AZO Componenter for Total Ingredient Automation

AZO®

What is a COMPONENTER® system?

Many facilities have already automated their dry bulk systems. Still, in order to achieve full automation of your factory, you can't forget to include your minor and micro ingredients. Eliminating potential labor-intensive operations can provide many benefits, but you have to bridge the gap with special techniques in automating minor and micro additives to realize these benefits. Here at AZO, we know that this moment is where a COMPONENTER® system becomes particularly effective.

COMPONENTER® is a term that AZO has given to the technology we use for automated minor or micro batching. It's a very precise automatic dosing and weighing system for minor and micro ingredients. These COMPONENTER® systems are highly accurate, flexible and provide a unique solution for automation. Essentially, this machine is a robust system that allows you to fulfill the requirements of automated batching, and it can be used in many industries.

The benefits COMPONENTER® systems offer over manual labor

— What has been the primary issue with automating minor and micro additives in the past? Over the years, industries have (for the most part) used manual labor for the manipulation, unloading, weighing and dosing of the small components that we call minor or micro additives. This presents a special challenge when it comes to automation. If you wanted to automate those ingredients, it would take a whole lot more than just having someone with buckets and scoops recording the data and tracking it.

— To take out the manual labor component of the equation (and also the potential inaccuracies and unreliability of having all of those ingredients in every formula every time as they should be), you need to provide some sort of automation. This is not an easy task. These ingredients vary over a wide range of weight values and flow characteristics.

— How do you do that on a single scale? How do you do that with multiple scales, multiple ingredients and the ability to track those ingredients in your process? The solution from AZO is the COMPONENTER®.

— The COMPONENTER® offers a very important solution in transitioning between "the bucket and scoop brigade" to full automation. What does it really do for you? It takes away the tedious manual weighing that can be greatly reduced (or even completely eliminated) for the micro weighing of your ingredients in the factory.

The levels of a COMPONENTER®

— How do these miraculous systems work? At the top of a COMPONENTER® is the area where you introduce your raw materials — feeding and storing. Then there's the metering, dosing and weighing area in the middle. Finally, the bottom section is how we take those materials away into processing after we've weighed and batched them. There are several ways to achieve this. Two main versions of the AZO COMPONENTER® system involve a circular configuration and a linear configuration. Both of these configurations have subsystems and various custom designs. We'll get into some of that as we continue.

What separates an AZO COMPONENTER® from similar systems

Whether you choose a circular micro ingredient COMPONENTER® or a linear micro ingredient version, some of the basic elements of dosing and weighing are the same. Here are a few of the decisive advantages inherent in the heart of the AZO micro COMPONENTER®:

1. There's a separate batching scale for every ingredient so that there can be precise dosing and metering with a vibrating screw. There are many screw feeders out there, but the AZO light bottom hopper (or vibratory bin bottom) and dosing screw feeder are a marriage of two unique functions. That marriage provides accurate dosing with the metering screw in a vibration mode into a very precise scale down below. What makes this unique is the combined effects of a dosing screw feeder and a vibratory feeder with sharp cutoff. Precise fine dosing with automatic pre-act adjusts make these weighments very accurate.

2. Once we have precisely metered the material into the AZO micro-scale, the next task is getting that material out of there without leaving any behind. Once you spend a lot of money to weigh up into a hopper or a scale, the last thing you want to do is discharge part of the weighment with the rest stuck in the scale. AZO has a special technique for complete discharge: The micro ingredient bucket scale is rotated 180 degrees for discharging. Furthermore, there's a power-free mechanism that ensures that all residual powder in our micro ingredient bucket scale is emptied. The scale then reverts back to its right-side-up position, and we check the scale for zero to make sure everything has been discharged.

3. The different configurations you can include with an AZO COMPONENTER® make these systems flexible. Each of these systems can discharge completely either directly into a mixer, an AZO BatchTainer (IBC) or into a pneumatic conveying system (for transport to a remote location).

4. The AZO scale below the dosing feeder is situated on a single load cell. This is unique, as the scale is free-floating with no connections. All of the utilities (such as compressed air lines, butterfly valves, cabling, wiring and other connections) have been eliminated from the AZO micro ingredient bucket scale. This takes away all of those outside influences that prevent accurate sensing by the accurate load cells. This is a very key feature of the design of the AZO COMPONENTER® micro scale.

About circular COMPONENTER® arrangements

The circular configuration of an AZO COMPONENTER® utilizes a stationary scale in which feeding stations (big bags, bag tipping stations or vacuum receivers) are arranged in a fixed position with a metering device (dosing screw or vibrating tray) attached underneath each station.

This configuration of the AZO COMPONENTER® is probably the most compact alternative of the various versions of the AZO COMPONENTER®. Still, it's very high quality and allows you to weigh your minor and micro ingredients with great precision.

There are some limitations. These systems are preferred when cost-effectiveness is important and you have up to eight ingredients. The design is limited to eight ingredients due to the circular design of this type of COMPONENTER®. Beyond eight ingredients is where a linear COMPONENTER® arrangement comes in.

All COMPONENTER® systems allow you to accomplish simultaneous weighing, as there is an individual micro ingredient scale within the enclosed hopper for each ingredient. Each of the ingredients can be weighed up simultaneously, and then each of the bucket scales can rotate and discharge simultaneously. This allows you to have high batch frequency (or fairly rapid batching), simultaneous weighing of the ingredients and simultaneous discharging.

About linear COMPONENTER® arrangements

The linear configuration of an AZO COMPONENTER® can be designed in several different ways depending on the application:

- Micro scales dedicated to each ingredient + a collecting hopper (on a linear track) or to an IBC on mobile platform scale (driven by linear track or AGV).
- Hybrid traveling scale on load cells with integral micro scale.
- Centralized weighing to container with mobile platform scale driven by either linear track or AGV.
- Dosi-Tainer plug-and-play style for ultimate flexibility whereby interchangeable raw material containers are docked above for dosing to COMPONENTER® micro scales or to a mobile scale.
- Individual container weighing as with the COMPONENTER® Step model.
- SHUTTLE-DOS: a type of COMPONENTER® that allows high throughput, multiple ingredients and multiple formulas to be prepared simultaneously. This is a linear style track system with independent scales at each ingredient station. IBC(s) are transported by individual drive units to each material feed location. Feeding devices (dosing screws or vibrating trays) are located above the scales in a corresponding linear arrangement. Feeding stations (situated above the COMPONENTER® scales) can be bulk bag unloaders, IBC docking stations, small silos, pneumatic receivers or bag/drum tipping hoppers.

Linear COMPONENTER® #1

Special advantages of the COMPONENTER® Step model

The COMPONENTER® Step is a very flexible and expandable model that has special advantages with maximum product safety for tracking and tracing. It also has the advantage of repeatable process steps and weighing results. It gives you strict adherence to formulation, precise scaling to the gram and fast cycle times. It also prevents cross-contamination and is the most cost-effective COMPONENTER® model.

In the case of the COMPONENTER® Step, an indexing conveyor automatically takes individual containers and indexes them through the ingredient stations. You could then weigh up unique recipes with multiple ingredients into each container.

Once you have this COMPONENTER® full of its initial set of ingredient containers, it becomes a steady-state process for filling and batching. This could be especially useful in operations, for example, where there are many colors involved or to avoid cross contamination of flavors or strong pigments. When it is critical to keep ingredients separate from a cross-contamination perspective, the COMPONENTER® Step is particularly attractive.

Linear COMPONENTER® #2

How an AZO COMPONENTER® handles IBC(s)

When used with container systems, COMPONENTER® systems by AZO also handle intermediate bulk containers (IBCs). A right design can weigh minor, micros and some of your major weighments as well. This style system is particularly suited for the pharmaceutical industry where you're making a batch for granulation to be utilized for oral solid dosage.

What makes all of this possible is the ability to integrate the mechanical feeding, scaling, weighing and conveying piece with a reliable control system. The control system has many features and modules that are important to include in any ingredient automation system. A few examples include inventory management, ingredient management, recipe management, order management and further options upon request.

AZO can even tie in this batching system with your host computer and downstream processes. Every automation system that has a precise scale and metering system associated with it should also include the proper control system to back it up and provide full integration. This also gives you the ability to track your ingredients, trace your ingredients and utilize barcode tracking systems throughout.

A possible future of total automation

Total automation could look like a combination of a series of bulk ingredients coming from silos, rack storage of containers, IBC(s), big bag stations, a series of COMPONENTER® systems, and a mixing station. All of this could be tied together with AGVs, automatic scales for bulk, minor and micro ingredients and a control system integration. Your operation may not need this level of sophistication, but just think about what the future could look like if you decide to go fully automatic. Everything is possible with AZO!

AZO®

Questions, comments, concerns?
We have the answer!

Contact us today!