

MOBA

GRADING - PACKING - PROCESSING

OvoPro

FROM EGG TO RAW PRODUCT



THE PARTNER FOR PROFIT

www.moba.nl

From egg to raw product

Before the actual processing of egg liquids starts, the eggs need to be broken, and in many cases, albumen and yolk need to be separated. In this section of a processing plant, important steps such as loading the eggs on the breaker, candling, sanitizing and the breaking action itself determine the starting quality of the products.

Key factors: Achieving the best possible separation with the highest yield, combined with the lowest possible contamination, in all steps of the process.

In the egg processing business, it is absolutely vital that the complete egg-breaking process is focused on getting the best possible end product. Proper pasteurization of the egg products is very important for achieving this, but the whole process needs to contribute to the all important factors such as shelf life and functional properties. Keeping the bacterial load of the product as low as possible right from the start should be the ultimate focus.

The better the input quality, the fewer compromises need to be accepted in the downstream process.

Accumulator and collection belt



Inline Supply

OUR FOCUS

- High capacity accumulators: high speed combined with low impact on the eggs
- Highest possible filling ratio
- Conveyor belts with adjustable speeds. This will always guarantee the highest filling rate combined with perfect egg handling, regardless of dry or wet eggs
- Cleanable with high pressure

Accumulators are used to transfer the eggs gently from the conveyors coming from chicken houses onto the in-feed conveyor of the egg-breaking machine. To properly control the eggs going to the breaker, the eggs will need to be placed individually onto the rollers of the breaker in-feed conveyor.

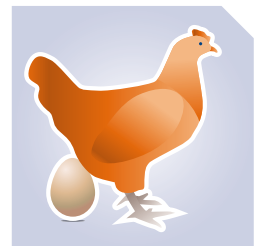
If cracked eggs are handled through a breaker, the risk is greater that shell particles will end up in the egg liquids. This in turn increases the bacterial load of the raw product. Also, when the egg is opened by the breaker, a shell could open along this crack, instead of on the intended position. The crack causes a serrated shell surface, that will hold more liquid and reduces the yield of any egg breaker. It is therefore important that during accumulation the eggs are not damaged or broken. At the same time, the in-feed conveyor needs to be filled in the best possible way to ensure that the egg breaker operates as efficiently as possible.

It is also very important that the accumulator is easy to clean and maintain to avoid any contamination at the beginning of the egg-breaking process.

Many times a high filling ratio conflicts with gentle egg-handling. In case of high capacities it is better to avoid pressure build-up near the rollers. This can be achieved by creating controlled accumulation of eggs before the eggs approach the rollers. This creates a high filling ratio while machine induced cracks will be kept to an absolute minimum. In order to properly supply sufficient eggs from the chicken houses onto the accumulator, fill sensors are used to control the supply belts from chicken houses.

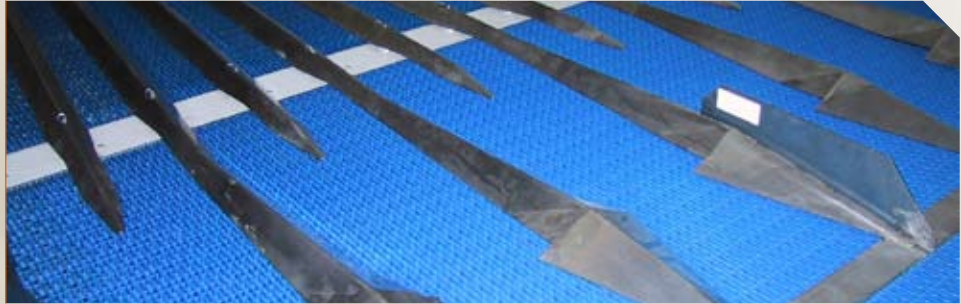
WE OFFER

- Economical solutions for supplying eggs manually onto a breaker (for lower capacity operations)
- Controllable conveyor belt speed for achieving the best filling rate for dry and wet eggs



'The yield of the total processing plant is determined in this early phase of the process. Keep contamination risks low to avoid many compromises later in the process.'

Gentle egg handling and high filling rate



- Open and easily accessible stainless steel construction, where special attention has been given to eliminate the presence of dirt traps
- Possibility of cleaning at high pressure
- Rugged design that guarantees a smooth trouble-free operation with low service costs
- For accumulators with less than 12 rows, the standard wire-mesh accumulator belts can be upgraded with a plastic food-grade conveyor belt.
- Collection tables (Pre-accumulator) are used to connect several egg belts to one breaker when the total width of all egg belts is more than the effective width of the accumulator. The collection tables also enable you to select whether you want to supply the breaker with only one supply conveyor or with multiple conveyors at the same time.

No. of rows	3	5	6	12	15
Capacity (Cph)	up to 75	75-125	125-200	200-400	400-500
Capacity (Eph)	up to 27,000	27,000-45,000	45,000-72,000	72,000-144,000	144,000-180,000
Standard wire mesh belts	+	+	+	+	-
Standard plastic belts	-	-	-	-	+

Offline Supply



OUR FOCUS

- Highest possible yield
- Lowest possible contamination risk
- Minimum down-time as result of stuck eggs, damaged trays or cold pulp trays
- Gentle loading, even with weak-shelled eggs due to the loading principle and automatic vacuum limiting system
- Back-water flush for super-quick cleaning of the suction cup
- Open stainless steel construction for fast cleaning

When the eggs are supplied to an egg-processing plant on stacks of trays, it is called an offline operation. By means of a 'loader', eggs are taken off the trays and positioned on the rollers of the egg breaker. All this needs to be done as gently as possible, to prevent the eggs

Economical hand-held and accumulator system*Moba OvoPro FLB500 destacker loader*

from getting damaged. Since damaged eggs will break in an uncontrolled way, the risk is greater for shell particles ending up in the egg liquids. This in turn increases the bacterial load of the raw product. A serrated shell caused by a crack before breaking will also hold more liquid and will reduce the yield of any egg breaker.

Low-capacity egg loaders can be supplied with single trays as there is enough time for operators to do this manually. The high-capacity egg loaders are supplied with stacks of six trays automatically.

The trays are made of plastic or pulp (paper material). If pulp trays are re-used, it is necessary to determine which pulp trays are dry and re-usable, and which trays are wet. It is important that wet trays, or trays that contain stuck eggs, are automatically removed and not stacked again for re-use to prevent any down-time.

For hygienic reasons, remaining eggs need to be removed from the plastic trays and the trays need to be washed and dried before returned into the production chain.

WE OFFER

- High-end, high-capacity egg loaders for fully automatic de-stacking, loading, empty trays scanning and re-stacking.
- Low-end loading systems to automatically move the eggs from single trays onto the in-feed
- Hand-held vacuum system in combination with an accumulator for cost-effective loading in low capacity egg-breaking plants
- Special constructed vacuum heads that are able to handle even the poorest batches of eggs
- Vacuum limiter and special shaped suction cups to handle eggs as gently as possible and to keep the connected vacuum system free from liquid egg for extended periods of time
- Water back-flush feature for simple cleaning of the suction heads
- Electronic speed synchronization with the egg breaker
- The capacity for processing all commonly used plastic or pulp 30-egg trays in a 5x6 pattern, without adding additional equipment
- Offline washers for plastic trays as well as tray dryers for efficient cleaning, stacking and drying
- Spin dryers with capacities up to 120 trays per cycle and programmable drying time

Unique deflector system



Moba OvoPro egg loading systems

	Manual	FLB125	FLB200	FLB400
Capacity (CPH)	25-75	75-125	125-200	200-400
Capacity (EPH)	9,000-27,000	27,000-45,000	45,000-72,000	72,000-144,000
Infeed rows	2-5	5	6	12
De-stacker	n/a	-	+	+
Stuck egg detection	n/a	+	+	+
Wet tray detection	n/a	-	-	+
Combi-loading	n/a	+	+	+
Side loading	n/a	+	+	+
Water back flush	n/a	+	+	+
Foamable + high pressure cleanable	+	+	+	+

Egg Washing and Sanitizing



OUR FOCUS

- Best washing performance with low maintenance and low service costs
- Modular design, customized layout to match quality
- Lowest possible water and energy consumption
- Cleaner eggs in less space
- Low impact on eggs, both mechanically and temperature-wise
- Low pressure in combination with high water volume
- Optional UV disinfection for reducing the bacterial load on the eggshells

The purpose of washing and sanitizing eggs is to reduce the amount of micro organisms on the exterior of the shell. The lower the bacterial load of the egg shells during breaking, the lower the bacterial load of the raw products. The better the quality of the raw products, the fewer compromises needed in the pasteurization step of the process.

Using good washing equipment is the most cost-effective way to obtain this and create an end product with the best functional properties and shelf life.

An egg-washing system can be divided into four different sections:

1. Pre-washing
2. First washing
3. Second washing
4. Final rinse and sanitizing

Easy access stainless steel filter



There are two different types of washers; one has a continuous supply of fresh water, whereas the other recycles the washing water for a certain period of time. Both systems use fresh water to rinse the washed eggs.

- When using recycled water, there is more need for cleaning agents and chemicals to clean the eggs well. Also de-foamer is used to neutralize the foaming effects of dissolved albumen in the washing water.
- When using fresh water, there is less need to use chemicals and de-foamer, but there is more water consumption and more energy required to keep the washing water at the right temperature.

During the washing process, it is important to control the different variables, to maximize the washing efficiency and to minimize the possibility of contamination.

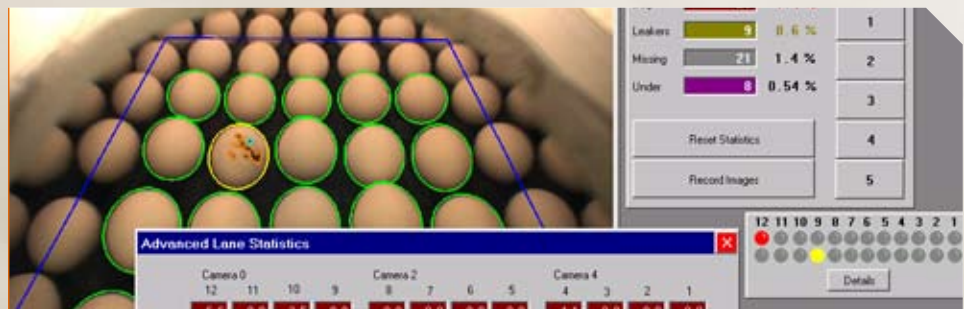
Another step in sanitation can be accomplished by UV DISINFECTION. UV treatment can be stand-alone or in combination with egg washing. The UV light will not penetrate the pores of the shell so the egg liquids are totally unaffected.

The bacterial load of the egg exterior however is reduced by a factor 1000. Since upon breaking of the shell there is always some transfer of bacteria from the shell into the raw product, a log 3 reduction by UV is an effective way to start with the cleanest possible raw product.

UV Disinfection also minimizes the risk that the roller section of the egg breaker becomes a source of cross contamination. Since the rollers are repeatedly exposed to the UV light, micro organisms don't have a chance to develop.

WE OFFER

- A complete range of egg washers, with capacities of 75 to 500 cases per hour (27,000-180,000 eph). The modular design allows you to customize the egg-washing system according to the quality of the eggs.
- The best possible length-cleaning ratio to reduce the rise of internal egg temperature
- Adjustable brush-pressure
- Low pressure, high water volume and more brush surface continuously on the shell to maximize the cleaning procedure in less travel time through the washer
- Unique deflector sprays water across the entire curved egg shell surface. This eliminates nozzle maintenance, plugging and replacement parts.
- Stainless steel heating coil construction that perfectly withstands the various applied chemicals and cleaning agents. This ensures trouble-free heating of the wash-water during the washer's lifecycle.



- An easy accessible stainless steel filter that prevents egg shells and feathers from clogging the spray manifold, when used in conjunction with the deflector spray
- Water-lubricated bearings and a harmonic motion brush drive to eliminate grease points and reduce maintenance and spare parts
- The drop-down doors on the washer cabinet allow greater and easier access for inspection, cleaning and sanitizing of the washer.
- Drop-down doors for easy access for cleaning, sanitizing and inspection.
- Optional Rotating Screen: automatically removes shells, feathers, manure, egg whites and egg yolks from the cleaning solution. This reduces detergent and de-foamer usage, waste water treatment costs and increases food safety.
- Optional Multi-Tube, externally mounted heat exchanger: reduces start-up time and energy costs. State-of-the-art controls and temperature transmitters accurately control the wash-water temperature, allowing a higher efficiency of heat transfer and stable washing temperature.
- Multiple tanks system that provides cleaner water as the eggs travel through the washing system and allow for phasing of cleaning-water temperature to reduce temperature shock on cold eggs.

Detection Systems and Candling



OUR FOCUS

- Automatic removal of unwanted eggs
- Improved detection of dirt and leakers compared to manual candling
- Reduced risk of contamination in the breaking and separating process
- Less false rejects
- Contact-less detection of dirty eggs or leakers
- Automatic re-wash for dirty eggs

If we want to have a superior product, it is very important to minimize the risk of contamination in the raw product. Therefore, it is vital that only clean, non-defective eggs enter the breaker.

In order to ensure that unwanted eggs are removed before breaking, all eggs need to be checked. This can be done manually or automatically.

Automatic detection systems (also called 'auto-candling equipment') are able to detect more defects and also reduce the number of falsely detected eggs ('false rejects') especially in higher capacity systems. This translates into significant savings.

With an automatic dirt and leaking detection unit, several cameras will scan the passing eggs for anything unsuitable to enter the egg breaker.

Dirty eggs can then be removed and rewashed. Leaking eggs can also be removed and sent to the centrifuge on the empty-shell conveyor.

WE OFFER

- Monitoring systems (cameras) to check that eggs are free from dirt, yolk, large cracks and leaking eggs
- The possibility to remove leaking eggs from the product flow
- The possibility to re-send dirty eggs to the washer
- Contact-less detection
- Each camera pair inspects 3 or 4 eggs in each row depending on the configuration.
- Diagnose screen for real-time performance inspection
- Pass/fail adjustment panel for easy set-up of the detection system
- Shatter-proof coating on the lights; prevents the risk of glass particles falling on the product.
- Collection of statistical information for reports
- Individual egg-weighing option for sorting out large eggs for retail
- Wash-down candling system, available in 5, 6, 12 and 15 row versions for inspection of external and internal quality of eggs for breaking
- Optional wash-down candling system, available in 5, 6, 12 and 15 row versions for inspection of external and internal quality and removal of the eggs before breaking.

Egg Breaking

OUR FOCUS

- High yield created by:
 - High-speed transfer combined with fixed cracker head for perfect positioning of the egg
 - Inclined position of the knife, ensuring that knife and shell edges are kept outside



Separation cups and cracker heads



the product flow. This is the quickest and most efficient way to empty the egg shell. More liquid can be recovered in less time.

- Separation cup is close to the cracker head for gentle handling
- Specific knife-timing to prevent shell fragments from entering the product; lowest possible contamination during the breaking process.
- Combined simplicity and reliability: Stable product transfers that do not require extra electronic supervision.
- Easy cleaning and maintenance

Egg breaking and separating is a precision job. Only equipment that combines the best essential features, such as precision breaking, high liquid recovery and clean ability are good enough.

In the first step of the breaking process, the eggs are transferred from the in-feed rollers onto the cracker heads. The eggs need to be positioned precisely so that upon opening the eggs, the liquids will flow freely from the shell.

Approximately 1.5 seconds after opening the egg, the liquid is completely drained from the egg. The quantity of liquid drained from the egg is called yield.

Although the liquids inside most eggs are sterile, there are always micro organisms (bacteria) found on the outside of the egg shell. When an egg is broken with a knife, there will always be some bacteria that find their way into the liquid. This might be caused, for example, by a falling shell particle. The cleaner the outside of the egg shell just before breaking, the lower the bacterial load of the raw product.

This is very important because the cleaner the raw product, the less pasteurization is needed to achieve a certain shelf life. And this in turn will result in an end product with the best possible shelf life combined with the least affected functional properties of the egg liquid, such as foaming, coagulation and emulsion.

In some cases the desired end product is always a mixture of yolk and albumen, often referred to as 'whole egg'. In this case, the liquid drained from the broken egg is collected in a collecting tray. If there is a need to separate the yolk from the albumen, the content of each egg is drained into a separation cup or shoot. Depending on the desired product, the whole egg or separated yolk and albumen will be processed to meet the specific application before being pasteurized.

At the end of the breaking cycle, the empty shells will be transported from the crackers via a shell conveyor system to an egg-shell centrifuge or an egg-shell screw press. Here the last bit of liquid will be drained from the shell. This liquid, known as technical albumen, can be further processed for non-food applications.

'An accurate egg breaker will reduce the required impact of the pasteurization process.'

Breaker separator; configuration 'S'*Breaker for whole egg with 'WS' separation*

WE OFFER

A range of Moba OvoPro egg-breaking and egg-separating systems which provides the best solutions for all operations in a wide variety of capacities from 25 to 500 cases per hour (9,000-180,000 eggs per hour). The unique features in the Moba OvoPro breaker design give you the best possible results.

- Maximum recovery and cleanest product:
 - Unique cracker unit design combines perfect breaking of the egg shell with excellent liquid recovery.
 - Specific knife timing and positioning of the cracker head creates a perfect cut with the lowest possible risk of shell fragments in the raw product.
 - The position of the knife allows the product to flow freely from the shell, away from knife and sharp shell edges.
 - No additional need for unsanitary vacuum systems or shell conveyors
 - Produces egg products with longer shelf life combined with the best possible functional properties
- Robust design: Maximum performance, long lifetime with a minimum of down-time for maintenance
- High reliability due to the ability to adjust or replace components in the easiest and quickest way possible
- Automatic tensioning of the cracker holding chains
- Enhanced CIP (Cleaning in Place) features that combine optimal cleaning and disinfection with minimal efforts and down-time
- Cleaning of the egg breaker integrated into the plant's main CIP system
- Servo-driven timing between rollers, crackers and cups performed automatically for the high-end of Moba OvoPro egg breaker range
- Optimal mechanical timing between the different parts of the breaker, which contributes to the best performance and the lowest down-time in the market
- Reliable high-speed transfer that moves the eggs gently from roller to cracker heads
- Big advantage of this system is that the cracker does not need to tilt when it receives the eggs
- A simple design keep the cracker head fixed and greatly improves reliability.
- Real-time tracking of egg count, whole egg production and no-breaks
- Upgrading of breaking systems from 75 to 125 cph by adding two rows of crackers, without replacing the entire breaking unit

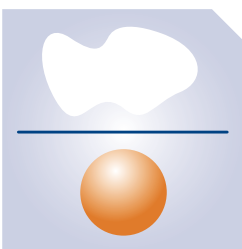
Separation in progress



Moba OvoPro egg breaking systems

	EB25	EB75	EB125	EB200	EB400	EB500
Capacity (CPH)	25	75	125	200	400	500
Capacity (EPH)	9,000	27,000	45,000	72,000	144,000	180,000
In-feed rows	2	3	5	6	12	15
Configuration for whole egg (W)	+	+	+	+	+	-
Configuration for separation (S)	-	+	+	+	+	+
Configuration for separation (WS; outside USA)	+	+	+	+	+	-
OPTIONS						
Automatic Loader	-	+	+	+	+	+
Accumulator	+	+	+	+	+	+
Washer	-	+	+	+	+	+
Servo drive	-	-	-	+	+	+

Separation



OUR FOCUS

- High percentage of yolk solids and cleaner egg whites
- Adjustable percentage of solid from egg yolk
- Compensation for the differences in egg white viscosity due to flock age, flock type and temperature
- Yolk with even weak membranes can be separated perfectly
- Quick scan & release of egg whites, avoiding the leaking of egg yolk into the albumen product after inspection
- Real-time performance analysis of individual cracker heads
- Real-time tracking of egg count, whole egg production and no-breaks
- Reduction of water usage by zoned cup washing: only cups stained by yolk are washed
- Stainless steel cup design for easy cleaning with minimum use of cleaning agents
- The most robust cup transport system in the industry. The cups are pulled rather than pushed by the servo drive. This very simple and reliable system eliminates jams that are caused by inaccurate chain tension.

Collection trays for whole egg and yolk



Most egg-breaking machines in the market have the ability to separate yolk from albumen (egg white) after breaking. In general, there are two ways to separate yolk from egg white. The most accurate method is known as 'cup separation'. The other method is to separate yolk from white by using 'slides', where the yolk 'floats' on top of the slide and the albumen drips through.

Egg breaking with cup separation is the only method approved by USDA since it enables the operator to inspect the individual egg content after breaking. The cup system also offers more possibilities using detection systems and individual cup washing devices.

A cup-separation system works as follows: After the egg is opened, the content is caught gently by a separation cup assembly. The upper part of the cup catches only the yolk, while the bottom part receives the albumen. The design should be such that even the weakest membrane holding the yolk will remain undamaged, preventing the yolk from mixing with the albumen.

The reason why this is very important is that albumen will lose its foaming ability when the quantity of fat is too high. Since a very big part of the egg yolk contains fat, more than 0.03% fat will prevent the white from foaming well when whipped.

Whole eggs with natural proportions are very common and recommended for most whole-egg applications because they are cheap to produce. This is regardless of the fact that there are occasions where it makes sense to separate first and then create a very accurate mix. Since there is no fixed relation between the amount of albumen or yolk in an egg, just mixing yolk and albumen will create fluctuations in quality. For example, a bakery will need a specific blend of yolk and albumen for cookies, while another mixture might be better for cake. If perfect separated products are available, the exact required mix can be created and very accurately reproduced later on.

Handling the eggs at the right temperature is one of the key factors for separating the albumen correctly from the yolk. If the eggs are too cold when broken, the liquid has a much higher viscosity (less fluid). This makes separation more difficult and has a negative effect on the yield. Besides temperature, factors such as storing time of the eggs, flock age or flock type, have a significant influence on how well the egg liquids are separated.

By shaking the separation cups, the albumen will drip more easily from the cup. Since a 'thicker' (more viscous) product requires more shaking than a 'thinner' egg, to achieve optimal performance, we need to adjust how rigorously the cups are shaken. The operator can then compensate those factors that affect viscosity.

If the breaking process fails and a yolk membrane breaks, the cup combination will contain a mixed whole egg instead of two separate products. An operator will see this, activate a lever

and the cup combination will release the contents into a separate bin. The operator can also spot an unusable egg such as a rotten egg or a blood egg. The content can be redirected and released in the so called 'inedible' tray.

Detection can also be carried out by an automatic yolk scanner. It can detect yolk in the albumen. If the amount of yolk in the albumen cup is too much or a defect is detected, a cup wash can be activated automatically, which will clean that specific cup before the next egg arrives. When separation is completed and no defects are detected, the yolks and the albumen are collected separately for further processing.

This means that in the typical egg breaking / separating machine there are four collection trays:

- Albumen
- Yolks
- Incidental whole eggs: This tray acts as outlet for every egg that could not be separated properly (for example, due to a broken yolk membrane).
- Inedible: This tray is for anything considered unfit for processing. Any egg that deviates in color or smell is discarded into this bin.

WE OFFER

- Due to the excellent separation of modern egg breaking machines, Moba OvoPro can now design breaking plants without an incidental whole egg line. If the eggs are of certain quality and the machine is properly calibrated, this can feature can greatly reduce plant investment.
- Individual separation/inspection cups and areas for the inspection and rejection of eggs
- Smart component design and limited use of electronics and pneumatics that result in low maintenance and high reliability
- Short distance between cracker unit and cup to ensure that the yolk is handled in the gentlest way possible when released from the cracker into the cup
- Adjustable cup-shaking to ensure a perfect control of the solids percentage of the egg yolk:
 - Compensates for differences in viscosity of the product due to flock age, flock type, temperature, etc.
 - Gives you the ability to define the proper yolk solids percentage of your egg product without adding whites or whole eggs later.
 - Creates a better uniform product at all times, enabling the producer to maintain a constant level of product quality.

Yolk scanner



- Servo drive system on the high-end breakers. When precision needs to be combined with high capacities, this system offers:
 - Electronic timing of egg transfer and cracker-to-cup alignment
 - Smart cup wash for water savings
- Electronic yolk scanner with vision technology that automatically detects presence of yolk in the egg whites. It will send the egg whites with yolk to the incidental whole egg outlet of the machine. The scanner sensitivity can quickly be adjusted to the size of the yolk spot and that triggers the release mechanism to the whole egg. The result is production of cleaner egg whites and high-solids egg yolks with minimal incidental whole-egg production.
- ‘High-purity egg whites’ made possible by smart arrangement of the collection trays and yolk scanner. The first release after the inedible tray is the albumen release. In practice, this means that albumen can be released right after it has been scanned, without any delay. In case there is a broken yolk present in the upper bowl, it has no time to drip into the egg white.
- Perfect analysis: The combination of the electronic yolk scanner with the servo drive system provides additional service and statistic information:
 - Real-time performance analysis of individual cracker heads
 - Real-time tracking of egg count, whole-egg production and no breaks
- Smart cup wash: The electronic yolk scanner allows the operator to independently select the size of the yolk spot that should trigger the cup wash.

Moba OvoPro egg separating systems

	EB25	EB75	EB125	EB200	EB400	EB500
Cap (CPH)	25	75	125	200	400	500
Cap (EPH)	9,000	27,000	45,000	72,000	144,000	180,000
OPTIONS						
Yolk scanner	-	+	+	+	+	+
Servo drive	-	-	-	+	+	+
Perfect Analysis	-	-	+	+	+	+
High Purity Egg Whites System	-	-	+	+	+	+
Smart Cup Wash	-	-	-	-	+	+

Shell transport



Shells



OUR FOCUS

- Complete shell-handling systems
- Lowest amount of waste material
- Lowest possible energy consumption
- Custom-made installations

With environmental regulations becoming ever stricter, a proper system to handle your empty shells is essential.

There are regulations that oblige egg processors to first process their egg shells further to eliminate the risks of contamination. A very efficient method to eliminate this risk is to dehydrate and pasteurize the wet shells by centrifuging and heating them.

To comply with regulations, egg shells are centrifuged and dried further. At the same time, the drying process converts the egg shells into a usable product for other applications, such as fertilizers for the agricultural sector.

Our engineers will work with you to find the best solution for your specific shell-handling needs.

Besides specific elements such as centrifuges and dryers, the transport of the shells in between the various process is important. There are two types of transportation of egg shells: To the shell centrifuge and from the centrifuge.

Augers are mainly used for 'wet shells' and in applications where the shells have to be transported 20 meters or less. This is often used to transport the shells towards the centrifuge.

Pneumatic conveyors are used for shells that have been centrifuged and have to travel longer distances from the centrifuge.

WE OFFER

- Shell transport systems designed to be easily washable without needless disassembly
- Completely manufactured transport systems in stainless steel and available in any length
- Custom-made solutions

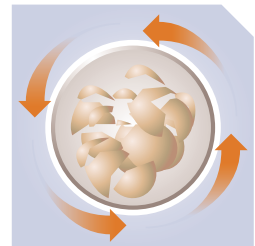
Screw press



Liquid Recovery from Eggshells

OUR FOCUS

- Saving energy
- Reducing the small particles that wind up in the technical albumen compared to basket type centrifuges
- Reliable construction



The egg shells remaining after the liquid is collected also need to be processed further. First step is to extract the residual liquid from the shells. This liquid is usable as technical albumen for non-food applications.

Shell centrifuge is the general method used for this.

A transport system feeds the empty egg shells into a centrifuge, and centrifugal force is used to separate the liquid from the shells. The processed shells are automatically fed into a to a collection point in a second transport system for further processing. The egg liquid is drained into a collecting vat and stored as technical albumen.

You could also use a shell centrifuge for the production of whole eggs, but the method of extracting egg liquid by centrifuging whole eggs results in broken shell parts that are mixed with the egg content.

This increases the risk of external micro organisms, which could come in contact with the product. Methods that entail a very high risk of contamination are obviously prohibited.

Besides obtaining technical albumen, there is a second reason for extracting the remaining fluids from the empty shells. Centrifuging prepares the egg shells for drying. The higher the moisture content of the egg shells, the more energy is required for proper drying. Using egg-shell centrifuges reduces energy costs.

A second method of extracting technical albumen from egg shells is by the use of a screw press.

This system consists of a rotating screw inside a perforated cylindrical screen. The pressure needed to separate albumen from shells is achieved by the reducing pitch of the screw. Material entering the hopper is gradually pressed together, while it moves to the exit of the press. The pressure can be controlled by an adjustable discharge cone.

WE OFFER

The Moba OvoPro shell centrifuges and screw presses have a capacity range from 75 to 2500 cases per hour.

All models have an automated lubrication system for lubricating the bearings and they can be easily dismantled for daily cleaning and maintenance. There are two types of Moba OvoPro shell centrifuges: grease and oil lubricated.

Type SC-300, 750 and 1400:

- Forced-oil lubrication system to maintain the bearings lubricated at all time
- Stainless steel construction
- Capacities up to 1400 cases per hour (500,000 eggs/ hour)
- Specifically designed to handle large quantities of egg shells and liquids
- Gear belt drive
- Oil reservoir, pump and filter
- Low oil pressure detection and alarm

Type SP-250, SP-700 and SP-2500 screw press:

- Stainless steel construction
- Long- life rugged drive motors and gear box
- Standard screen perforation from 2.3 to 0.84 mm
- Capacities up to 2,500 cases per hour
- More compacted shells, compared to traditional centrifuging: less transport costs.

Egg shell dryer



Egg Shell Dryers

OUR FOCUS

- Low operational cost
- Configuration to all kinds of fuels
- Easy operation / low maintenance
- Compact design
- Stainless steel version optional



Once the greater part of the liquid is either pressed or centrifuged from the egg shells, the remaining moisture needs to be removed.

The centrifuged egg shells are first combined with hot air. The hot air heats the product to a temperature that evaporates and eliminates the micro organisms.

Once the egg shells are completely dried, they are removed from the egg shell dryer. Dried egg shells can be used as fertilizer or in animal feed.

A mandatory condition for dry egg shells used in animal feeds is that they are free of harmful bacteria like salmonella.

Optionally, the dried shell can be further milled to a grounded calcium product.

WE OFFER

Egg-shell dryers which can be heated in several ways: Natural gas, propane, diesel, or alternative fuels can be used to operate the efficient burner for heating the incoming air. The hot air passes through the perforated bed of the process chamber at the same time that the wet shells are transported. The high-velocity hot air stream creates gentle turbulence in the product. This removes lighter particles that are directed to the cyclone where they are removed from the airflow. The dried products are discharged through a rotary outlet driven by the conveyor. Operating temperature, product depth, retention time and air flow are variable for optimum performance and the best possible dried products. Moba OvoPro can offer you a wide range of egg-shell dryers, with capacities from 500 to 6,000 kg/hr enabling you to get the proper shell drying solution for your specific needs.

- Egg shell mill to further grind down the dried egg shells



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