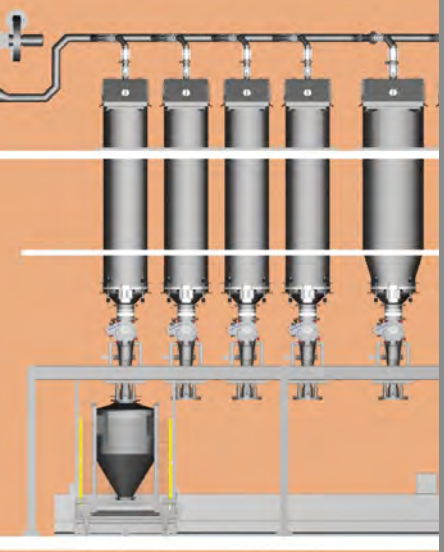
Manufacture of high-quality nutritional supplements:

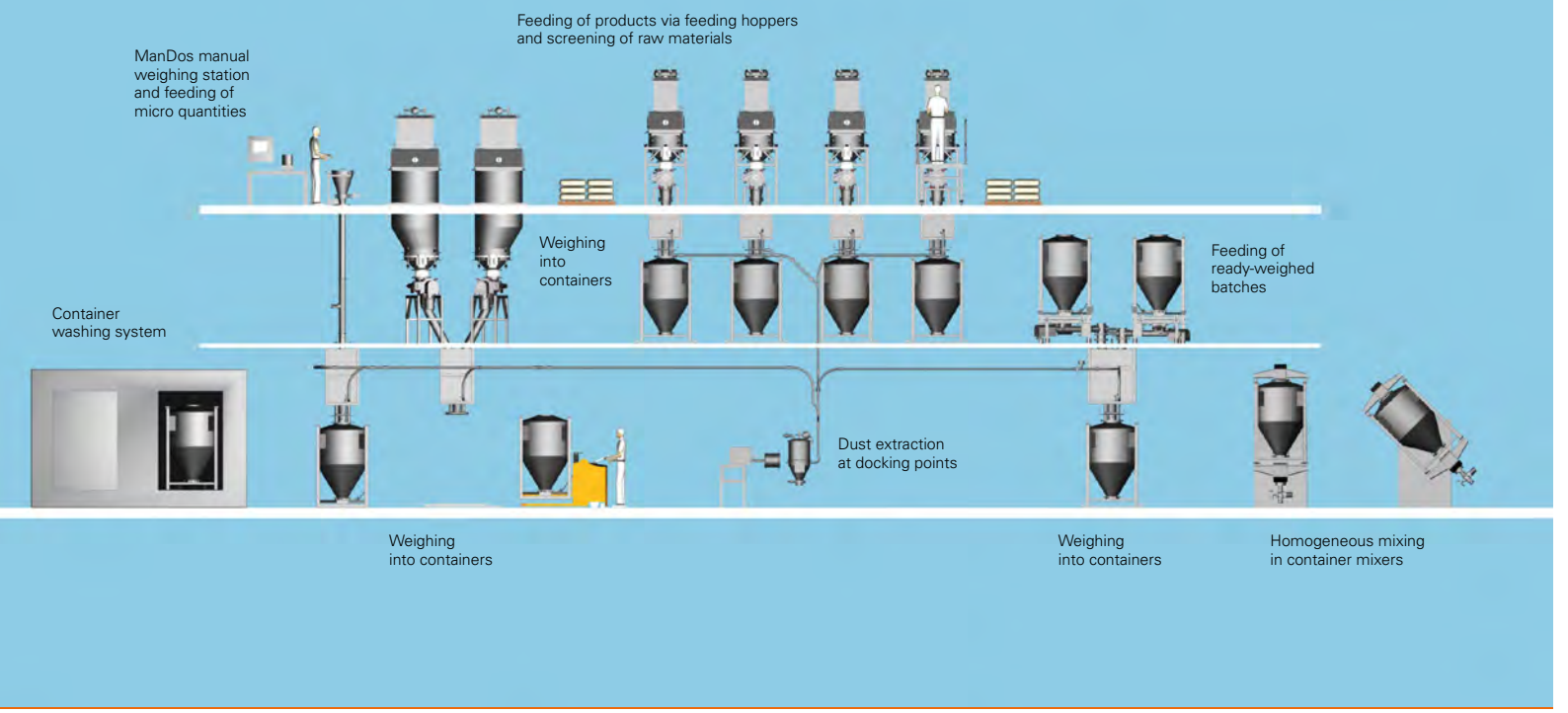
Flexible provision of batches using container systems

THE SOLUTION



The No. 1 in mixer feeding

AZO®



System concept I: container system for batch provision for manufacturing tablets and capsules

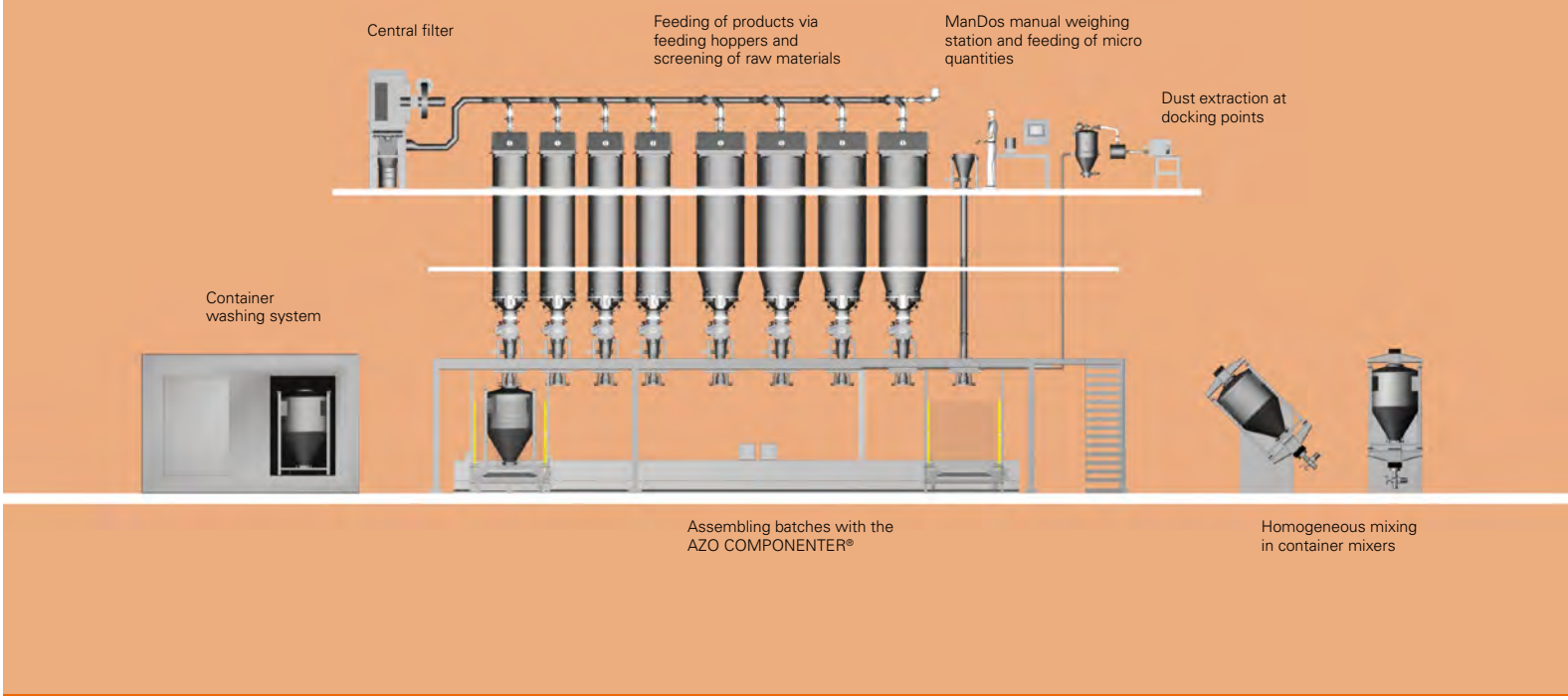
Two concepts – one goal:
flexible, reliable production of nutritional supplements

The customer

TIENS Group Co. Ltd. was founded by Li Jinyuan in Tianjin in China in 1995, and by 1998 it had established itself on the international market. The multinational company has specialised in retail and international trade in addition to tourism, finance and e-commerce. TIENS operates in over 190 countries and regions, with subsidiaries and branch offices in 110 of them. The group has concluded strategic alliances with global companies from over 20 different countries. The TIENS Group develops nutritional supplements as well as health, spa and cosmetic products and is on a course of constant expansion.

As a result of strategic development of the "Great Health Industry" with a total investment of around seven million Yuan, the Tiens International Health Park covers an area of one square kilometre. Manufacture of health products and nutritional supplements in the "Great Health Production System" is based on AZO's production system. The new first-class plant for manufacturing nutritional supplements in powder and tablet form was commissioned in 2010. TIENS has established partnerships with renowned providers of systems engineering in order to construct the plant in Tianjin. AZO, the German expert for bulk materials, feeding of raw materials and automatic batch provision, has supplied two systems with different concepts, for example.

TIENS International Health Industrial Park in Tianjin, China



System concept II: AZO COMPONENTER® system for batch provision for manufacturing powders

Investment objectives

The controls were implemented by AZO CONTROLS with an operation, visualisation and manufacturing execution system. TIENS is able to produce in compliance with the latest international standards using cutting-edge systems and control engineering, which allows it to further strengthen its market position.

1. production with consistently high quality in compliance with international norms such as GPA, FDA and EU standards
2. future-proof concept with surplus capacity to accommodate further growth
3. flexible production of different formulations in order to react quickly to customer requirements
4. efficient handling of raw materials with minimum attrition
5. energy-efficient production and careful management of resources
6. transparent production processes that are fully documented with batch tracing
7. the most exacting hygiene standards and ease of cleaning for the system
8. reliable weighing accuracy for high product quality
9. improved efficiency and increased security thanks to automation of production processes, simultaneously reducing the number of production staff

AZO's first-class system

»The system from AZO has to reflect TIENS' image and development strategy and therefore plays a crucial role both in terms of products and the company's identity.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Feeding hopper with cyclone screeners ensure that bagged goods are fed reliably with little generation of dust

Production in compliance with international standards

ensures high quality of products

The AZO solution in detail

System concept I
Raw materials, which are supplied in sacks, are filled into circular stainless steel containers, called BATCHTAINERs®. Formulations can be assembled from here as required. The BATCHTAINER® with the ready-mixed batch is positioned on a tablet press or capsule filling machine. Thanks to the three different weighing stations for the main, medium and minor ingredients, it is possible to produce different formulations with a minimum of time. As a result, the system offers maximum flexibility.

Transferring of the raw materials in BATCHTAINERs®
The system that is designed to weigh and mix tablet powders has three levels. Raw materials are fed into the system on the top level. Two large feeding hoppers are provided here for carrier substances and four smaller hoppers for active agents and carrier substances. Each of the feeding hoppers has its own filter for dust extraction during filling. The extraction process starts as soon as the cover is opened.

Screening, dosing and weighing
There is one type DA cyclone screener under each feeding hopper for control screening of products. At the same time, the screeners dose the product with maximum accuracy into the BATCHTAINER®, which is positioned below on floor scales. Vibration bottoms ensure that products are discharged reliably from the feeding hoppers and that the dosing screw is filled

Weighing of raw materials into BATCHTAINERs® on floor scales

Central extraction of dust from the docking devices with upstream secondary filter

»We used to screen all raw materials manually. Today this is done completely automatically using cyclone screeners in the closed system. This means we can be sure that only flawless products are used in our formulations.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Feeding hopper with integrated filters ensures that there is little generation of dust while feeding bagged goods

Type DA cyclone screener:
exact dosing and reliable control screening

evenly in the screener. The dosing screw can be switched from coarse to fine dosing using frequency converters so that high dosing accuracy is achieved.

For filling, the BATCHTAINER® is positioned on a floor scale by means of an electrical stacker truck. The dust-free connection is made using a docking device. Any dust is extracted from the docking device centrally using a vacuum pump with upstream secondary filter. The raw materials are now available in BATCHTAINERs® for further assembly of the formulation batch.

Weighing of carrier substances into BATCHTAINER®

Docking device with trickle guard slider

Cyclone screener for control screening and dosing

»As a result of automatic provision of batches, we have less manual intervention and therefore have our production process reliably under control.«

Mr. Li Jun
General Manager of Manufacturing Management Center

BATCHTAINER® discharge bases with patented docking collars and frequency controlled dosing screw

Provision of batches using container system:
flexible, energy-efficient and no contamination

Assembly of formulations
The BATCHTAINERs® filled with the raw materials can be positioned on four container discharge stations, which are on the intermediate level. The ingredients are weighed according to the formulation via these discharge bases into a BATCHTAINER®, which is on the lower level.

ManDos – manual weighing station for micro quantities
Micro quantities are often critical in the formulation but are usually difficult to automate. By using the ManDos manual weighing station, small quantities can be weighed into bags with extreme accuracy and documented for the purpose of batch tracing. Machine operators are guided through the weighing process using the controls, which means user errors are avoided. They scan the raw materials with a barcode scanner and weigh them into bags, which are again given a barcode by the operator. This prevents products being mixed up and ensures that only approved raw materials are used for production. The operator then fills the bags via the feeding funnel in accordance with the formulation into the BATCHTAINERs® underneath. Raw materials for halal products are also added using these feeding funnels.

Mixing process
Once all the raw materials are in the BATCHTAINER® in accordance with the formulation, it is inserted into the container mixer using a stacker truck and clamped in position. The mixing process can now start and lasts about ten

Assembling and weighing of the formulation

ManDos manual weighing station

Feeding of ready-weighed raw materials

»The system from AZO provides clean, dust-free production. This allows us to satisfy the most stringent standards for hygiene.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Container mixer for producing homogeneous ready mixes

Hygienic manufacturing thanks to rigorous wet cleaning of BATCHTAINERs®

minutes depending on the product. The control unit for the container mixer has been integrated in AZO CONTROLS' system controls, and the mixing workflow is registered in the formulations. There are two container mixers available. After mixing, the BATCHTAINERs® are placed on capsule-filling machines or tablet presses and discharged.

Container washing system
Whenever the formulation is changed or after a specific time, the BATCHTAINERs® are taken to one of the two container washing lines and are cleaned exhaustively. Once dried, the BATCHTAINERs® are available for refilling.

Container washing system for rigorous wet cleaning of used containers

Control room with process control and visualisation system

»Today we produce accredited quality to meet the high standards of our group of companies using AZO's systems and control engineering.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Feeding hopper for feeding raw materials with little generation of dust on the top level of the AZO COMPONENTER®

AZO COMPONENTER®: automatic batch provision
for manufacturing effective powders

System concept II
The feeding hoppers are arranged in a line. A BATCHTAINER® below them is conveyed on a scales to the dosing points and automatically collects the ingredients depending on the formulation.

Product feeding
There are eight feeding hoppers positioned in line on the top level of the AZO COMPONENTER® for feeding bagged goods. This is where carrier substances, active agents and additives are fed in. The feeding hoppers have central extraction. This is activated as soon as the cover of one feeding hopper has been opened. Dust that accumulates when sacks are emptied is extracted and air is cleaned using a central filter.

AZO cyclone screener
There is a type DA screener under each feeding hopper. This machine has two purposes.
The raw materials are screened and any caking or foreign particles are removed from the product.
At the same time, the screener doses the ingredients via a dosing screw with a separate drive into a BATCHTAINER® that passes under the dosing points on mobile floor scales. The screener can be opened, without the need for tools, on the screen side and on the dosing side for quick, easy cleaning and the screen basket and dosing screw can be extracted.

Cyclone screeners below the feeding hoppers for control screening

Intuitive, convenient operation via touch screen terminals

»Thanks to the ManDos manual weighing system, even micro quantities can be documented from start to finish and can be traced back. So we manufacture safe, reliable products for our customers at all times.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Operator terminals with touch screen

Straightforward, intuitive operation
makes flexible assignment of staff possible

ManDos – manual weighing station for micro ingredients
One ManDos is also provided in this system for combining micro quantities. In this case, the machine operator weighs the ingredients into bags using bench scales. The operator is guided through the weighing process by prompts on the monitor so that user errors are prevented. All raw materials are scanned with a barcode reader. After the bags have been weighed, they are also given a barcode. This provides documentation of all micro ingredients, which allows batches to be traced if needed. A small feeding funnel is provided for feeding pre-weighed micro quantities.

Left: ManDos with feeding funnel
Right: central extraction of dust from the docking devices with upstream secondary filter

Feeding funnel for the small quantities that are pre-weighed at the ManDos

»The AZO COMPONENTER® allows automatic assembling of batches with precisely weighed ingredients and continuous documentation. This system enables us to manufacture in accordance with international standards.«

Mr. Li Jun
General Manager of Manufacturing Management Center

Removal of the filled BATCHTAINER® from the AZO COMPONENTER®

AZO COMPONENTER®: assembling of formulations without generating dust and without contamination

Automatic assembly of batches with the AZO COMPONENTER®
Vibration bottoms at the feeding hoppers ensure that products are discharged reliably and that the dosing screw is filled evenly in the screener. The dosing screw can be switched from coarse to fine dosing using frequency converters so that high dosing accuracy is achieved. The empty BATCHTAINER® is driven into the COMPONENTER® at the start of the dosing line and moves to the programmed dosing points in accordance with the formulation. It is docked here without generating dust and the ingredients are weighed into it. An extraction device for the BATCHTAINER® runs during filling operations. There is a small feeding funnel at the end of the dosing line for adding pre-weighed micro quantities.
As soon as all the ingredients are in the BATCHTAINER®, it is ejected and transported to the container mixer. After the mixing process on the container mixer, the BATCHTAINERs® with the homogeneous powder mix are positioned on the filling lines and the finished product is filled into bags or packets.

Insertion of the BATCHTAINER® into the AZO COMPONENTER®

Automatic weighing using the AZO COMPONENTER®

»The easy-to-operate Kastor production control and visualisation system assists production staff with intuitive operator prompting. It affords the most accurate monitoring, control and documentation of our production processes at all times.«

Mr. Li Jun
General Manager of Manufacturing Management Center

The container mixer ensures that all ingredients are blended to a homogeneous mixture

Complete, fully documented batch tracing
ensure high quality for products

Container mixer and washing system
Similarly to the system for manufacturing tablets and capsules, two container mixers and container washing lines are provided here too.

Process control and remote monitoring system
Both systems are controlled via the KASTOR process control and visualisation system from AZO CONTROLS. The machine operator has the entire production line within view from the central control room.
In addition, there are operator terminals in each area, where certain actions can be carried out. The system offers a wide variety of workflow controls, such as recording data for raw materials or calculating mass balances. Furthermore, the centralised system allows continuous traceability of production workflows by means of batch protocols, mass balances and verification of formulations, in addition to long-term archival of accumulated data. An integral PLC system ensures that the entire system of actuators and sensors runs correctly. This PLC provides the link to the mechanical system via the switchgear designed and manufactured by AZO CONTROLS.

Hygienic wet cleaning of BATCHTAINERs® in the container washing line

Production at a glance: process control and visualisation system

2009 1065 GB

Conclusion:

»We are very satisfied with our new partner AZO, one of the major manufacturers of powder handling systems.

The plant has now been in operation for over three years and the new system for our "Industrial Park Project" is working extremely well.

Our expectations have been met to our total satisfaction.«

Mr. Li Jun
General Manager of Manufacturing Management Center

AZO®

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