

# AZO ShuttleDos®

## Energy-efficient, dynamic batch preparation

**Unequaled speed**

**Energy-efficient**

**Contamination-free**

**Easy to clean due to floor clearance**

**Exceedingly flexible for recipe changeover**

**Particularly precise**

**Optimum line arrangement**

### Preferred applications

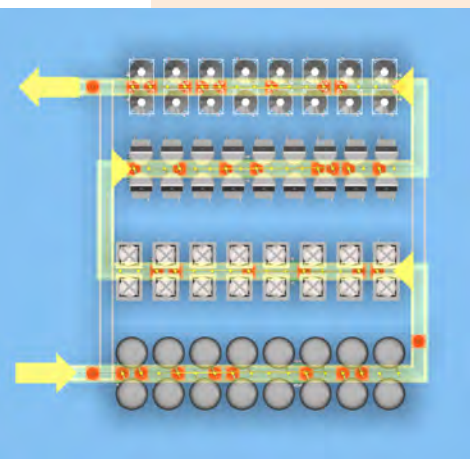
The AZO ShuttleDos® system is the right choice wherever fully automatic batch preparation involving a wide variety of recipes with numerous components in a closed system as well as strict line separation and avoidance of contamination is required. Up to 20 batches per hour with up to ten exactly weighed components within a weighing range from 100 gram to several hundred kilograms – AZO innovation is tailor-made for challenges like these.

The clever design makes the innovative AZO system capable of delivering an exemplary level of automation which has not been achieved before, furthermore many of the key technologies involved have been patented.

### Special advantages

- Energy-efficient, climate-friendly operation
- Cost-effective solution
- Greater throughput than conventional container systems
- Dust-free, contamination-free docking and undocking by AZO CleanDock®
- Low-maintenance and easy to clean design
- Universally applicable

## SYSTEMS



*„We rely on the latest technologies to secure our market leadership. The AZO ShuttleDos® makes us fast, flexible and allows us to produce with efficient use of energy.“*

*Quotation of a customer*



### System description

The new fully automated AZO ShuttleDos® system doses components into mobile containers. These raw materials can be stored in silos, be delivered in big bags or containers or be added from sacks via feeding hoppers. The storage vessels are provided with high-performance discharge and dosing elements. Each dosing point is equipped with its own weighing unit for achieving high throughput rates. The system allows for optimum line arrangement with separate areas for major, medium and

minor components. The decisive elements of the new AZO system are the mobile shuttles. These mobile shuttles can move past drums or containers where a weighing process is currently taking place, and pick up the containers that have already finished filling and now require further transport to a new dosing station. This new principle enormously boosts throughput

rates. The entire design of the AZO ShuttleDos® system is raised free of the floor. In addition the fully automatic production area can be designed for an operator-free running of the system.



## Flexible product feeding of the raw materials

During development of this new system, a great emphasis was placed on giving the greatest possible flexibility to users when supplying raw materials, allowing the most economical delivery form to be selected for production and manufacture. The modular technology in this area provides the opportunity to change over the individual product feeding stations by fitting different modules at any time in order to respond rapidly to changing market trends. Of course, if this is not required the product feeding stations can be installed in a dedicated arrangement as well.



Feeding hoppers for sacks, drums and cartons

### Feeding hoppers for sacks, drums and cartons

In particular it is these ultra-small and small quantities that are supplied in such units and that have to be transferred into the closed system with minimal dust exposure.

For this purpose, the raw materials are either directly weighed from the feeding hopper by the means of a dosing element into the collection bin or weighed in advance using a ManDos manual weighing station, provided with a barcode, and then delivered to the feeding hopper in a way that eliminates the risk of mix-ups. The extraction system starts as soon as the lid of the feeding hopper is opened, and low-dust filling can be performed. Very often these feeding hoppers are equipped with a screen to prevent coarse impurities getting into the process. Additional cyclone screeners provide even greater security by ensuring that no impurities larger than the mesh size of the screen can enter the production process.

by means of the patented docking collar. This design makes it possible to change a product with very little cleaning required. Intelligent control systems prevent operating faults in this area.



DOSITAINER® with optimum outlet geometry

### DOSITAINER® as changeover unit

Frequently, companies which process bulk products use many different components, all of which are not necessarily required within every recipe. Therefore, AZO has developed a special container with an integrated dosing element for these components, enabling a fast exchange of units whilst keeping cleaning requirements to a minimum. The DOSITAINER® made from stainless steel is placed onto the dosing station only when the corresponding component is required in the recipe. Its special outlet geometry and integrated dosing screw makes it suitable for uninterrupted dosing and discharging even for challenging bulk products. The drive for the dosing screw is integrated in the unloading station. Docking of the containers is done



Big bag discharge stations with dosing screws for medium components

As raw materials are changed frequently in this area the feeding hoppers can be configured in a modular design. In this way they can be removed quickly and cleaned thoroughly at a separate washing station.

### Dust-tight docking of big bags

The medium components are predominantly supplied in big bags. The big bags standing on

pallets are lifted into the discharge station using hoisting equipment, and then are docked to create a dust-tight seal using the big bag connection system. Connection by means of an inflatable collar provides a very convenient method of docking in this area. A fill-level check prompts the operator to change over the empty big bags in good time. This ensures that there is always sufficient raw material available.

### Receiving vessels and silos

For raw materials that are required in the system at significant throughputs pneumatically fed receivers or silos can be installed above the AZO ShuttleDos®. These are refilled automatically, thereby ensuring that the bulk components are available for dosing at any time.

### Reliable discharging and exact dosing

Vibration bottoms developed by AZO are used in conjunction with dosing screws at all product feeding stations. By this intelligent solution a high level of dosing and weighing accuracy is achieved, even with large dosing screws due to the consistent filling level. The dosing screws are connected to the AZO CleanDock® docking system, allowing dust-tight,



Exact dosing by AZO dosing screws

# Key technologies of the AZO ShuttleDos® system

## Innovative, linear weighing technology for the tightest tolerance limits

This new weighing system is characterised by its floor clearance and its precise dosing and weighing. 20 to 30 containers (BATCHTAINER®, MIXTAINER® etc.) can be provided per hour, with five to ten exactly weighed-in components per container. The number of components per recipe is not limited, but does of course have an effect on the overall throughput of the system. The AZO ShuttleDos® system achieves this high batch count because each dosing station has its dedicated weighing unit enabling the individual components to be weighed simultaneously, thereby saving time. A lower throughput capacity provided, it is also possible that two to four components can share one weighing unit. The scales can be matched both to the container size and to the required weighing and dosing accuracy.

If weighing with accuracies to the gram is required, AZODOS® loss in weight feeders are used. This makes it possible to work within the tightest tolerance limits, even though the quantities of the individual components required differ vastly.

## AZO CleanDock®

The new AZO CleanDock® is AZO's successful answer to the call for developing a simple and inexpensive docking system. It combines two important functions: dust-tight docking with scale decoupling at the same time. By this innovative system cross-contamination of different products and raw materials is avoided. Dust emissions are prevented when both dosing and transporting the mobile collecting vessels (BATCHTAINER®, MIXTAINER® etc.). Both the dosing element and the container to be filled are sealed in the undocked condition. A dust-tight connection is produced between the dosing

element and container whilst docking. A special, flexible system ensures that the weighing unit is decoupled during the dosing and weighing process. The modular docking system is universally applicable, and is suitable for connecting one or two dosing elements, depending on the customer requirements. In addition, the system requires little maintenance, and is easy to clean as it has no dead ends.

## Contamination-free batch preparation

The AZO ShuttleDos® system is especially suitable, where a mutual mixing and interference of different components down to a dust level must be avoided at all (e.g. products containing allergens, allergen-free products, kosher, halal or vegetarian recipes). The clever automation solution ensures any raw materials that are not involved in the recipe will not be carried over.



AZO CleanDock® for dust-free docking and undocking of mobile containers

## AZO®Shuttle – the speedy transport system

This system is much less expensive than conventional automated guided vehicles. Linear systems hold the upper hand when it comes to rapid batch preparation. The shuttle units can move past on the

outside of the containers that are currently involved in the weighing process and pick up those containers that have already been finished filling and now need further transport to a new dosing point. This new principle means that AZO is capable of boosting throughput rates to the extreme.

## Cross transport system

The AZO ShuttleDos® allows optimised route and line allocation according to recipe by means of this cross transport option. The components can be set up variably in one, two or multiple rows, according to the

space available. The shuttle units approach all dosing stations at high speed by means of the innovative guidance system. It makes sure that the collecting containers (BATCHTAINER®, MIXTAINER® etc.) are automatically moved to vacant dosing stations.



Mobile shuttle units for rapid transport of the collecting containers



The individual dosing lines are linked with each other by means of cross transport systems

## AZO ShuttleDos® is proven in practice

In this new AZO ShuttleDos® system, large, medium and small quantities are dosed fully automatically into mobile collecting vessels (MIXTAINER® or BATCHTAINER®). The raw materials are stored both in silos and are fed from big bags, containers, cartons and sacks by means of unloading stations and feeding hoppers. The collecting containers are locked into the dosing line for weighing in the

components. An optical scanning system makes sure that the containers are loaded in the right sequence and are positioned correctly. Following this, fully automatic dosing and weighing of the individual components into the collecting containers is performed according to the recipe.

The system is set up in two lines. On the left line, the bulk



Locking MIXTAINER® containers in and out on the AZO ShuttleDos®



Product feeding level above the dosing and weighing section

### Process control and visualisation technology of the finest quality monitors the entire process

A local touch screen terminal enables the operator to call up the corresponding recipes. The raw material provision and the weighing/dosing processes are displayed on the process visualisation. In this malfunctions can be detected immediately and rectified. Barcode systems guarantee that the correct raw materials end up in the corresponding recipe, and can be traced accordingly. The intuitive operating dialog makes it possible for the operators to work with the complex system instantly without extensive training. The fully automatic production area can be

designed to be completely enclosed and monitored by cameras, thereby offering a staff-free operation of the automatic batch preparation

**„This new system means we meet the strictest regulations with regard to cleanliness and hygiene, so we are operating in accordance with GMP guidelines. We have achieved the highest levels of flexibility, recipe accuracy, batch tracing right to the point of permanent recipe documentation.“**

*Quotation of a customer*



User-friendly operation of the system by touch screen terminals

components supplied in big bags and containers are dosed and weighed. On the right line, the pre-weighed small and ultra-small amounts are provided and loaded directly into the collecting containers following reliable identification and release by the control system. At the end of the weighing and dosing section, the BATCHTAINER® or MIXTAINER® containers filled according to the recipe are removed from the AZO ShuttleDos® by electrical lifting trucks and supplied to a container

mixing process. The container mixers can be both free-fall and precision mixers.

Another alternative is to empty the content of the BATCHTAINER® into a mixer which makes a homogenous blend. After the mixing process, the batch is refilled into the same BATCHTAINER® and provided to further processing steps such as packaging, tablet compression or filling processes. In so doing the cleaning efforts can be minimised.