity around the eggs.

To meet this exacting requirement, Pas Reform's SmartPro™ uniquely combines three critical features: modular design, a new Vortex™-based airflow principle and Adaptive Metabolic Feedback™.



Modular incubator design

Modular design creates sectional environments in the incubator that can be controlled individually. This is the only way to guarantee homogeneous temperature in incubators containing more than 100,000 hatching eggs. Each modular section of the incubator is supported by its own temperature, heating, cooling, humidification and ventilation systems.





Modular design: precise control

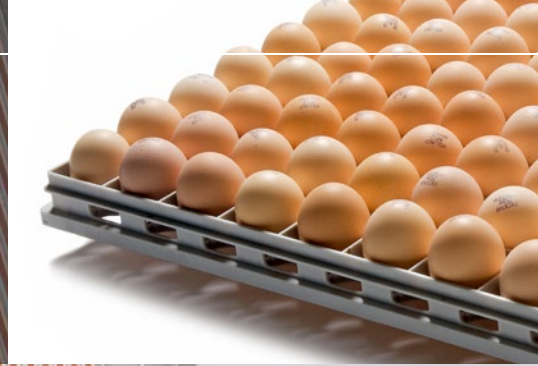
- Modular setter and hatcher design enables the precise control of temperature, humidity, O₂ and CO₂ in large incubators.
- Separate heating, cooling, humidification and ventilation systems in each section of up to 22,032 eggs provide a homogeneous environment.
- Modular, precise ambient control for larger hatchers comprising up to six modules.

- Integrated heating & cooling system (setter) and SurroundCooling™ (hatcher) in each section of the incubator, for optimum energy transmission, fast, even warm-up to set temperature and maximum, future-proof cooling capacity.
- Modular design of both setter and hatcher uniquely enables the incubation of eggs from different flocks and different ages in the same machine, without losing performance and results.



Vortex™-based airflow

Intensive analysis using Computational Fluid Dynamics (CFD) has demonstrated that the most effective method of exchanging energy, CO₂/O₂ and moisture in the incubator, is to generate as many vortices as possible – of a specific dimension and intensity – in the wake of the air pump blade. This research, combined with practical field studies, has driven the design and construction of Pas Reform's brand new Vortex™.



Vortex™ for complete temperature homogeneity

- Tested and proven as the most effective method of exchanging energy, CO₂/O₂ and moisture in the incubator.
- Generates multiple, controlled vortices in the wake of the air pump blade, exchanging energy, CO₂/O₂ and moisture without affecting the incubator's homogeneous temperature.
- Inlet air is channeled along the side of the setter trolleys, to prevent ambient air making direct contact with the eggs.
- Mixing zone assures complete air temperature homogeneity before air is drawn over the eggs.
- Mixed air vortices flow in parallel with the turning direction of setter trolleys, ensuring that air direction along the eggs changes constantly, for unique, homogeneous egg shell temperature.

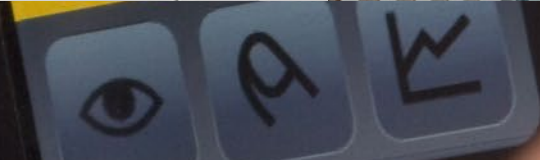
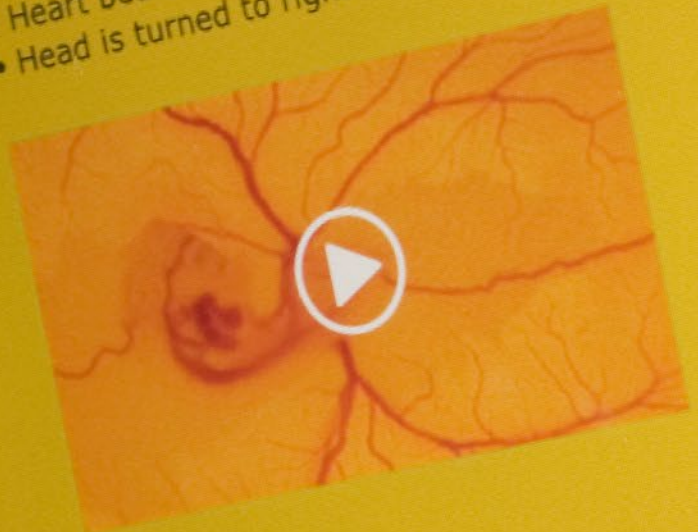
Adaptive Metabolic Feedback™

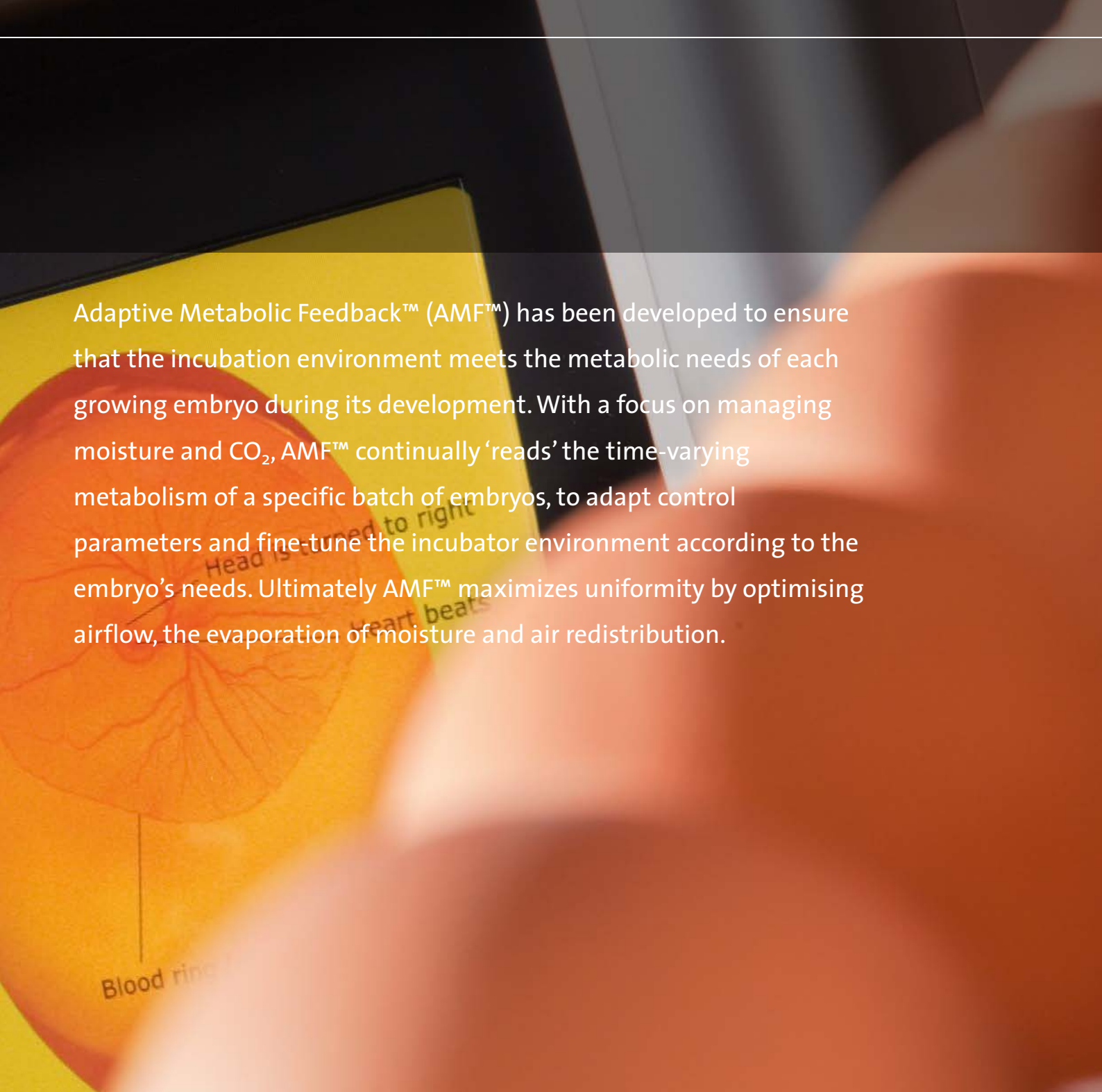
Day 3

49-72 hours

Phase 1 - Differentiation

- Blood ring (area vasculosa)
- Heart beats
- Head is turned to right





Adaptive Metabolic Feedback™ (AMF™) has been developed to ensure that the incubation environment meets the metabolic needs of each growing embryo during its development. With a focus on managing moisture and CO₂, AMF™ continually ‘reads’ the time-varying metabolism of a specific batch of embryos, to adapt control parameters and fine-tune the incubator environment according to the embryo’s needs. Ultimately AMF™ maximizes uniformity by optimising airflow, the evaporation of moisture and air redistribution.

AMF™: creating an adaptive environment

- AMF™ software delivers precise, adaptive control over humidity and CO₂ during the incubation process – according to the time-varying metabolism of a specific batch of embryos.
- Unparalleled functionality incorporated into one central operator console. Fully integrated sensor box includes high precision electronic humidity and CO₂ control.
- Custom controlled relative humidity set points for variable egg weight loss at each stage of embryonic development.
- Prevents excessive inlet of (dry and cold) fresh air for maximum temperature homogeneity.
- Additional, integrated modules include SmartWatch™ – automatically registers and minimizes the hatch window; ESM™ Energy Saving Module – for fully programmable Vortex™ RPM; SmartTransfer™ module – for programmable turning intervals during transfer; PID control – with set points per section and fully adjustable turning programmes.

Ergonomically advanced

Ease of use is of paramount importance in the daily, working practice of the hatchery. From loading and unloading incubators, to closed-door operation and keeping both routine and service maintenance tasks to the minimum, SmartPro's™ advanced ergonomic design benefits from decades of practical hatchery experience. Every detail has been thoughtfully engineered, to deliver safe, efficient operation, while at the same time minimising maintenance, reducing the risk of mistakes and decreasing labour costs.



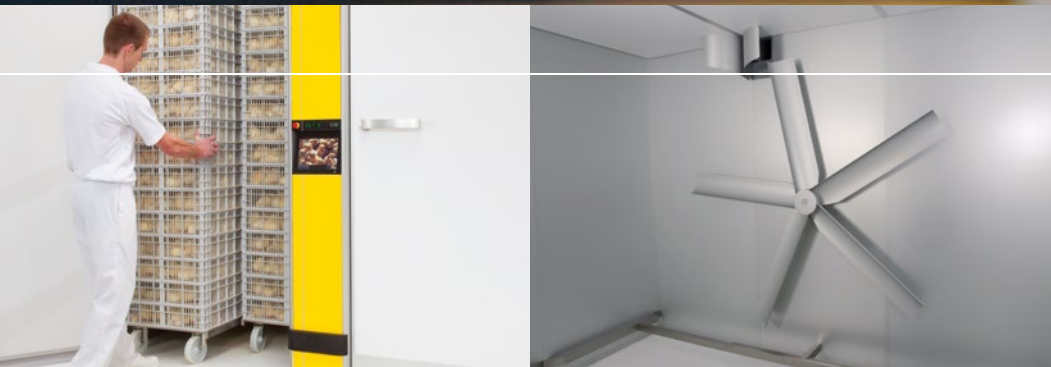


Thoughtful engineering. Maximum user friendliness

- SmartTouch™ multi-language user interface design, makes operation simple and easily accessible to operators of all skill levels – from experienced hatchery managers with specific control needs, to fully automated hatcheries.
- Large, high-contrast, high resolution 10.4 inch colour LCD screen with Projective Capacitive Touch Screen technology (PCT) and ergonomic user interface viewing angle.
- Highly manoeuvrable trolley, with two swivel wheels and ergonomically designed handle bar for easy loading / unloading of incubator.
- Large inspection window provides full view of entire machine interior for thorough physical inspection, plus comprehensive user interface and record keeping – all from outside the incubator.
- Maximum use of maintenance free components, including high temperature bearings, long-life lubricants, low friction motors and toothed V-belt.

Hygiene assured

SmartPro™ was specifically designed to meet the stringent hygienic requirements of the modern hatchery. With compartmentalized sensors, modular hatchers to prevent cross contamination, the incorporation of Microban® antibacterial protection into setter trays and hatcher baskets and integrated cooling pipes in anodized aluminium hatcher walls, the time required to clean the incubator thoroughly is the shortest in the industry.





Smart, clean and protected

- Modular hatcher control prevents cross contamination from older to younger batches, because eggs of different ages need not be mixed.
- Setter trays and hatcher baskets incorporate Microban® technology for the most effective, continuous antibacterial protection. Patented antimicrobial agent penetrates the cell wall of unwelcome micro-organisms on contact, disrupting normal cell function to prevent the multiplication and spread of bacteria.
- SurroundCooling™ – integrated cooling pipes inside smooth-walled 'food safe' anodized aluminium hatcher wall panels significantly improve the effectiveness of cleaning, minimize the risk of cross contamination and greatly reduce cleaning time.
- Securely placed and compartmentalized sensors in central operating console allow for high pressure cleaning without risking damage to sensors.
- All surfaces, fixings and finishes are designed to resist the ingress of moisture and bacteria, preventing the creation of dirt traps.

Energy efficient





With a focus on delivering environmentally friendly incubation, the CFD-designed and highly effective Vortex™, together with high efficiency motors, dramatically reduces electrical consumption. Adaptive Metabolic Feedback™ (AMF™) technology actively controls ventilation, to use only the specific amount of fresh air necessary. Together with the Energy Saving Module (ESM™) for metabolism-based RPM control, the use of fossil fuels and electricity are reduced to the lowest possible levels, which translate into significantly reduced operation costs.



Eco-friendly, cost-efficient incubation

- ESM™ Energy Saving module makes the RPM of the Vortex™ air pump fully programmable – derived from embryonic metabolism rates – to reduce energy consumption by more than 60% in specific phases of embryonic development.
- AMF™ guards against unnecessary or excessive ventilation.
- Vortex™ air pump blades and high-efficiency motors prevent energy loss by optimising energy exchange in the incubator.
- Smart PID control delivers greatest accuracy to date in predicting heating and cooling for each incubator section, to avoid expensive overshoots.
- Fully sealed cabinet, including airtight 3-lock door system and seamless ‘Hotmelt’ panels with maximum insulation value, designed to prevent energy leakage.

SmartSetPro™

Technical specifications

Type	SmartSetPro™ 6	SmartSetPro™ 4	SmartSetPro™ 3	SmartSetPro™ 2	SmartSetPro™ 1
Capacity hen eggs (150 egg tray / 16 trolley)	115,200	76,800	57,600	38,400	19,200
Capacity hen eggs (162 egg tray / 16 trolley)	124,416	82,944	62,208	41,472	20,736
Number of setter trays	768	512	384	256	128
Capacity hen eggs (150 egg tray / 17 trolley)	122,400	81,600	61,200	40,800	20,400
Capacity hen eggs (162 egg tray / 17 trolley)	132,192	88,128	66,096	44,064	22,032
Number of setter trays	816	544	408	272	136
Capacity duck eggs (126 egg tray / 14 trolley)	84,672	56,448	42,336	28,224	14,112
Number of setter trays	672	448	336	224	112
Capacity turkey eggs (126 egg tray / 14 trolley)	-	-	-	28,224	14,112
Number of setter trays	-	-	-	224	112
Width (mm) excluding corridor*	4184	4184	2293	4184 or 2293	2293
Width (mm) including corridor*	4784	4784	2889	4784 or 2889	2889
Height (+height of motor) (mm)	2459 (+300)				
Height including louvre (mm)	2978				
Depth (+central operating console) (mm)	7276 (+72)	4938 (+72)	7276 (+72)	2600 (+72) or 4938 (+72)	2600 (+72)
Number of setter trolleys	24	16	12	8	4
Height of setter trolley (mm)	2109				
Setter tray dimensions (mm)	507 x 733				
Modular design	Heating, cooling, humidification and ventilation systems in each incubation section				
Number of incubation sections	6	4	3	2	1
Number of temperature sensors	6	4	3	2	1
Heating	Integrated heating, warm water radiator or electrical heating in each incubator section				
Cooling	Water cooling system with 34 vertical, parallel coils in each incubator section				
Humidification	Nozzle in each incubator section (humidity roller optional)				
Ventilation	Vortex™ air pump system in each incubation section				
Set points per section	Separate temperature set points for each section of 19,200 eggs				
Incubator control	SmartTouch™ user interface				
Display	High-contrast, 10.4 inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)				
Embryonic reference	Detailed 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				
Pre-heating module	Full programming for pre-heating time, temperature and ventilation				
Turning programmes	Fully adjustable turning programmes: frequency of turning, start/stop timing, 2 or 3 auto-turning positions				
SmartTransfer™ module	Provides programmable turning intervals during egg transfer				
AMF™ (Optional)	Adaptive Metabolic Feedback™, including fully integrated sensor box, with high precision electronic humidity and CO ₂ control				
ESM™ (Optional)	Energy Saving Module, for fully programmable RPM of the Vortex™				
SmartCenterPro™ (Optional)	Hatchery Information System				
Microban®	Antibacterial protection in setter tray				
Housing	Fully sealed cabinet; robust, easy-to-clean construction with mainly stainless steel interior; extruded, anodized aluminium profiles for maximum stability and ease of installation; seamless 'Hotmelt' panels with maximum insulation value; 3-lock door system, includes solid hinges, airtight sealing rubbers and solid door handles				

* Add 51 mm for standalone incubator

SmartHatchPro™

Technical specifications

Type	SmartHatchPro™		
Capacity hen eggs (based on 150 egg tray)	19,200 or 20,400	Number of hatcher baskets	128 or 136
Capacity hen eggs (based on 162 egg tray)	20,736 or 22,032	Number of hatcher baskets	128 or 136
Capacity duck eggs (based on 126 egg tray)	14,112	Number of hatcher baskets	112
Capacity turkey eggs (based on 126 egg tray)	14,112	Number of hatcher baskets	112
<hr/>			
Width (mm)*	3184		
Height (+height of motor) (mm)	2459 (+300)		
Height including louvre (mm)	2978		
Depth (+central operating console) (mm)	2211 (+72)		
<hr/>			
Number of hatcher dolleys	5		
Modular design	Up to six modules with a maximum of 122,400 hen eggs (based on 150 egg tray) or 132,192 hen eggs (based on 162 egg tray)		
Heating	Electrical heating		
Cooling	SurroundCooling™: 12 parallel water cooling circuits, incorporated in aluminium cabinet walls		
Humidification	Nozzle or humidity roller		
Incubator control	SmartTouch™, including multiple machine control		
Display	High-contrast, 10.4 inch colour LCD screen with Projective Capacitive Touch screen technology (PCT)		
Embryonic reference	Detailed Academy info on the current status of embryonic development		
Microban®	Antibacterial protection in hatcher basket		
Performance testing module	To run a performance check on incubators before starting a new incubation cycle		
SmartWatch™ (optional)	Hatch window module including fully integrated sensor box, with high precision electronic humidity and CO ₂ control		
SmartCenterPro™ (Optional)	Hatchery Information System		
<hr/>			
Housing	Fully sealed cabinet; robust, easy-to-clean construction with extruded, anodized aluminium profiles for maximum stability and ease of installation; smooth-walled 'food-safe' anodized aluminium inner walls; seamless 'Hotmelt' panels with maximum insulation value; 3-lock door system, includes solid hinges, airtight sealing rubbers and solid door handles		

* Add 51 mm for standalone incubator

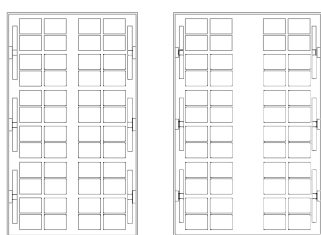


Setter

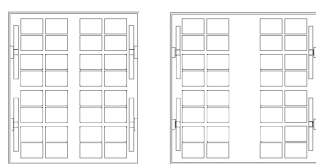


Hatcher - Modular machine control in one SmartTouch™ user interface

SmartSetPro™ 6



SmartSetPro™ 4



SmartSetPro™ 2





SmartSetPro™



SmartTouch™ human interface



Vortex™ air pump system



Modular machine control



SmartHatchPro™



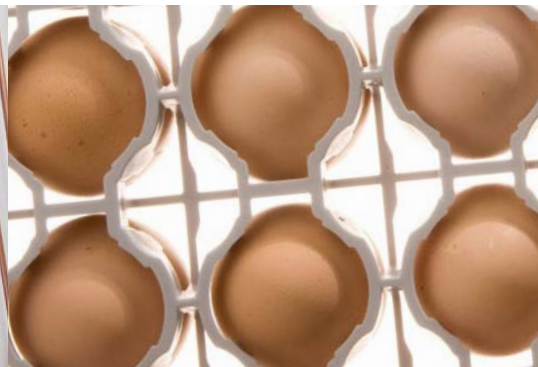
SmartWatch™ hatch window module



Highly manoeuvrable trolley



Vortices flow parallel with turning direction of trays



SmartTray™ for free movement of air vortices



SmartSetPro™ including corridor



Robust, ergonomic design



Backup from Pas Reform Academy



AMF™'s fully integrated sensor box



Maintenance-free components



Separate temperature set points for each module



Adaptive Metabolic Feedback™ software



Large inspection window



High-contrast, 10.4 inch LCD display



Vortex™-based airflow



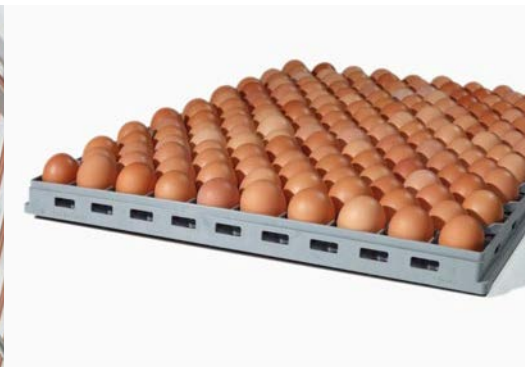
SmartHatchPro™ air in- and outlet



Modular hatcher design



Vortex™ air pump blades



SmartTray™ 162



SmartTray™ 150



Projective Capacitive Touch screen technology



Total hatchery control via SmartCenterPro™



Trolley with ergonomically designed handle bar



3-lock, airtight door system



Fully programmable RPM



Spray nozzle humidification

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.



Pas Reform Hatchery Technologies

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

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



www.twitter.com/pasreform

www.linkedin.com/company/pas-reform-hatchery-technologies

www.facebook.com/pasreform

www.youtube.com/pasreformbv

www.flickr.com/pasreform