MOBA

GRADING - PACKING - PROCESSING

EBS

75 | 125 | 200 | 400

PROFIT STARTS WITH CARE

Egg breaking and separating is a precision operation in which only equipment that combines the best of the essential features is good enough. These features include precision breaking, high liquid recovery, ease of cleaning and durability. The range of Moba's egg breaking and separating systems offers the best solution for all operations in a wide variety of capacities of up to 400 cases per hour (144,000 eggs per hour).

'The overall yield of an egg processing plant is determined in this early phase of the process. Minimize contamination risks in this phase to avoid excessive compromises later in the process.'

The egg-breaking operation must focus on producing the best possible finished product. Although the egg liquids produced by the egg-breaking operation must always be pasteurized, pasteurization is not as such a guarantee for a good finished product.

Egg products which combine the best possible shelf life and the retention of their valued functional properties can be obtained only with gentle egg handling throughout the egg breaking operation, as cracked eggs entering the breaker can have an effect on:

- The bacterial load on the raw product, which can be increased: shell cracks increase the risk of shell fragments entering the product. Shell fragments are a potential source of contamination.
- The breaker's overall yield: undesirable shell cracks can result in eggs opening in an unintended manner. serrated shell surfaces can slow the drainage rate of the egg liquid from the shell.
- The whole-egg yield: cracked shells can pose an extra risk to the egg yolk membrane, which can rupture while the eggshell is emptying. Yolk will then contaminate the albumen cup, resulting in whole egg.

Controlled accumulation; No pressure on the eggs

Supply systems **INLINE**

OUR FOCUS

- Gentle egg handling: high capacity in combination with the least possible impact on the eggs.
- Highest possible filling ratio with dry or wet eggs.
- Excellent cleanability of the equipment.

Accumulators transfer the eggs gently from the hen-house conveyors to the infeed conveyor of the egg-breaking machine.

The supply of eggs to the breaker is controlled by placing each egg individually on the rollers of the breaker infeed conveyor. Obviously, the eggs must be handled with the greatest possible care. However, a high filling ratio is often in conflict with gentle egg-handling.

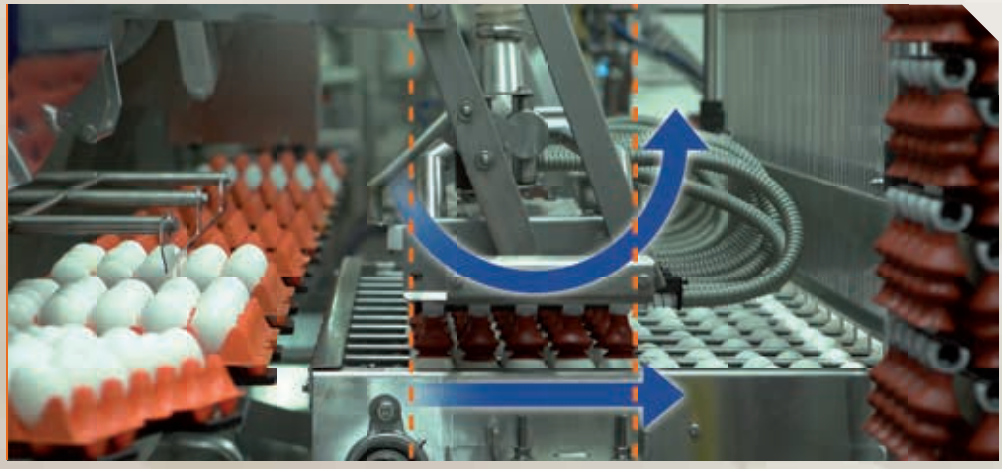
Gentle egg handling is achieved by avoiding pressure build-up near the rollers. This is in turn achieved by the controlled accumulation of the eggs before they are fed to the rollers. This results in a high filling ratio while keeping machine-induced cracks to an absolute minimum. Moba accumulator systems minimize the pressure on the eggs. This results in a very gentle egg treatment even at very high capacities.

The accumulator must be easy to clean and maintain. The open construction of Moba accumulators in combination with standard CIP features guarantees quick and thorough cleaning.

WE OFFER

- Adjustable conveyor speed for the best filling rate for dry and wet eggs.
- Open and easily accessible stainless steel construction, with specific attention to the elimination of dirt traps.
- Option for cleaning at high pressure.
- Rugged design that guarantees smooth, trouble-free operation and low service costs.
- Collection tables (Pre-accumulators) connect several egg conveyors to one breaker. When the total width of the egg conveyors is wider than the effective width of the accumulator then the collection tables can be used to select the infeed conveyor or conveyors that will supply eggs to the breaker at any given time.

FLB 200; Common speed loading



Supply systems **OFFLINE**

OUR FOCUS

- Gentle loading, even with eggs with weak shells.
- Minimized contamination risks with an open stainless steel construction providing for fast and thorough cleaning.
- Minimized downtime caused by stuck eggs, damaged trays or cold pulp trays.
- Rapid intermittent cleaning of the suction heads with a back-water flush system.

Offline egg processing plants receive the eggs on stacks of trays. A loader system takes the eggs off the trays and gently positions them on the rollers of the egg breaker. The eggs must be handled as carefully as possible. Damaged eggs will break in an uncontrolled manner and increase the risk of shell fragments contaminating the egg liquids. Shell fragments in turn increase the bacterial load on the raw product.

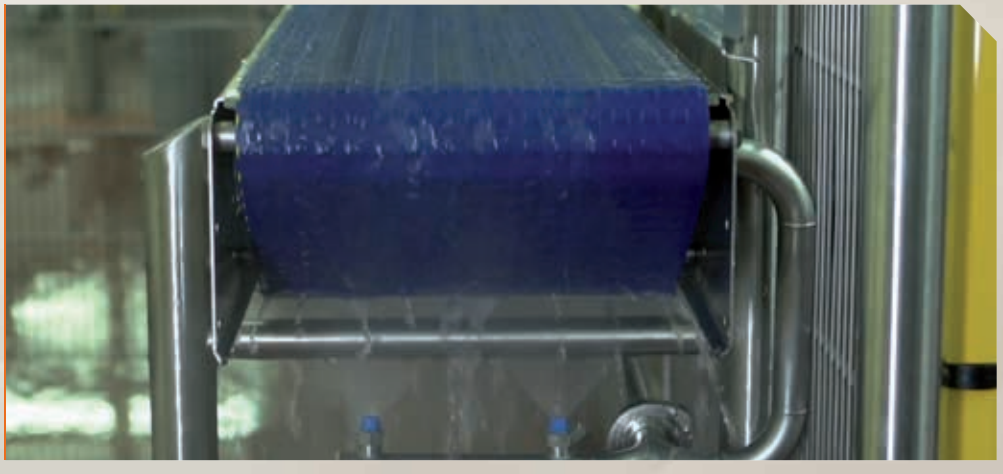
Low-capacity egg loaders can be supplied with single trays, as the operator has sufficient time to destack by hand. High-capacity egg loaders are supplied with stacks of six trays, which are then destacked automatically.

Moba loading systems have a very open construction that makes cleaning easy. Moreover, the CIP functionality guarantees that places that are hard to reach are also cleaned properly.

WE OFFER

- Open and easily accessible stainless steel construction, with specific attention to the elimination of dirt traps.
- Option for cleaning at high pressure.
- Rugged design that guarantees smooth, trouble-free operation and low service costs.
- Hand-held vacuum systems in combination with an accumulator for cost-effective loading at low capacity egg-breaking plants.
- Low-end loading systems that automatically transfer the eggs from hand-loaded single trays to the breaker infeed conveyor.
- High-end, high-capacity egg loaders with fully automated destacking, loading, empty tray scanning and re-stacking.
- Specially-constructed vacuum heads that are able to handle eggs of even the poorest quality.

Pre-rinse feature on FLB 400



- Vacuum limiter and specially-shaped suction cups that handle eggs as gently as possible and ensure that the vacuum supply is kept free of liquid egg for long periods of time.
- 'Common speed loading' for gentle egg treatment.
- Water back-flush feature for fast and simple cleaning of the suction heads.
- Precise electronic speed synchronization with the egg breaker.
- Option for tracking processed egg batches.

Egg breaking

OUR FOCUS

- High yield achieved by:
  - Straightforward, stable transfer from the infeed to the crackerbars without the need for electronic controls.
  - Free flow of product after the egg has been opened. No blockage of the liquid flow caused by the knives or shell edges.
- Minimized contamination during the breaking process: Specific knife-timing stops shell fragments contaminating the product.
- Easy cleaning by virtue of the open and accessible construction in combination with CIP.
- Straightforward adjustments and good accessibility to achieve ease of service and maintenance.

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

In the first step of the breaking process the eggs are transferred from the infeed rollers to the cracker heads. The eggs need to be positioned precisely so that the egg liquids will flow freely out of the open egg. Various modular widths guarantee gentle egg handling, even with the highest capacity breaker currently available.

All liquid is drained from the egg within about 1.5 seconds after it has been opened.
Although the liquid inside eggs is sterile, microorganisms (bacteria) are always present on the outside of the shell. When the knife breaks the egg some bacteria will always contaminate the liquid. This can be due, for example, to the presence of shell fragments in the egg liquid. The cleaner the outside of the shell just before breaking, the lower the bacterial load on the egg liquid.

Stable transfer into crackers

Specific knife timing and positioning of the cracker head

The cleaner the egg liquid, the lower the pasteurization treatment needed to achieve a specific shelf life. The lower the pasteurization treatment the better the retention of the functional properties of the egg liquid pasteurized to obtain the required shelf life.
In some cases the required finished product is a mixture of yolk and albumen, often referred to as 'whole egg'. The liquid drained from the broken egg is then collected directly in a dedicated collecting tray. When, in contrast, the yolk and the albumen need to be separated then the content of each egg is drained into a separation cup.

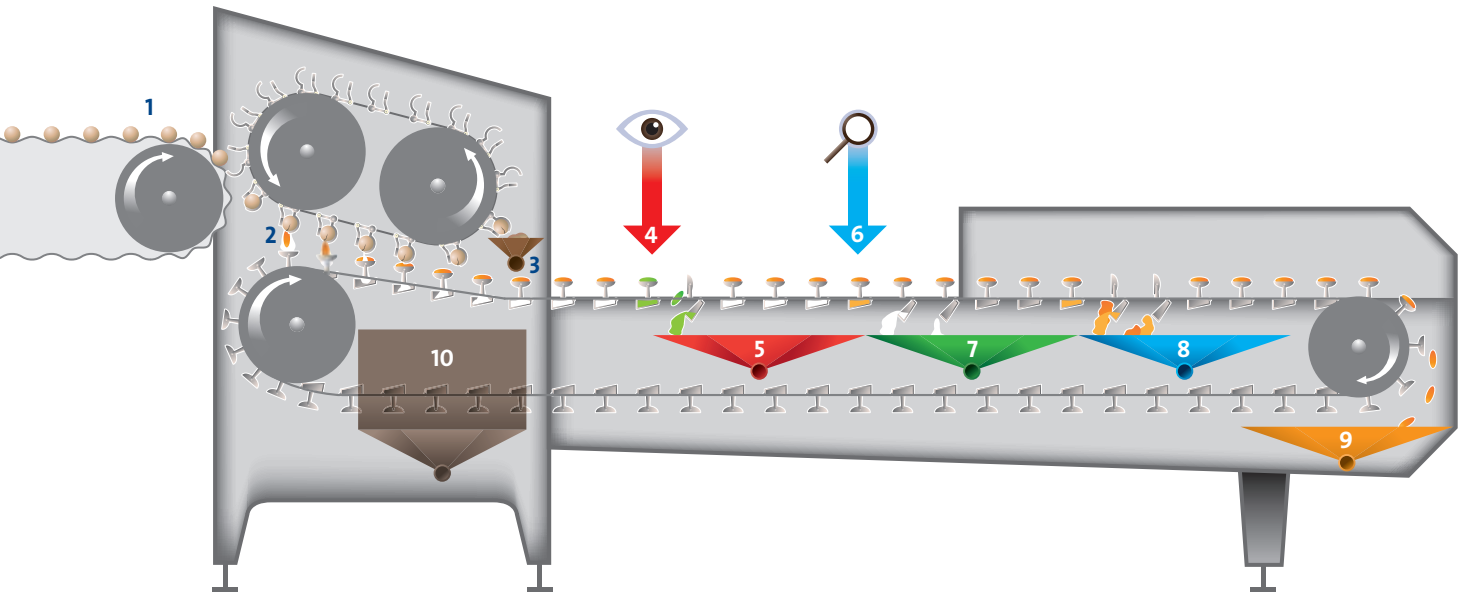
At the end of the breaking cycle the empty shells are transported from the crackers via a shell conveyor system to an egg-shell centrifuge or an egg-shell screw press. These extract the last liquid from the shell. This liquid, referred to as technical albumen, can be processed for non-food applications.

WE OFFER

The best solutions for all operations: capacities ranging from 75 to 400 cases per hour (27,000-144,000 eggs per hour). The unique features of the Moba breaker design guarantee you the best possible results.

- Maximum recovery and cleanest product.
- The unique cracker unit design combines perfect breaking of the eggshell with excellent liquid recovery.
- The specific knife timing and positioning of the cracker head creates a perfect cut with the lowest possible risk of shell fragments contaminating the egg liquid.
- The position of the knife allows the product to flow freely out of the shell, and away from the knife and sharp edges of the shell.
- Robust design: maximum performance, long service life with the minimum of downtime for maintenance.
- Enhanced CIP (Cleaning in Place) features that combine optimum cleaning and disinfection with minimum efforts and downtime.
- The high-end of the Moba egg breaker range features automated, servo-driven timing between rollers, crackers and cups.
- Real-time tracking of egg count, whole egg production and unbroken eggs
- Upgrading options for low-end breaking systems.

EBS Breaker control interface



1 *Infeed conveyor*
2 *Breaking the eggs and liquid collection*
3 *Release of empty shells*
4 *Manual inspection and release of cups*
5 *Inedibles collection tray*
6 *Yolk scanning*
7 *Albumen collection tray*
8 *Whole egg collection tray*
9 *Yolk collection tray*
10 *Cupwash*

Dry egg yolks by adjustable cup shaking

Product separation

OUR FOCUS

- Clean egg whites by the use of smart dedicated yolk scanning systems for each row.
- Dry egg yolks by adjustable cup shaking.
- Gentle egg liquid treatment: correct separation, even with eggs with weak yolks.
- Precise and 'close by yolk scanning' enhancing scanning capabilities.
- Real-time performance analysis of individual cracker heads.
- Real-time tracking of egg count, whole egg production and unbroken eggs.
- Reduction of water consumption with zoned cup washing: only cups contaminated with yolk are washed.
- Stainless steel cup design for easy cleaning with minimum use of cleaning agents.

In principle, all egg-breaking machines available on the market can separate yolk from albumen (egg white) after breaking the eggs. The yolk can be separated from the egg white using one of two general methods. The first method, and the most accurate method, is referred to as 'cup separation'. The second method is based on the use of 'slides' to separate the yolk and albumen, where the yolk 'floats' on top of the slide and the albumen drips through the slide. Egg breaking with cup separation is the sole method approved by USDA, as the operator is able to inspect the content of each egg after it is broken. The cup system also offers more options for the use of detection systems and individual cup washing units.

A cup-separation system works as follows: The egg is opened and the contents are collected gently in a separation cup unit. The upper part of the cup collects the yolk and the bottom part the albumen.

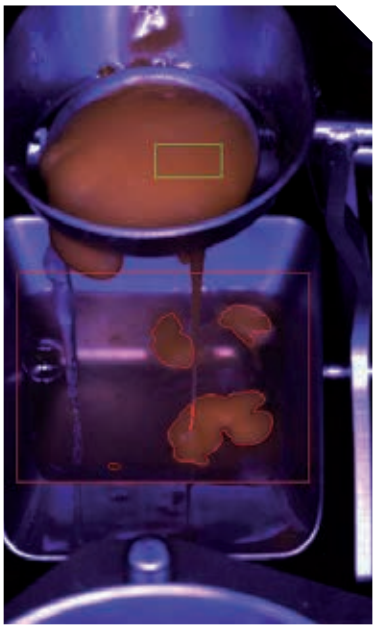
Whole egg mixtures containing the natural proportions of yolk and albumen are very common and are recommended for most whole-egg applications as they are cheap to produce. However, in some cases it is preferable to separate the yolk and albumen and then recombine them to create a very accurate mix. As eggs do not contain constant amounts of yolk and albumen, mixing the contents of eggs will result in batches of varying composition and quality. This will not be suitable for bakeries that, for example, need a specific blend of yolk and albumen for cookies and another blend for cake. Perfectly-separated yolks and albumen can be used to make batches containing the precise blend required by the customer.

EBS 125

Eggs need to be at the right temperature if the albumen and yolk are to be separated correctly. Eggs that are too cold when broken contain liquids with a much higher viscosity (less runny). This complicates separation. In addition to temperature, the separation efficiency is also influenced by factors including the storage time of the eggs, the flock age and type and even the feed composition. Shaking the separation cups speeds the rate at which albumen drips from the cup. As 'thicker' (more viscous) liquids require more shaking than 'thinner' liquids it is necessary to be able to adjust the intensity of the cup shaking. The operator can then compensate for variations in the viscosity. When a yolk membrane ruptures then the cup combination will contain a mixed whole egg and not the two separate products. The operator can see this and activate a lever to release the contents of the cup combination into a separate bin. In addition, the operator can see unusable eggs such as rotten eggs or blood eggs. The contents of the cup combinations can be redirected and released into what is referred to as the 'inedibles' tray.

Automatic yolk scanning

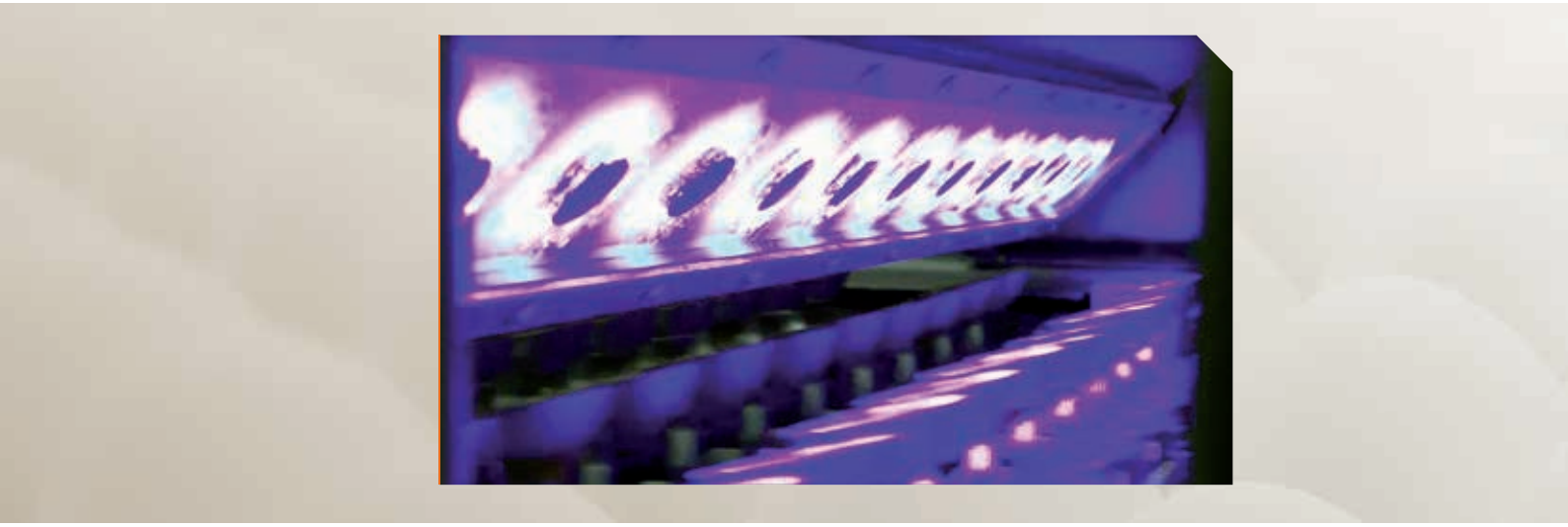
Yolk in the albumen cup can also be detected with an automatic yolk scanner. The Moba yolk scanner is able to detect even the smallest possible speck of yolk in the albumen. The yolk scanner is equipped with dedicated cameras for each row of separation cups. These cameras are positioned closely above the cups. Cameras mounted in this position have a clear view of the albumen cup and the yolk cup.



Special LED lighting creates a contrast between the egg yolk and albumen. Each camera can also check very accurately whether the specific colour of yolk in the yolk cup is also present in the albumen cup. This greatly increases the accuracy of the detection. The combination of this yolk detection method and the release of the albumen immediately after scanning results in albumen with an average fat content of well below 0.03%.

The scanner, on the basis of the preset limit for the amount of yolk in the albumen, determines whether the albumen will be bypassed into the whole egg collection bin or continue to the albumen collection bin. When the scanner approves the contents of the albumen cup they are immediately released into the albumen collection tray located right after the scanner. The albumen tray must be located in the correct position to minimize the risk of yolk leaking into the albumen cup after scanning.

Yolk scanner with one dedicated camera per row



When the separation is complete and no defects have been detected then the yolks and albumen are collected separately for further processing. As a result, a typical Moba egg breaking / separating machine has four collection trays:

- Inedibles: this tray is used to collect all material deemed to be unfit for processing. Eggs with a non-compliant colour or odour can be discarded into this bin by hand.
- Albumen.
- Occasional whole eggs: This tray is used to collect eggs that could not be separated properly (for example, due to a ruptured yolk membrane).
- Yolks.

The yolk scanner is also used to activate the cup wash system. When yolk has been detected in a specific cup several times in a row the scanner will activate the breaker's cup wash system to clean the relevant cup.

WE OFFER

- Short distance between cracker unit and cup to ensure that the yolk is handled as gently as possible on its release from the cracker into the cup.
- Individual separation/inspection cups and areas for the inspection and rejection of eggs.
- Adjustable cup shaking for the optimum control of the solids content of the egg yolk:
  - Compensation for variations in the viscosity of the product due to flock age, flock type and temperature, etc.
  - The ability to define the required yolk solids content of the egg product without the need for the subsequent addition of egg white or whole eggs to correct the solids content.
- A more uniform product and a constant quality product.
- Servo drive system on high-end breakers. When precision needs to be combined with high capacities then this system also offers:
  - Electronic timing of the egg transfer and automatic cracker-to-cup alignment.
  - Smart cup wash for water savings.
- Electronic yolk scanners by row that automatically detect yolk in the egg whites. The scanners divert albumen contaminated with yolk to the occasional whole egg tray. The scanner sensitivity can be adjusted for the size of the speck of yolk that triggers the release mechanism to divert the albumen to the whole egg tray.
- High-purity albumen can be produced by virtue of the smart arrangement of the collection trays and yolk scanner. The first release after the inedibles tray is the albumen release. In practice, albumen can then be released immediately after it has been scanned. A broken yolk in the upper cup, where relevant, will not then have a time to drip into the albumen.

CIP spray balls and nozzles in the EBS 400

- Perfect analysis: The combination of the electronic yolk scanner and the servo drive system provides additional service and statistics information:
  - Real-time performance analysis of individual cracker heads.
  - Real-time tracking of egg count, whole-egg production and unbroken eggs.
  - Smart cup wash: The electronic yolk scanner enables the operator to select the size of the yolk speck that triggers the cup wash.

Cleaning in place

Cleaning the equipment is necessary for the best possible egg products, but is also a time-consuming job. Enhanced CIP features combine optimal cleaning and disinfection with minimum efforts and downtime. The Moba CIP features provide for the integral cleaning of the egg breaking equipment in combination with the plant's main CIP system.

MOBA EGG BREAKING SYSTEMS				
	EBS 75	**EBS 125**	**EBS 200**	**EBS 400**
Capacity (EPH)	27,000	45,000	72,000	144,000
Capacity (CPH)	75	125	200	400
Number of infeed rows	3	5	6	12
Servo drives	No	No	Yes	Yes
Yolk scanning per row	No	Optional	Yes	Yes
Cup wash	Yes	Yes	Yes	Yes
Automatic cup wash	Optional	Optional	Yes	Yes
Option for inline configuration	Yes	Yes	Yes	Yes
Manual loading	Yes	Yes	No	No
Connection to single tray loader	No	ELB 125	No	No
Connection to destacker-loader	No	No	FLB 200	FLB 400
Moba 'Common Speed Loading'	No	No	Yes	Yes
Option for combi loading	No	Yes	Yes	Yes
Connection to Egg Washing system	Yes	Yes	Yes	Yes

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Information about the worldwide offices and agents' network is available at www.moba.net