

# Individual feed systems for flexible compounding processes in the finishing of plastics.

## THE SOLUTION



# The task: reliable handling of many raw changes and reproducible compounding.



Maintenance-free outdoor silos



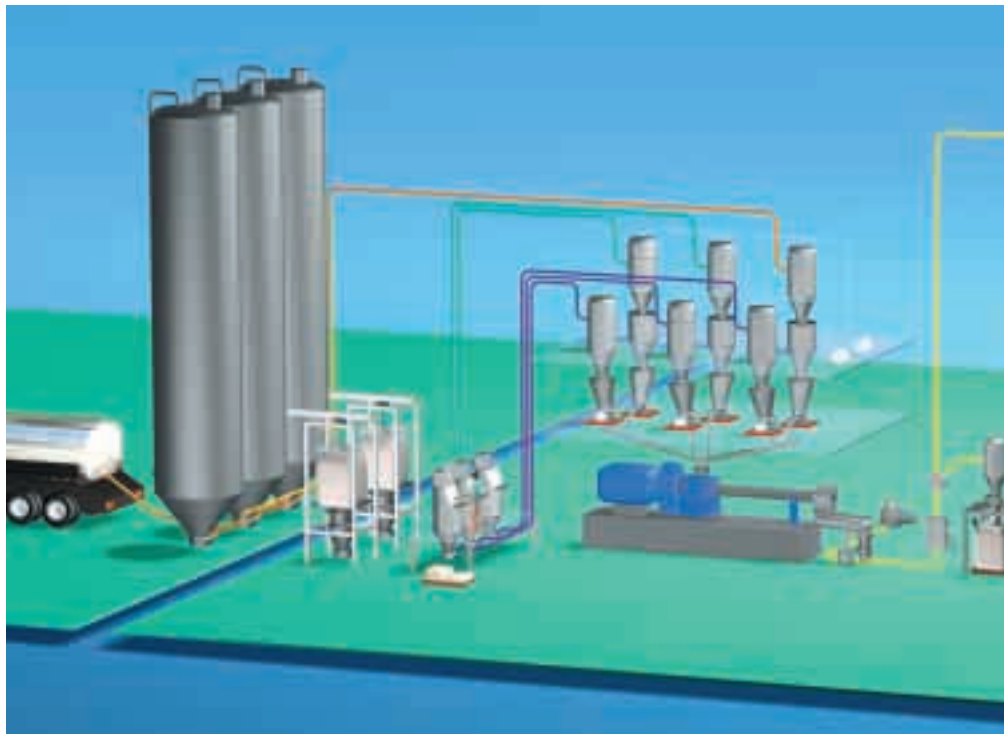
Octabin pick-up stations



Big-bag pick-up at ground level



AZODOS® dosing system



Complete compounding system

**The multiplicity of applications for plastics continues to grow. Furthermore, the form, colour, design and specific properties of plastics are being constantly optimised and developed. This immense multiplicity of plastic products is what determines the everyday challenges that face plastic finishing businesses. Frequent raw material changes and changing production processes are the rule.**

AZO has specialised itself in precisely this production practice. Its unique expertise in powder handling enables AZO to realise flexible and individual, complete and part systems for compounding. The philosophy of the flexible plant means that processors have many options for producing even widely differing compounds efficiently and making sure that multi-component blends are precisely dosed and spot on.

The complete system embraces the provision and feeding of the raw material, continuous gravimetric dosing, the actual compounding process, the receiving of the finished compound in granulate form and the delivery of the product to various filling and loading systems.

**The most efficient system for any business.**

For companies that manufacture technical plastics with production rates of 5 tonnes per hour or more, AZO has developed innovative solutions that offer measurable competitive advantages through short cleaning and changeover times. The range of solutions includes ingredient automation for the feeding of compounding systems with plastics, fillers, fibres, additives and liquids.

# materials, frequent recipe



Pneumatic feeding systems for filling machines



Big-bag filling



Operation, control, monitoring, documentation

## Interesting solutions for masterbatch producers.

For masterbatch producers, AZO offers systems for the automatic feeding of mixers with plastic additives, fillers and colouring pigments for the production of additive compounds.

## Recipe management made easy.

Frequent changes of compounds for production are simplified by convenient recipe control. At the same time, the innovative operating concept provides the information essential for assessing product quality in a clear trend diagram. The analysis of alarm messages permits quick diagnosis of events.

The advantages of AZO feeding systems summed up:

- tailor-made individual solutions through extensive expertise and a broad product range
- frequent product changes are achieved quickly and without fuss owing to systems that are easy to operate and clean
- feeding and handling of a large number of widely differing raw materials and carrying away of the finished compound
- high-precision differential dosing with exceptionally convenient operation and control
- reduction in wear due to gentle conveying of the finished product
- reproducible and documented compounding through forward-looking process control and visualisation systems



# Feed raw materials directly or elevate pneumatically.

**AZO customers benefit from extensive know-how in this sector. We provide optimal product input systems for all types of packaging through specifically designed solutions.**

Standard plastics and additives (fillers, fibres, additives, dyes, liquids) are delivered in different forms of packaging. Raw materials from road tankers, big bags, octabins, sacks, barrels and tanks must be seamlessly integrated into the automation system. The ideal situation is where all systems involved in material feeding come from one supplier. This guarantees reliable control of interfaces through your process and control systems.

## Feeding via emptying stations above the dosing level.

Pick-up stations for sacks and big bags are positioned above the dosing level, enabling dust-free supply of raw material into the closed system.

Tipping hoppers equipped with a highly effective suction system are used for sacks: the aspiration system switches on as soon as the cover is opened. Low level indicator systems signal in good time when refilling is required. The filling of the dosing systems is achieved via a flap valve or dosing valve. When the level of material falls, the AZODOS® dosing system requests refilling. During this time, the dosing system continues to dose volumetrically at the previous value.



Combined pick-up stations for sacks and big bags

Where the number of components is very large, collecting tubes or screw conveyors carry the components to the extruder inlet.



Barcode reading for batch tracing



Raw material feeding above dosing level

## Ground-level raw material delivery and pneumatic elevation to extruder.

Where the building characteristics rule out an arrangement with the raw material feeder above the extruder, AZO recommends pneumatic elevation of the raw materials to the dosing systems.

Products are extracted from the silos by way of a silo hopper connector. Raw materials from sacks and big bags are supplied at ground level via emptying stations.

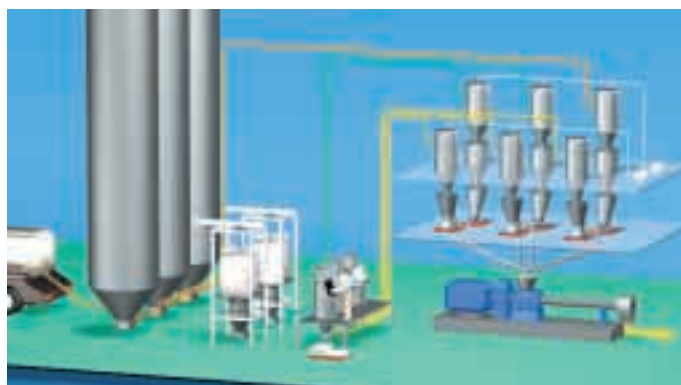
Products from various types of packaging are thus passed dust-free and smoothly into the closed system. The feeding of the raw materials is easily controlled by the operator from the ground floor. The two methods of feeding can be combined if needed.



Sack pick-up on ground floor



Outdoor silos with silo hopper connector



Raw material feeding on ground floor level

# Vacuum conveying systems for feeding the dosing systems.



Pneumatic conveying systems, gentle and with minimal separation

**With pneumatic feeding systems, personnel costs can be reduced and production buildings designed at lower cost. In addition, one product input station can be used to supply several compounding lines at the same time.**

Depending on throughput, pneumatic conveying systems can be operated as a collective feeding system with the help of several separators and a pump. All separators from AZO are equipped with self-cleaning filters. If required, they can also be provided with highly efficient delivery and dosing elements. When working with raw materials with poor flow characteristics and large buffer tanks, the reliable vibration discharger in conjunction with a dosing device is a recommended solution for feeding the dosing systems.

## **Pneumatic feeding of dosing systems via buffer tank.**

Raw material kept in reserve in the buffer tanks ensures an even more reliable supply because the necessary top-up quantity is always available when called for.



Efficient feeding of dosing systems



Buffer tanks with discharge and dosing system above the dosing level

The advantages of AZO's direct feeding systems summed up:

- integration of all packaging types into the automation system
- combined pick-up of sacks and big bags possible
- ideal solution for minimal throughput rates

The advantages of ground-level AZO feeding with pneumatic elevation summed up:

- independent of building design
- cost-effective production facilities can be realised
- lower personnel costs, as feeding and dosing is controlled from one floor
- even several compounding lines can be supplied from one input station

The advantages of AZO feeding with vacuum conveying systems summed up:

- reliability of feeding through reserve of material
- provision and reliable discharge of even the most difficult raw materials

# Pre-mixing, enables spot-on handling even while saving space.



Saves space when working with pre-mixtures

**Where minor components are used with maximum precision, where a great number of components are conveyed to one extruder in situations where maximum flexibility is a must, the system with pre-mixing comes into its own.**

A further advantage is offered by the concept of pre-mixing with minor quantities that have to be dosed in over a given unit of time. The pre-mixing method also permits better handling of components that are sensitive to heat, such as waxes.

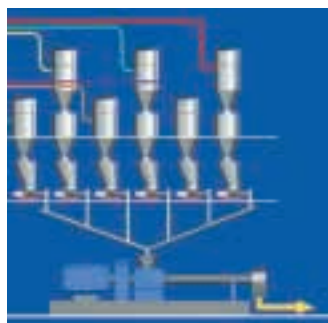
AZO recommends using the unique and proven pre-mixing system consisting of AZO conveyor scale and AZO MIXOMAT, since, where a large number of components are involved, this system is cheaper than individual dosing systems.

## Many components and a limited amount of space.

Compact vacuum weighing systems from AZO in conjunction with a distributor valve and the MIXOMAT mixer bring many raw materials together in a space-



Fewer dosing systems with pre-mixtures



A differential dosing system for each component

saving arrangement. The automatic vacuum weighing systems adjust optimally to any throughput rate and required level of accuracy.

## The conveyor scale and MIXOMAT convey, dose, weigh and mix in one system.

Wherever pre-mixing directly over the extruder is practical, the MIXOMAT is the preferred solution. In this premix concept, the MIXOMAT replaces several dosing systems. It has a high level of repeat accuracy in combination with the conveyor scale. In batch operation, precise order quantities can be produced through batch optimisation.

The large front doors permit easy and residue-free cleaning. Recipe changes can be quickly realised because only one device has to be cleaned despite several raw materials being used.



Conveyor scale with distribution valve



High-performance mixer for homogeneous mixtures



Feeding of minor quantities directly into the MIXOMAT



Easy to clean due to large front doors



# en of difficult raw materials



Combination of conveyor scale and MIXOMAT

## Feed difficult additives and micro-quantities: the MIXOMAT feeds the AZODOS® directly.

A well-proven solution is the arrangement of MIXOMAT above the dosing level.

This variant is always used where raw materials are to be weighed, coloured and mixed directly over the AZODOS®. Minor quantities such as master-batch or difficult-to-process additives are dosed by a dosing station into a minor component scale, precisely weighed there and then fed to the MIXOMAT.

Homogeneous pre-mixtures are delivered to the following dosing system.

## Precise weighing of minor quantities with the FLEXIDOS®.

This concept is preferred where it is not possible to install complex systems above the extruder and vibrations would be detrimental to the precision weighing.

With the FLEXIDOS®, the materials are precisely weighed at ground level. The raw material



MIXOVERT® mixer for the feeding of dosing systems



FLEXIDOS® at ground level, precise dosing and weighing

is conveyed pneumatically to the dosing level where it is mixed again, either horizontally in the MIXOMAT or by a vertical mixing system in the MIXOVERT®.

The homogeneous pre-mixture is then transferred to the AZODOS®.

The advantages of pre-mixing with AZO vacuum weighing systems summed up:

- horizontal material flow
- compact, space-saving system
- brings many raw materials to one point
- high level of weighing and dosing accuracy even with difficult components
- filling and operation at ground level
- precise order quantities can be produced through batch optimisation

The advantages of pre-mixing with AZO MIXOMAT summed up:

- doses micro-quantities into larger components for better distribution
- quick recipe changes possible through easy-clean design

• precise recording of throughput quantity

• saving of differential dosing scales

The advantages of pre-mixing with FLEXIDOS® and MIXOVERT® summed up:

- precise weighing on ground floor
- feeding into the dosing system with no mix separation

# The complete range of continuous grav AZODOS® , the new differential dosing



Easy-clean AZODOS® series

## Compact construction – big performance: AZODOS® dosing systems.

Since the production rates of compounding processes differ greatly in the industry, AZO has developed a series that enables you to cover all output ranges.

The AZODOS® dosing system consists of a reserve tank with electromechanical weigher that can be fed either by tipping hopper or pneumatically by separators. The frequency-controlled dosing screw allows a very large control range. Flexible compensating couplings at the tank inlet and screw outlet fully isolate the system, thus ruling out weighing errors.

During the brief refilling phase, the dosing system continues to dose volumetrically at a mean value and immediately resumes online control on completion of the filling operation.



Mixer fully withdrawn and dosing screw partially withdrawn

**The differing material characteristics, forms and consistencies of plastic polymers are a particular challenge for dosing systems used in compounding.**

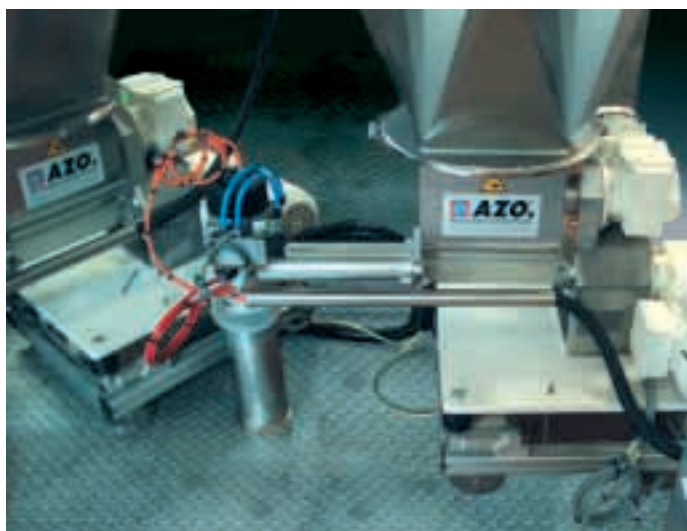
## AZODOS®, the new differential dosing system.

With the AZODOS® series, AZO has succeeded in developing a dosing system that covers a very wide range of tasks. Moreover, it can offer a space-saving arrangement, has a very large control range and is designed to allow quick and thorough cleaning at product change.

The weight recording technology is an essential element of the overall system. Its special design and very robust construction guarantee optimal force input into the weighing cell. The AZODOS® works according to the “loss-in-weight” principle. A discharge agitator and frequency-controlled dosing screw ensure that the powder material is fully discharged from the weighing container and the removed amount precisely weighed. A reference variable sent from the subsequent compounding process is used for adjusting the throughput rate by changing the speed of the dosing screw. If the fill level in the reserve tank reaches the minimum value, it is automatically refilled.

## The special extras of the AZODOS® dosing system.

With the AZODOS®, both the dosing screw and mixing tool can be conveniently removed with no fuss by means of a withdrawing device. All parts are freely accessible and can therefore be quickly and thoroughly cleaned.



AZODOS® as differential dosing system



Mixer and dosing screw fully withdrawn



# imetric dosing systems. system.



Star arrangement of dosing systems

## Dosing of fibres.

Raw materials such as glass and carbon fibre can be fed to the compounding process at a separate inlet connection using dosing belt conveyors. A range of micro-dosers is also available for the dosing and weighing of micro quantities.

## Liquid component handling.

Components in liquid form can be fed volumetrically, but this is better done gravimetrically. For this too, AZO offers a series that covers a wide performance and control range.

## The AZODOS® control technology sets new standards.

Outstanding functionality, simple operation and an exceptional price/performance ratio characterise this innovative



Graphic operator terminal

control technology. A graphic operator terminal with touch-screen panel enables convenient operation, control and adjustment of one or more AZODOS® dosing systems. In complex installations, this can also be performed by PC using a central process control and visual display system. Certainty in process control and when changing production parameters is the main reasoning here. The intuitive user guidance system makes it easy for the operator to control such complex dosing processes simply and securely.



Reserve tank with AZODOS® dosing system

Mechatronic solutions, in which dosing mechanism and associated electronic controllers form a structural unit, offer significant savings in terms of investment costs. The forward-looking control concept simplifies frequent recipe changes through an easy-to-use recipe control system. At the same time, trend displays provide information that is very important for assessing production quality.

## Simple parameter adjustment instead of laborious programming.

The new AZODOS® control system offers a functional scope that is tailored to the task and can be easily adapted to each respective application by means of parameters.

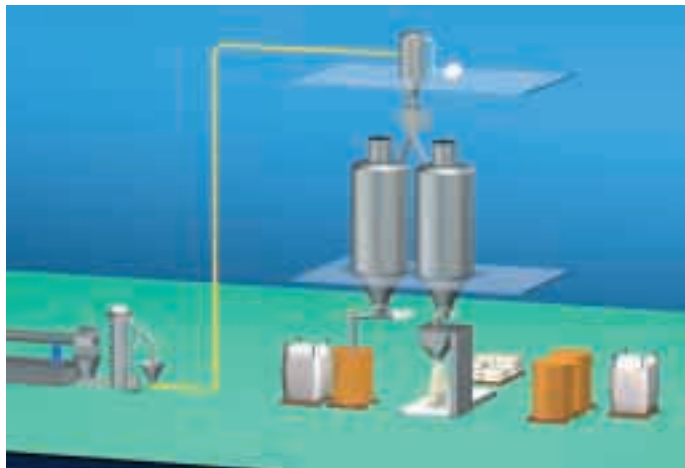
By using functions that have been tried and tested in many applications, AZO has created a practice-oriented and perfected system with user-oriented documentation. This new generation of controllers makes complex and individual programming a thing of the past.

## The advantages of AZODOS® summed up:

- differential dosing scales based on the loss-in-weight principle
- precise online control and quick correction in the event of deviations from the setpoint
- different bulk densities have no effect on the dosing result
- no complicated calibration
- very high dosing precision even with small throughput rates
- rust-free chrome-nickel steel design for long years of service
- easy-clean system for quick component changes
- high-accuracy measured value recording
- high level of operator convenience through local graphic display
- expandable through modular design



# Gentle conveying of finished products to the filling systems.



Conveying of finished products by vacuum conveyor

**When finished products are conveyed (often with a large proportion of glass fibre) after the extrusion and granulating process, a big challenge is to keep the wear on pipe bends and piping as low as possible. We recommend a low-velocity conveyor system for this.**



Separator with large filter



Filling of big bags and containers



Feeding of buffer silos or mixing silos

The supply of filling systems for sacks, big bag products, octabins, indoor and outdoor silos calls for guaranteed reliable and careful feeding.



Filling of big bags and containers



Central process control and visual display system



Complex filling system

The refined granule material is generated continuously and elevated pneumatically to buffer silos by a vacuum conveyor system. At the same time, samples can be taken for quality testing. The compound is temporarily stored until filled into the buffer silos. AZO can also supply these as mixing silos if required. Vacuum conveying systems are especially simple and low-cost solutions. They can be designed for both discontinuous or continuous operation.



Automatic bagging machine

# Long distances and high throughput rates.



Feeding of filling machines with pressure conveying systems



Loading of road tankers

**Pressure conveying systems are the best solution wherever compounding processes are performed at high throughput rates and long conveying distances have to be bridged. These work reliably and can feed several filling systems.**

Granules accumulate continuously at a spiral cooler or vibration screen and are transferred to the pressure conveyor. The pneumatic pressure system then feeds buffer tanks and loading silos.

Filling machines feed the compound from the buffer tanks into sacks, big bags and octabins. The filling systems can be specifically configured to suit the customer's requirements.

Non-conforming products and special goods are filled into big bags by separators and can thus be returned to the compounding process.

Road tankers are filled dust-free by silo loading units. AZO recommends equipping loading silos with a weighing system for silo fill level control.

## **Especially gentle conveying with impulse conveying systems.**

Impulse conveying is the gentlest method of pneumatic conveying, and can be implemented in the form of a vacuum or pressure conveying system. Impulse conveying systems are preferred wherever compounds are highly abrasive and could wear out pipes and bends.



Filling system for big bags



Continuous pressure conveying system



Buffer silos above the filling systems

## **The advantages of AZO vacuum conveying systems summed up:**

- very simple product infeed
- economic system for small and medium throughput rates

## **The advantages of AZO pressure conveying systems summed up:**

- efficient conveyors for long distances and high conveying rates
- low-cost feeding for several filling systems

## **The advantages of AZO impulse conveying systems summed up:**

- Particularly gentle conveying for pipe systems and compounds
- energy-saving and economic



# AZO – gets right to the point.

## **AZO – the expert partner you can always rely on.**

We at AZO know what's what. For decades, the company has been the source of numerous new ideas and forward-looking technologies.

Vacuum weighing systems, COMPONENTER® systems and DosiLogistic® – without which you couldn't imagine today's feeding systems – bear the trade mark "Invented by AZO".

As an expert supplier of complete and part systems, we also provide compound manufacturers with an extensive range of machines and components.

Decide on flexibility and efficiency. Decide on AZO.



### **Product feeding systems**

for sacks, octabins and big bags for feeding raw materials into the closed system.



### **AZODOS®,**

the new dosing system for small to large feed rates with exceptionally convenient operation and control.



### **Filling systems**

for sacks, big bags, octabins and containers.



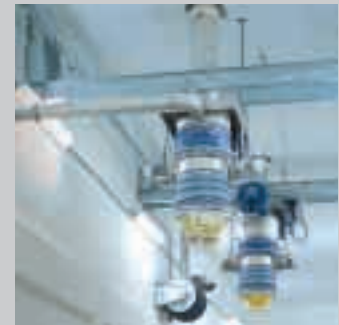
### **Pneumatic vacuum and pressure conveying systems**

for the feeding of dosing devices, filling machines and road tankers.



### **Conveyor scale and MIXOMAT**

for provision of pre-mixtures consisting of several components.



### **Loading systems**

Loading unit for the filling of road tankers.

AZO GmbH + Co. KG  
74706 Osterburken, Germany  
Tel. +49 (0) 62 91/92-0  
Fax +49 (0) 62 91/92 95 00  
info@azo.de, www.azo.de