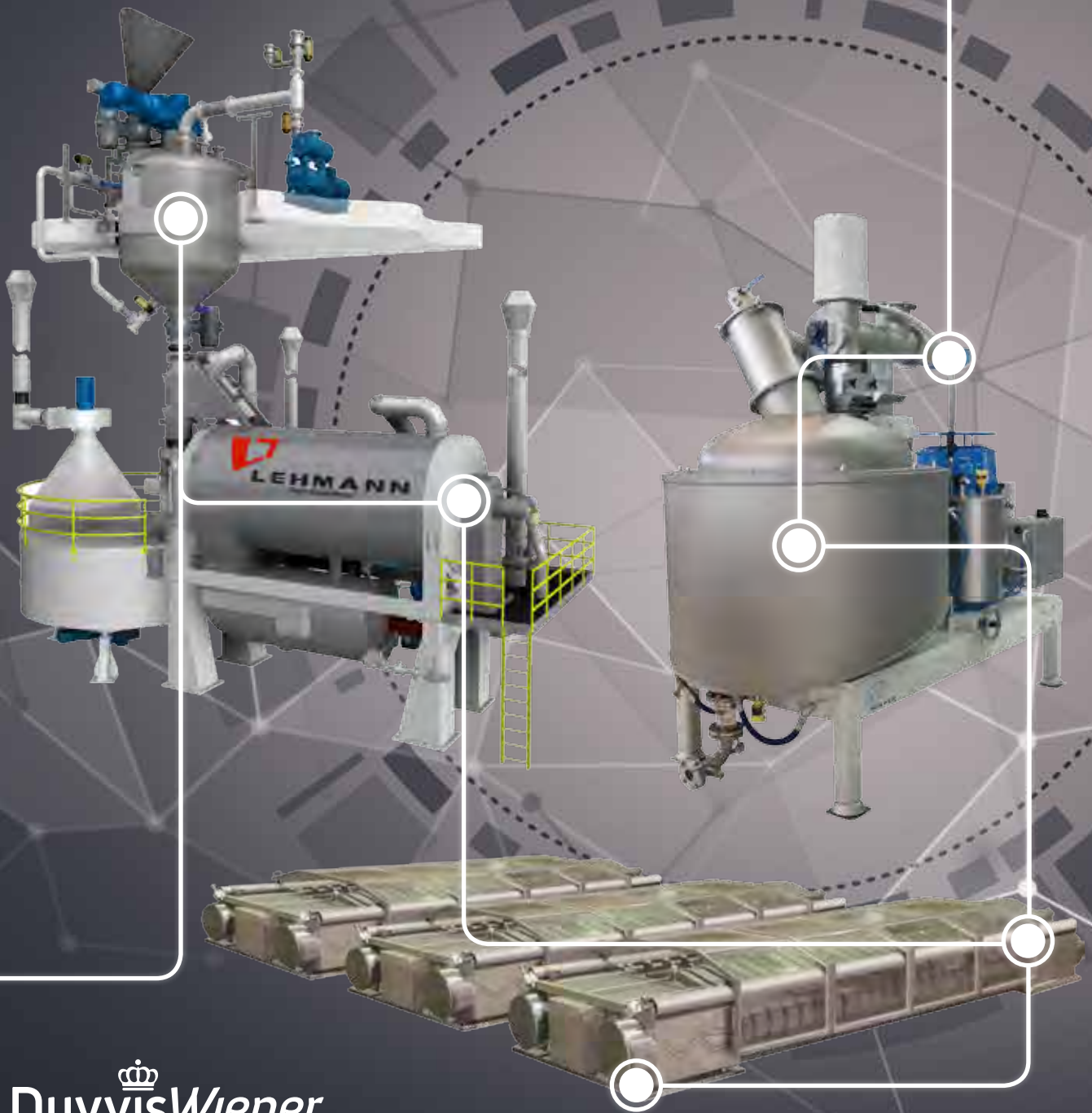


COCOA

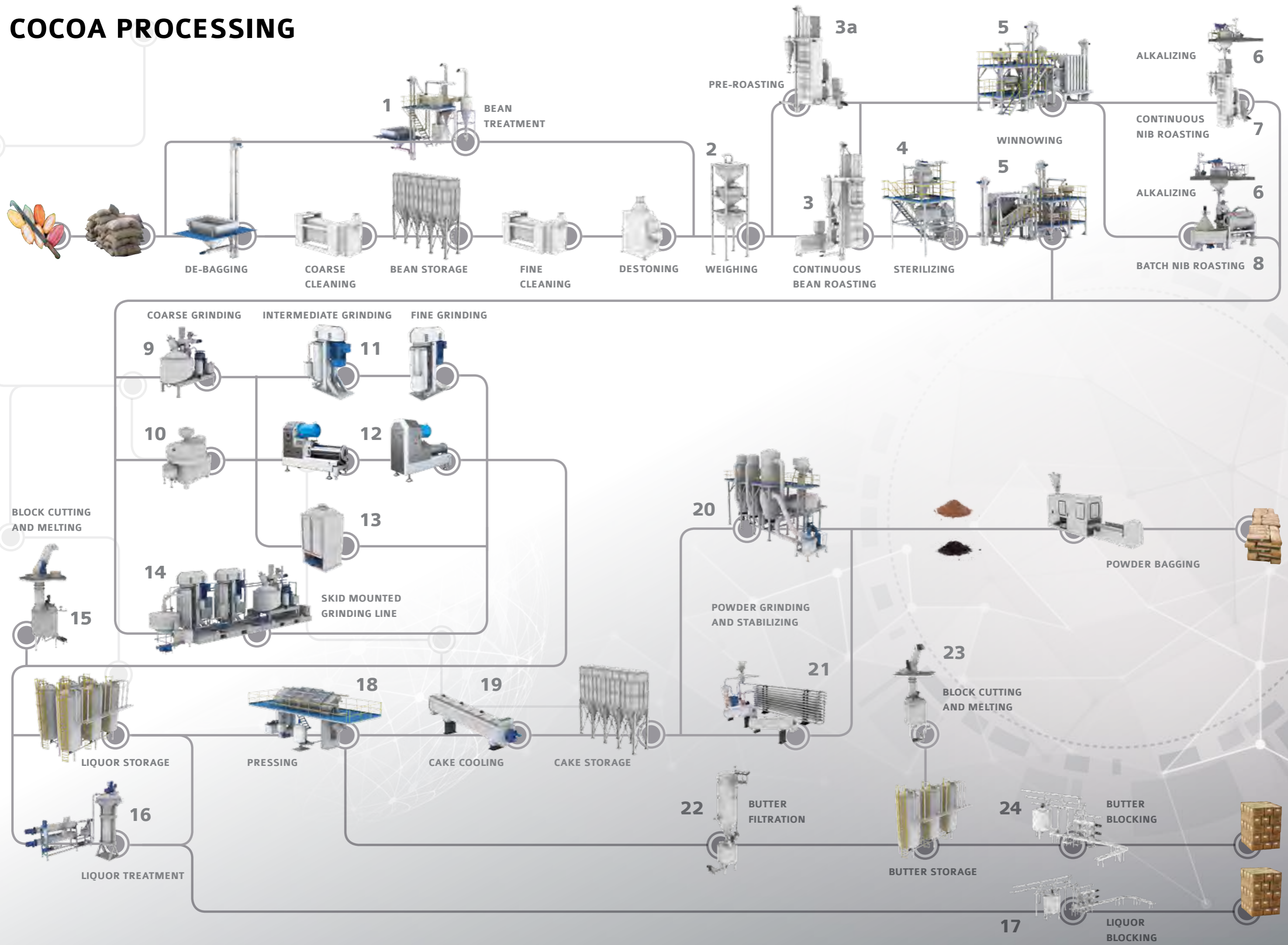
From bean to liquor, powder and butter




DuyvisWiener
from cocoa to chocolate

Cocoa, Compound, Chocolate and Nut Systems Worldwide

COCOA PROCESSING



BEAN TREATMENT

1 Several tailor-made solutions are available for feeding the cocoa beans from trucks, big bags or jute bags. Feed hoppers, transport systems and storage silos can all be tailor-made to suit the customer's operation, building conditions and line capacity demands. Reliable and highly efficient cleaning machines remove any foreign material, such as wooden particles, clusters, strings, sand and dust from the cocoa beans. Our destoning machines allow simple and safe separation of glass, stones and other heavy material. This is achieved using an air-flowed vibration sieve with special netting. The product is classified according to its specific weight. All operations can be readily monitored.

2 After destoning and cleaning, the cocoa beans are fed through the unique, continuous batch weighing system, which registers the amount of cocoa beans and measures the capacities of the complete process. Our cleaning system is unique in recording the process. This combined with other measurement systems for liquor, powder and butter, allows the perfect balance of line efficiency to be achieved.

3 CONTINUOUS BEAN ROASTING
Introduce the finest cocoa liquor ever produced to your chocolate recipe! To achieve the highest quality chocolate, it is essential to roast whole cocoa beans, properly separate the cocoa shells and grind to the finest liquor. Our continuous bean roasters have many advantages compared to other bean roasting systems. The beans pass through the roaster by gravity and are held in layers; during each cycle one small batch is dumped to the next level. Hot air passes through each layer from bottom to top. In this way, each bean receives the desired amount of hot air and the same treatment, allowing every bean to be equally roasted. Bean roasting guarantees that the flavours are retained in the nib. At the same time, the shell protects the nib against over-roasting and is easily removable afterwards. This bean roasting method prevents butter migrating from the nib to the shell. In chocolate processing, bean roasting is considered the favorite method. In the continuous bean roasting approach, winnowing is performed after roasting. Before winnowing, the beans are sterilized by steam.

With the different principles of roasting, continuous nib roasting and batch nib roasting, we can meet all the fulfil the customers' needs and requirements, allowing them to combine high capacity with superb quality. Our technology is highly valued by chocolate manufacturers worldwide, as the equipment is the perfect solution for the production of high end cocoa liquor.

BENEFITS OF F.B. LEHMANN CONTINUOUS BEAN ROASTERS

- Very low energy consumption
- Adjustable to bean and bean moisture
- No 'over roast'
- No fire hazard (no open fire)
- Selectable energy source (steam, oil or gas)
- Limited floor space (foot print)



BEAN CLEANING UP TO 20 MT BEANS/H
BEAN DESTONING UP TO 6 MT BEANS/H

3a

BENEFITS F.B. LEHMANN PRE-ROASTER

- Adjustable to any kind of bean type and origin
- Limited floor space (foot print)
- High level of automation
- Reduced labour costs

PRE ROASTING / SHELL POPPING
8 MT BEANS/H

CONTINUOUS BEAN ROASTING
UP TO 8 MT BEANS/H



4 STERILIZING
Before winnowing, the beans are sterilized by steam.

The hot cocoa beans are transferred from the roaster directly to the cocoa bean sterilizer. Compared to other systems, the sterilizing of hot beans saves a great deal of energy and has great benefits for the product.

BENEFITS F.B. LEHMANN STERILIZING

- High pressure vessel temperatures possible
- Energy savings of up to 25%
- Excellent loosening of the shell
- Bacteria counts below 500 cfu per gram
- No risk of contamination of clean nibs
- Excellent release of the shell for optimum shell separation in downstream winnowing
- Low intake of moisture and low consumption of energy
- Short and low pressure steam treatment for moisture intake only on the shell
- Fast emptying and filling
- Fully stainless steel design

STERILIZING UP TO 8 MT BEANS/H



5

BENEFITS OF THE F.B. LEHMANN WINNOWER

- High quality of cocoa (less wear on downstream grinding and refining machines)
- Double Reflex Breaker, frequency controlled for gentle breaking in 1st and 2nd stage of bean treatment
- Nib content in shell < 0,1%
- Shell content in nib < 1,0%
- Adjustable to bean quality
- Less fine nibs (perfect sizing)



WINNOWING UP TO 6 MT BEANS/H

6 ALKALIZING

When using a nib roaster, the shell must first be removed with the winnower, which gently loosens the shell from the kernel. After winnowing, alkalizing can take place. Over the last 30 years, nib alkalization has been the most common method. It was the most flexible system regarding flavour, colour and pH influence. The new, specialized alkalizing system is, however, also able to treat nibs with a very high moisture content.

BENEFITS OF THE F.B. LEHMANN ALKALIZER

- Perfect mixer
- Robust design
- Capable of handling nibs with up to 35% moisture
- pH values >8 can be achieved
- All nibs are treated equally, uniform flavour development
- Low energy consumption



**CONTINUOUS NIB ROASTING (CNR)
UP TO 10 MT/H**

7 CONTINUOUS NIB ROASTING

After drying in the alkalizing system, the pre-dried nibs are fed to the roaster resulting in excellent colour and flavour development. After alkalization, the moisture must be evaporated of and discharged. A vacuum system can be used to speed up this drying process. The continuous nib roasting principle has many advantages. When using turning layers, all nibs are treated equally and uniform flavour development is achieved. The method has certainly proven its value in both cocoa and chocolate production. Due to low energy consumption, it is an excellent roasting method for flexible flavour development. It also produces excellent end product colour. High-acid and non-fermented beans can be upgraded to a less acidic and a more cocoa flavoured product.

Additional advantages are, that the system can be adjusted to process any kind of bean type and origin and it is suitable for 24/7 production. The exhaust air has a lower concentration of odour due to the low roasting temperature. The continuous nib roaster has a cooling section to cool down the nibs to the ideal temperature for liquor grinding.

BENEFITS OF THE F.B. LEHMANN CONTINUOUS NIB ROASTER

- Very low energy consumption
- Adjustable to bean and bean moisture
- No 'over roast'
- No fire hazard (no open fire)
- Selectable energy source (steam, oil or gas)
- Limited floor space (footprint)

8 BATCH NIB ROASTING SYSTEM

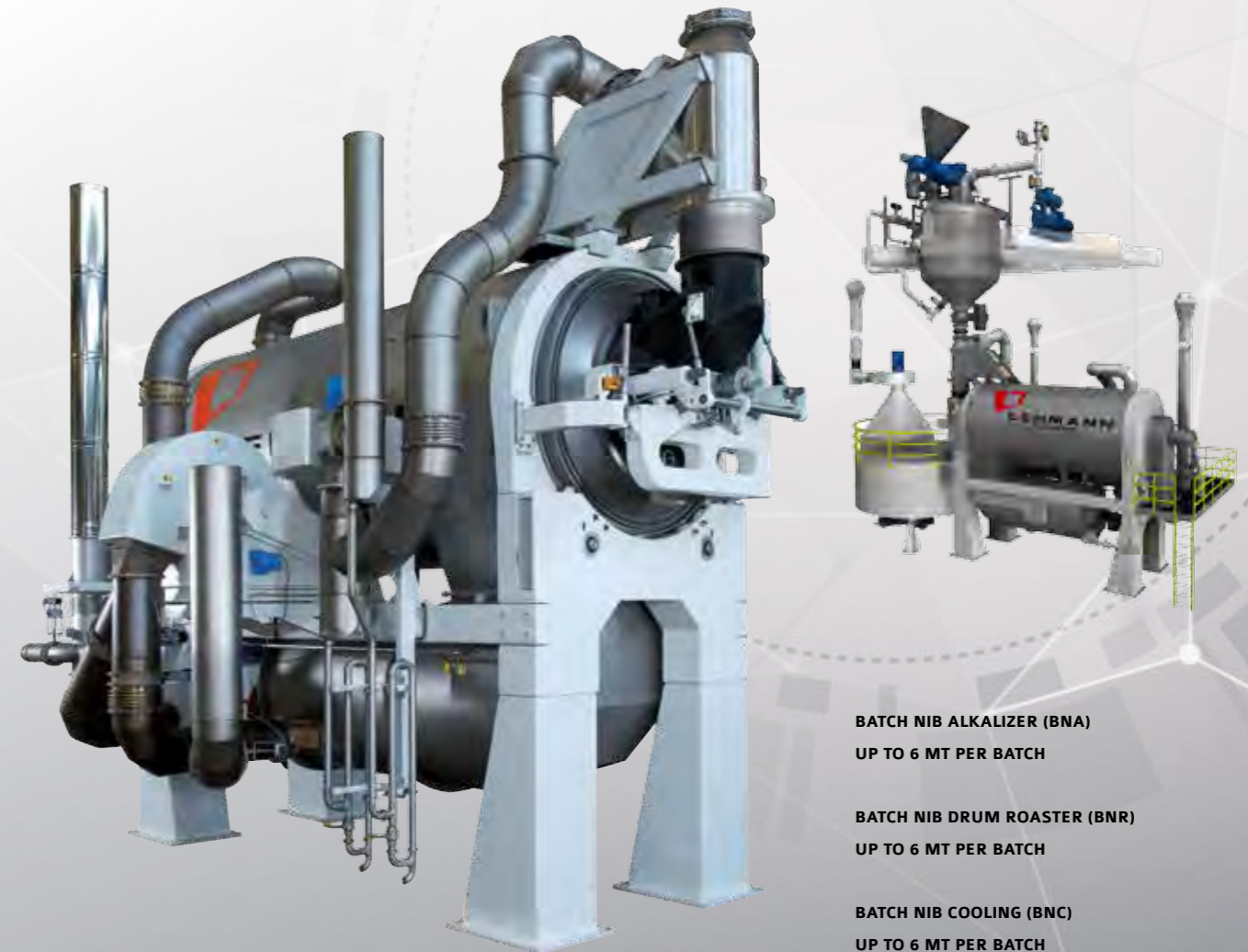
As well as the continuous nib roasting system, we offer a batch nib roasting system. The batch nib drum roaster combines the benefits of high capacity nib roasting with high quality flavour development. After the batch has been roasted, it is fed into a cooler, which cools down the nibs to the ideal temperature to then be fed into the liquor grinding section.

This roasting system has the advantage that recipe changes can easily be made between the different batches. Any preferred recipe can be realized. During this batch-wise process, the nibs can be treated in the roaster. Filling and emptying takes very little time due to the large door inlet. The excellent insulation of the drum roaster means the outer surface temperature is lower compared to other roasting systems. This in turn means lower room temperature, which benefits the instrumentation. The burning gas for hot air injection is recovered and so the batch nib drum roaster uses less energy. Other advantages can be found in the drum drive. Due to the lower torque on the outgoing shaft of the gear box, the safety ratio is significantly higher. The drum drive provides a good access for maintenance and is flexible in terms of speed. The roaster can be started/stopped with product.

The hot and fresh air flows directly into the product which improves the roasting and flavour development. The cooling bed, free floating with agitating arms, prevents pollution and grid blockage. The cooling bed is designed for nibs with an end temperature of 70°C and works on load cells.

BENEFITS OF THE F.B. LEHMANN BATCH NIB ROASTER AND COOLER

- Flexibility in recipe changes
- 25% less energy use per kg/h
- 30% shorter roasting time
- Recovery of burning gas for hot air injection
- All fans at one side, greater accessibility and easier to maintain
- The door has a large inlet and is simple to adjust (xyz)
- Higher safety ratio due to lower torque on outgoing shaft of gear box (wheel ratio 2:1)
- Fresh air through the product leads to better flavour development
- Lower end temperature
- Self cleaning and free floating cooling bed with excellent cooling performance



**BATCH NIB ALKALIZER (BNA)
UP TO 6 MT PER BATCH**

**BATCH NIB DRUM ROASTER (BNR)
UP TO 6 MT PER BATCH**

**BATCH NIB COOLING (BNC)
UP TO 6 MT PER BATCH**

COARSE LIQUOR GRINDING

COCOA LIQUOR GRINDING

The equipment of the Royal Duyvis Wiener group is designed to fulfil current global, industrial requirements. A proven example is our complete solution for efficient and sustainable cocoa liquor grinding. Built-on decades of experience, our cocoa liquor grinding technology is considered to be the global standard. By using our basic technology we have been able to raise the bar for global cocoa liquor grinding to a higher output, combined with improved product quality and equipment reliability – a superior product based on simple principles.

DIFFERENT METHODS OF PRE-GRINDING AND GRINDING

The Royal Duyvis Wiener group offers different methods of pre-grinding and grinding. With our stone mills or beater blade mills, we will find the optimum solution for your specific requirements.

9 THE BEATER BLADE MILL: NIBROTOM

“Keep your production process simple and pay attention to every detail” is a common approach at Royal Duyvis Wiener since it typically results in the most efficient solution with the best equipment. Cocoa nibs are fed into the grinding chamber by a feeding screw, where knives immediately start the grinding process. These knives are made from specially hardened steel that significantly reduces wear.



**COARSE GRINDING NIBROTOM
UP TO 6000 KG NIBS/H**

PERFECT TEMPERATURE CONTROL

Grinding nibs at high capacities demands a great deal of energy. To obtain the highest quality and capacity, the heat produced during the process needs to be controlled. Apart from grinding the cooling vessel, the most effective way to do this is to control the air passing through the grinding chamber. Royal Duyvis Wiener has found a way to deploy the cooling as effectively as possible, while eliminating the risk of exhausting solids. The grinding chamber is easy to access. When opening the mill for routine inspection, cleaning the air labyrinth can be done quickly and easily.

MAXIMUM CAPACITY AND MAXIMUM QUALITY

The raw material leaves the machine through a sieve and by selecting the appropriate sieve size, fineness can be adjusted as required. Optimum quality is ensured and maximum capacity is achieved.

10 LIQUOR (PRE)GRINDING BY USING STONE MILLS

F.B. Lehmann single ceramic mill or stone mill contains a set of integrated hard cast iron pre-milling disks for transforming solid nibs (nuts, seeds, almonds etc.) into a coarse ground liquor. The mill is suitable for green, dried, roasted and alkalized nibs and has an integrated air suction system for further de-moisturization of moist products.



COARSE GRINDING CMG UP TO 900 KG NIBS/H

BENEFITS OF THE WIENER NIBROTOM PRE-GRINDER

- Low maintenance by design and construction
- Less downtime
- Design of main shaft and bearing construction makes it possible to use hard metal beater blades
- Easily/quickly changeable wear parts
- Simple but leak-tight sieve installation
- Well-designed aspiration for reduction of temperature and moisture
- Small footprint
- Low energy use in relation to the capacity
- GMP design
- Low liquor temperature at outlet (< 115 °C = 239°)

BENEFITS OF THE F.B. LEHMANN SINGLE STONE MILL CMG

- Fineness 7 – 8 % > 75 µm
- Slowly rotating disc for gentle milling at low temperatures
- Low energy consumption
- Unique long life of ceramic grinding discs
- Low noise level
- No increase of iron content

INTERMEDIATE AND FINE GRINDING

11 INTERMEDIATE AND FINE GRINDING STAGES IN OUR WIENER BALL MILLS

The principles of grinding are well established: The pre-ground liquor is pumped through the ball mill's grinding vessel in one or more stages. The refining action is accomplished by a special shaft with agitator arms and diverters rotating in a vertical jacketed grinding tank, which is filled with hardened steel balls. The various layers of grinding elements move in the same direction, but at different speeds. The latest design of the Wiener ball mill exhibits a higher capacity while using less energy. Compared to conventional ball mills, the Wiener ball mills use at least 50 percent less energy while achieving the same results. The ball mill is easy to maintain as all wear parts are manufactured from high grade materials and are easily accessible for replacement. The design of the vessel, pin configuration, and ideal parameter control, make this ball mill the most efficient in today's market.

BENEFITS OF THE WIENER BALL MILL

- High capacities available
- The most efficient ball mill on the market today
- By selecting the size of the sieve, fineness can be adapted as required
- All wear parts are made from the highest grade material
- Royal Duyvis Wiener grinding lines can be completed with tanks, pumps, platforms, etc.
- Complete turn-key lines can be delivered on skids, ready for use



INTERMEDIATE AND FINE GRINDING BALL MILL UP TO 6000 KG LIQUOR/H

12 THE F.B. LEHMANN FM BALL MILL

The horizontal ball mill type FM is used for the refining of pre-milled cocoa liquor or mixed recipes. This state-of-the-art ball mill is suitable in cocoa liquor processing for direct use in chocolate recipes. Using this high efficient ball mill offers you the advantage of even particle distribution. The highly wear-resistant materials guarantee the longest possible life span of the grinding tool, almost no wear and the lowest iron intake to the product.

BENEFITS OF THE F.B. LEHMANN FM BALL MILL

- A closed, compact unit with a horizontal and conical grinding chamber
- No pressure of the balls towards the product outlet
- Homogenous refining all along the length of the grinding chamber and an equal distribution of the balls inside
- High throughput capacities, related to the grinding chamber volume, producing a refined product with a very highly tuned particle distribution
- Contamination of iron in the product is virtually zero
- Cooled grinding chamber walls during operation and heated while at standstill
- Easy to operate and to maintain
- All wear parts are easy changeable

13 THE F.B. LEHMANN TRIPLE STONE MILL

The F.B. Lehmann Triple mill CMB, suitable for small size installations, is a combination of a pre-mill for nibs and a liquor refiner and can be used for the same range of products as the single stone mill CMG. The grinding of the nibs takes place on the upper set of the grinding discs and the liquor is refined in two subsequent stages on the middle and lower sets of the grinding discs.

BENEFITS OF THE F.B. LEHMANN CMB TRIPLE MILL

- Fineness achieved 1 – 1.5 % > 75 µm
- Slowly rotating disc for gentle milling at low temperatures
- Low energy consumption
- Unique long life of ceramic grinding discs
- Low noise level
- No increase of iron content

14 TURN-KEY LINES

Royal Duyvis Wiener grinding lines can be equipped with tanks, pumps, platforms, etc. We can supply complete turn-key lines on skids. Various size tanks are available for a flexible, high-capacity liquor grinding facility. Thouet and Royal Duyvis Wiener gear pumps can be offered for standard applications and for larger capacities. The Royal Duyvis Wiener gear pumps are originally developed for the cocoa butter presses and have been successfully introduced in several liquor lines. These pumps are very durable and guarantee minimal maintenance.



FINE GRINDING FM BALL MILL UP TO 2000 KG LIQUOR/H



FINE GRINDING MILL CMG UP TO 1500 KG LIQUOR/H

LIQUOR TREATMENT

15 F.B. LEHMANN LIQUOR BLOCK CUTTER AND MELTING DEVICE

The block cutter and melter are executed in stainless steel and suitable for cutting of cocoa-, chocolate-, and cocoa butter blocks. The block cutter can be installed in the floor or on a platform and mounted above a stirrer tank.

16 LIQUOR TREATMENT

With this liquor treatment line, you are able to roast, pasteurize, sterilize or upgrade the cocoa liquor. This can be achieved by:

- adding sugars for promoting flavour formations (such as Maillard)
- adding lye for alkalizing
- removing volatile components such as acetic acids and off-flavours and water

This will result in a reduction in conching time.

THIN FILM EVAPORATOR KFB AND CONTINUOUS LIQUID CONCHE CLC

PRE-CONCHING

The Wiener Thin Film Evaporator type TC and the Thin Film Evaporator type KFB from F.B. Lehmann are both indispensable parts of your cocoa production line.

They provide significant reduction of volatile acids, off-flavours and improved viscosity. The process of bringing hot, dry air into intensive contact with the cocoa liquor removes moisture, volatile acids and off-flavours.

MOST IMPORTANT BENEFITS

Treating the liquor provides the optimum pre-conching effect and the viscosity improves due to the addition of shear stress. Efficient removal of moisture and off-flavours is achieved by blasting hot air through a thin layer of product. The equipment is easy to install in your existing production line. The Thin-Film Evaporator type KFB is indispensable for flavour treatment of cocoa liquor. It shortens the conching process time of chocolate, by the extraction of moisture, acids and off-flavours by spreading the liquor into a hot and thin film layer and by hot air admission to remove moisture from the machine. On request, the injection of water can be added before the treatment to improve the extraction effects. Filtering systems for bacteria free air intake and a condenser for de-humidification of the exhaust air are offered as options and the systems are available in various sizes.

The F.B. Lehmann vibrating sieve is often used as a customer protection device. After passing through the sieve the liquor can be stored.

STERILIZING AND FLAVOUR IMPROVEMENT OF COCOA LIQUOR

Water is injected to increase moisture, to improve bacteria reduction and to remove acids and off-flavours. Heating and pressurizing cocoa liquor in heating cells (heat exchanger and KBF) and a sudden release of pressure, results in a bacteria de-activation rate of greater than log 3, depending on the incoming bacterial variety. The sterilized liquor is then treated with a Thin-Film Evaporator KFB. A filtering system for bacteria free air intake and a condenser for the de-humidification of the exhaust air are included. The flow rate of the liquor sterilizing plant is 3000 kg/h maximum. Due to the flash effect, by releasing the pressure after the liquor has passed through the sterilizers (KBF), part of the water is vaporized and released via the exhaust air of the downstream mixing vessel.

17 COOLING AND BLOCKING OF COCOA LIQUOR

The system is suitable for cooling cocoa liquor, cocoa butter, chocolate and similar recipes with subsequent dosing and filling of trays or carton boxes. The two step dosing valve ensures quick and fine dosing to achieve precise filling weights. The dosing weight is controlled by an industrial balance with roller conveyor. The blocks of cocoa liquor, in trays or carton boxes, are ready for sale. We can offer similar applications for creating drops, kibbles, layers etc. by dosing of cool product directly on a belt conveyor.

LIQUOR TREATMENT UP TO
3000 KG LIQUOR/H



DUYVIS PRESSING

18 COCOA PRESSING

The most advanced technology for superior and sustainable processing. The standard in the cocoa and chocolate industry Royal Duyvis Wiener equipment is designed and manufactured to meet the latest global industry requirements. A proven example is the Duyvis Cocoa Butter Press: a complete solution for efficient cocoa butter pressing.

THE GLOBAL STANDARD FOR MANY YEARS

High quality and ongoing development made the Duyvis press the global standard for efficient and sustainable cocoa butter extraction. The design, the operating principle and the material used, make this cocoa butter press unique in the market. Most importantly: it generates maximum output with a minimum of cycle times.

PERFECT PROCESSING

To obtain the best possible result, the liquor is prepared by quick heating and intense agitation. The in-house designed liquor pump fills the press rapidly. Made from high grade materials, the pump has a long life span and very low maintenance costs. The properties of the liquor will influence the behaviour of the press, so the pressing cycles are adjustable and flexible.

SYNTHESIS OF THEORY AND PRACTICE

Our knowledge of pressing is transferred into virtual models that precisely match each kind of liquor – bringing theory and practice together. This knowledge is also used in the control software to ensure maximum performance. The controls will continuously adjust speed and the power supplied to the main hydraulic ram to optimize performance to the liquor.



LIQUOR CONDITIONING
SYSTEMS UP TO 6000 KG/H



PRESSING UP TO 3000 KG LIQUOR/H 10 - 12%
PRESSING UP TO 5000 KG LIQUOR/H 22 - 24 %

FAST PROCESS

The cake is released as quickly as possible after the pressing cycle to ensure minimum impact on cycle time. This is achieved by using large release valves and high speed pumps. When the cake is dropped, the next cycle starts immediately. The cakes are discharged into a breaker where they are cut into smaller sizes, so called 'kibbled cake'.

19 CAKE COOLING

The broken cocoa cake is fed into the Thouet cake cooler. The cooling screw is designed for the continuous cooling of the hot broken cocoa cake. Due to the high temperature, the bacteria amount in the cocoa cake is nearly zero. The cooling takes place in a closed cooling screw, so there is almost no risk of contamination. Cooling down the cocoa cake ensures a constant product temperature in the subsequent powder process.

SUPERIOR IN BATCH-WISE PRODUCTION

Cocoa butter presses are reliable, but routine maintenance and cleaning have to be performed daily. The high forces and high speed involved require special precautions. Royal Duyvis Wiener has done its utmost to achieve maximum safety throughout the entire process cycle with a transparent cover that is locked during filling, pressing and opening. When maintenance is required, this cover can be opened after the safety devices have automatically locked the press. The press cover will be released only when the press is securely locked.

THE MOST IMPORTANT BENEFITS: MINIMAL DOWNTIME

Due to the minimal maintenance, downtime is very little, even after extensive use. Experience has shown that even after ten years of operation the Duyvis presses do not require noticeably more maintenance. Only minor parts need to be replaced and hardly any deformation can be observed.

MAXIMUM COST-EFFICIENCY

The experience of our customers is that, given the capacity and service provided, the Duyvis press is the most cost-efficient available. Production capacity remains consistent, even after years of operation.

EASY TO CLEAN

The Duyvis design allows easy cleaning. The press also has smooth surfaces, which is a major advantage from a hygienic and bacteriological point of view.

BETTER PERFORMANCE THROUGH STANDARDIZATION

All the parts of the Duyvis press are standardized and all pots and counterpots have exactly the same dimensions and are interchangeable.

EXCELLENT SUPPORT FOR GUARANTEED CONTINUITY

Royal Duyvis Wiener provides excellent after-sales service, including technical support and fast delivery of spare parts. We take pride in keeping our customers satisfied and their equipment up and running.

SAFETY FIRST

The Duyvis cocoa butter press is equipped with all necessary safety devices: It is almost impossible to cause damage to the press and the operator is well protected.

OVERHAUL OF ANY COCOA BUTTER PRESS

Our service department is capable of overhauling any type and brand cocoa butter press in the world. Optimizing your existing cocoa butter press to a 'Duyvis' press, could be a suitable option for our customers.



POWDER GRINDING & STABILIZING

20 DUYVIS POWDER TREATMENT

The Royal Duyvis Wiener Group has reached the highest standard in the cocoa and chocolate industry. All its equipment is designed and manufactured to exceed the current global industrial standards. A proven example is our updated cocoa powder pulverizing and stabilizing equipment. This is a complete solution for both pulverization and effective crystallization. Royal Duyvis Wiener has now improved its successful pulverizing and stabilizing line even further. The result is a stable cocoa pulverizing process with a quick crystallization speed and low product retention time – ideal for frequent product changes. The improved crystallization line prevents the formation of agglomerates once the cocoa powder has been packed for transport.

THE CRYSTALLIZATION PROCESS

During grinding, the temperature of the powder is already below the melting temperature of stable cocoa butter crystals. In this phase, large numbers of seed crystals are formed by high shearing forces. After grinding, two buffer and cooling phases follow, in which seed crystals fully develop, while heat produced by the crystallization process is discharged. If the cocoa butter encapsulated in the powder particles solidifies too quickly and/or at the wrong temperature, unstable and undesirable crystals will form. This undesirable post-crystallisation, especially in packaged cocoa powder, has to be prevented.

MORE CONTROL OVER CRYSTALLIZATION

In the design of the Royal Duyvis Wiener pulverizing and stabilization line, the crystallization temperature is reduced from 30°C to 21°C – 25°C. Research has shown that this is the optimal temperature for the process. This new design allows optimum control of the growth time of crystals and provides pin-point accuracy over the crystallization temperature.

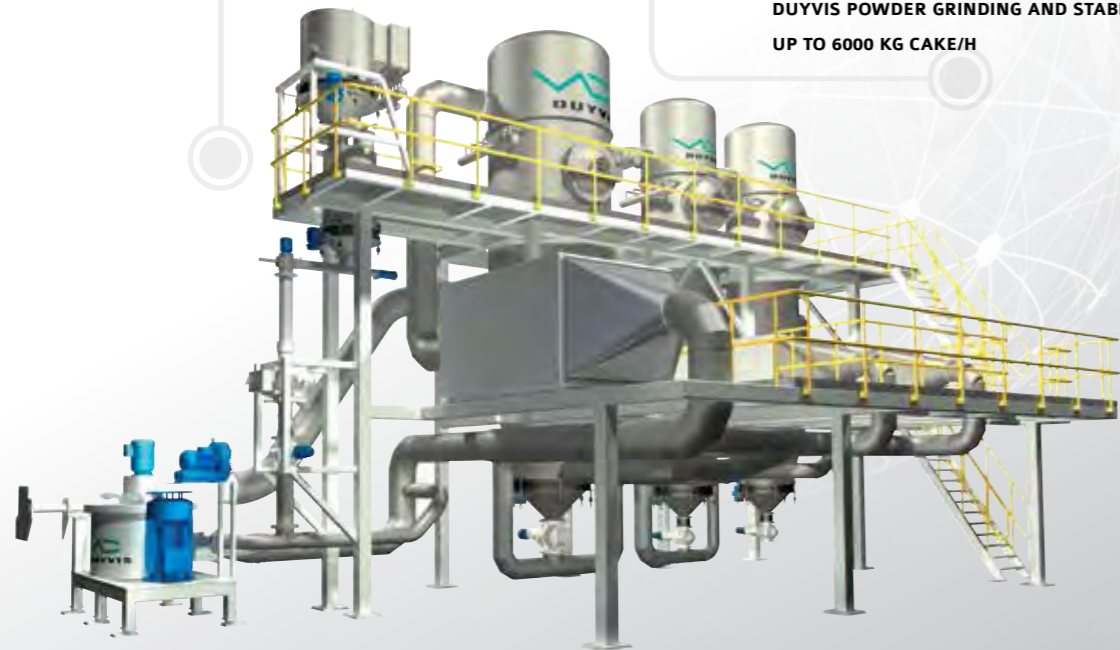
ADDING A THIRD COOLING STEP

In order to maintain the average temperature of the powder closer to 21°C – 25°C, a third cooling step has been introduced. During this step, cold air extracts the spawning latent heat. The design also provides controlled buffering in silos, allowing even more control over the production process.

ALSO SUITABLE FOR HIGH FAT CAKE

We have learned from experience with the current design that high fat cake can also be refined and stabilized. The required process conditions will result in a reduced capacity and require a grinding temperature of 21°C – 25°C. To conclude, our latest pulverizing line will produce cocoa powder with a deep, vivid color, which is a characteristic of correct stabilization.

DUYVIS POWDER GRINDING AND STABILIZING UP TO 6000 KG CAKE/H



CLASSIFIER MILL

When crystallization or stabilization is left unattended, lump formation during storage is possible or different colours may occur, due to differences in crystallization. With the Royal Duyvis Wiener / NEA classifier mill, excellent cocoa powder properties are obtained in terms of colour, free flowing properties and powder density. This installation is controllable and reliable and produces a stable powder, which is bagged immediately after processing. This classifier has the unique top-drive system, which results in long bearing life and simple maintenance. The life span of the hammers and is up to 2000 hours. All internal parts of the mill in contact with the cake kibbles are covered with exchangeable wear plates, made from wear resistant materials. All powder plants can be executed with a metal detector, nitro generator, spark detection and carbon dioxide injection.

BENEFITS CLASSIFIER MILL

- Large grinding chamber, hence lower dust concentration
- Less sticking to the walls
- Highly efficient classifying
- Due to the large grinding surface, the powder is not circulated many times, so there are fewer ultra-fines
- Little temperature increase
- Better particle size distribution
- Low wear
- Excellent top cut by closed and purged classifier wheel
- Simple and safe opening mechanism counterweight ensures balanced safety in any position

21 THOUET POWDER TREATMENT

This powder stabilizing system is well known across the globe, consisting of a cooling tube for the first tempering step and cooling screws or stabilizing silos for the second tempering step. The cooling system produces a cocoa powder with a vivid colour and the characteristics of correct stabilization.

PIN MILL

The Thouet pin mill is an alternative to the classifier mill and has a different working concept. The pin mill is used for de-agglomeration of the cake kibbles. It has integrated scrapers in the grinding chamber and a jacketed housing and mill door for cooling with cold water. The output range of the different types of pin mills is from 1500 kg/h up to 4000 kg/h at a fat content between 8% and 12%.

THOUET POWDER GRINDING AND STABILIZING UP TO 4000 KG CAKE/H



COCOA BUTTER TREATMENT

22 BUTTER FILTRATION

When cocoa butter comes from the press, it is seldom totally free of solids. Royal Duyvis Wiener offers an easy, clean and closed system that runs continuously and automatically. The butter is pumped into the filter tank and when this is completely full the solids form a film on the filter cloths while the butter is pumped through the filter candles. The solids themselves form on the filter layer and the butter can be pumped through continuously. Depending on how much solid is present in the butter, this filtering continues until the resistance through the filter becomes too high. Inspection glasses or clarity measurement show a completely clear butter flow. This butter can be directly fed into the next step, for example the deodoriser. When the layer of solids becomes too thick, the solids are automatically 'backwashed'. The solids go to the tank outlet. The filtering process is then continued or repeated. When the maximum amount of solids in the tank's conus is reached, these solids are dumped and pumped back to the grinding area. When the tank is completely empty, the entire filtering process is repeated. This process ensures a continuous flow of crystal-clear butter with minimum downtime. Capacities are available from 1000 to 4000 kg/h.

23 BUTTER BLOCK MELTING

The block cutter and melter is executed in stainless steel and suitable for cutting of cocoa-, chocolate-, and cocoa butter blocks. The block cutter can be installed in the floor or on a platform and mounted above a stirrer tank.

ALWAYS THE CORRECT CAPACITY

Ideally, the correct capacity should be selected for packing. For cocoa butter this is between 1000 and 4000 kg/h and for the packing of cocoa liquor from 500 kg/h to 2000 kg/h.

A PROFESSIONAL PROCESS

All phases of the filtering, tempering, filling and packing processes are closely harmonized, from pre-cooling and tempering to filling, weighing and conveying. As a result, you benefit from a swift, cost-saving and efficient component in your overall production process.

24 DUYVIS COOLING AND BLOCKING OF COCOA BUTTER

The system is suitable for cooling cocoa liquor, cocoa butter, chocolate and similar recipes with subsequent dosing and filling into trays or carton boxes. The two-step dosing valve ensures quick and fine dosing to achieve exact filling weights. The dosing weight is controlled by an industrial balance with roller conveyor. The blocks of cocoa butter, in trays or carton boxes, are ready for sale. We can offer similar applications for creating drops, kibbles, layers etc. by dosing cool product directly on a belt conveyor. The flow rate is up to 2000 kg/h per hour by connecting cooling cells in line.

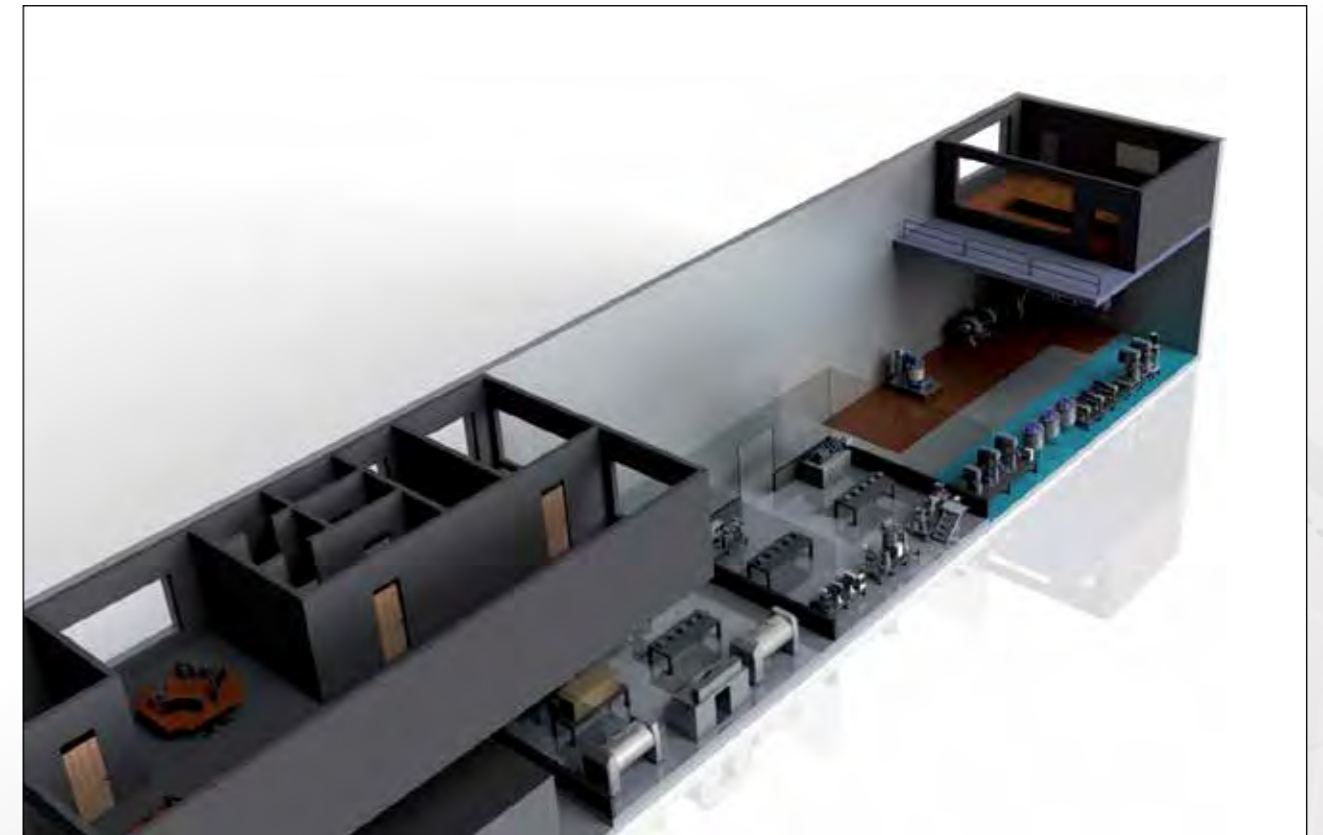
BENEFITS BUTTER BLOCKING

- Optimum tempering of butter for filling
- Exact filling weight for cardboard cartons
- No spillage of butter
- Hygiene operation
- Easy to operate; flexible applications



**BUTTER BLOCKING
UP TO 4000 KG BUTTER/H**

TECHNOLOGY CENTER



LEADING TEST FACILITIES, PROFITABLE RESEARCH, REMARKABLE DEVELOPMENT

The Royal Duyvis Wiener and F.B. Lehmann state-of-the-art technology centers are available for the customers' research and development. The Technology Centers in the Netherlands, Germany and Brazil facilitate your product development by testing food products in general and cocoa, chocolate and confectionery products in particular. By using our expertise, we can assist you in creating the most suitable recipe for your requirements. With its high quality equipment, our team of experienced process technologists analyses any type of chocolate, cocoa, cream and compound. The main goal of our Technology team is to find the ultimate solution for your application by testing and developing innovative equipment.



EXCELLENT INNOVATIONS, GLOBAL SERVICES.

Royal Duyvis Wiener B.V., founded in 1885, with its head office in Koog aan de Zaan, the Netherlands, is one of the leading manufacturers in the global cocoa and chocolate processing industry. We optimize production processes by supplying new equipment and upgrading existing plants. We reduce production costs by saving energy and minimizing downtime. The Royal Duyvis Wiener group includes: F.B. Lehmann, located in Aalen, Germany; Thouet, located in Aachen, Germany; JAF Inox, located in Tambau, Brazil; Log5, located in Koog aan de Zaan and Royal Duyvis Wiener Indonesia, located in Jakarta.

Competitive in cocoa and chocolate equipment

The Royal Duyvis Wiener group is well-known across the globe as solution provider in every industrial environment, particularly in the cocoa and chocolate industry. The Royal Duyvis Wiener group is the sole global supplier of complete turnkey lines for the production of cocoa, chocolate, compound and nut pastes. For either lab or large-scale production, single machines or turnkey processing plants, we offer multiple solutions for the complete process from cocoa bean to bar.

Guaranteed continuity

The Royal Duyvis Wiener group also globally modifies, repairs and maintains all types and brands of industrial cocoa and chocolate equipment. The Royal Duyvis Wiener team provides tailor made solutions, either preventative or curative. The result is a reliable and efficient production process, by minimizing down-time, saving energy costs and providing optimum yields.

Remarkable development

Our team of engineers, technical and process development experts, work side by side, focusing on sustainable production processes and innovative solutions. The technology centers in the Netherlands, Germany and Brazil, facilitate customers' product development by testing food products in general and cocoa, chocolate and confectionery products in particular.

Serving our customers across the globe

The Royal Duyvis Wiener group is proud to have built a solid foundation by expanding its business and services in different parts of the world. Based in the Netherlands, Germany, Indonesia and Brazil, our dedicated global staff is highly motivated in supporting our customers by assisting them to realize their optimal production facility, from raw beans to finished chocolate.

Corporate responsibility

We are very proud that in 2011, Her Majesty Queen Beatrix of the Netherlands has granted Duyvis Wiener the designation 'Royal'. Through its shareholder, the P.M. Duyvis foundation, Royal Duyvis Wiener is involved in society contributes and allocates its personnel and resources back to the community. With a long term outlook on and responsibility for the global environment, the R & D team at Royal Duyvis Wiener constantly seeks in to develop processing equipment which uses minimal energy, yet offers maximum durability and optimal quality.

