Handling Solutions for the Confectionery Industry

Automation, Convenience, Integration and Safety

In the confectionery industry, especially in the segments sweets, chewing gum and chocolate, the primary material handling operations involve feeding product into mixing vessels, mixers, kneaders, conches and similar processes. Typical bulk materials are sugar, corn starch, sorbitol, cocoa, maltodextrin, milk powder, whole milk powder or for example nuts.

Since these products differ very much in their specific behaviour and handling difficulty, the system supplier must be thoroughly experienced in this particular area of material handling. The product properties are manifold: hygroscopic, tending to dust explosion, heat sensitive, fragile, etc. In keeping with the trend to integrate all ingredients into the automation process, it is essential to design the system components to the respective requirements.

Wise handling solutions offer the following customer benefits:

- Integration of all ingredients into the automation process;
- closed, sanitary production;
- permanent production transparency;
- high production safety;
- maximum consistency of formulation and conformance to formulation standards;
- exact documentation of all production steps;
- batch registration from raw material to final product;
- fully automatic sequence of operations, using convenient process leading; and visualization system.

Bag tipping into the closed system.

PRODUCT PICK UP FROM BAGS

For product intake of cocoa, nuts etc. feed hoppers are used in the central supply station. They are equipped according to the products used. Normally these hoppers are equipped with covers. If the cover is opend the dust suctioning or central aspiration is switched on.

This ensures that the product can be fed virtually dust-free into the closed system. Depending on the product behaviour, the feed hoppers are equipped with pre-screener and vibration bottom for discharge. In any case, it is advisable to connect a screener below the feed hopper stations in order to prevent any impurities entering the production system.

From the feed hopper stations, the ingredients are usually transferred to indoor silos by pneumatic pressure conveying. In case of heat sensitive products the conveying air has to be cooled accordingly. For such taks a vacuum conveying system offers also considerable advantages. The indoor silos, normally of aluminum or stainless steel, are equipped with appropriate filters, discharge and dosing systems. Pipe diverters distribute the ingredients to the individual indoor silos. After storage of the medium components they can always be retrieved by the suction conveying system.

DISCHARGE STATION FOR BIG BAGS

As in other industries, Big Bags are increasingly used in confectionery production. The Big Bag offers several advantages over bags:

- many small bags can be replaced by a single Big Bag;
- Big Bags can be poured out virtually dust-free;
- handling in transport is therefore easier and more efficient;
- material residues in the packing are clearly reduced;
- the volume of an empty Big Bag is much smaller than that of the corresponding number of empty bags;
- the operators do not come into contact with the substances used;
- the total costs of bulk material handling are significantly reduced.

No matter, how different the Big Bags and the individual system, AZO offers different versions for product discharge with and without lifting device but in both cases using the double-ring connecting system, which became state of the art for dust-tight docking. With the new, convenient double-ring system, the discharge hose is slipped over the discharge spigot and sealed by means of a clamping disc that can be lowered either manually or pneumatically.
Via an integrated dust removing discharge spigot, the air is vacuumed out of the connecting system during or after pouring out. Thus low-dust discharge of Big Bags is possible.

Dust-tight emptying station for Big Bags.

At the same time the Big Bags can be evacuated and can be folded flat. The doublering connecting system is available as a completely pneumatically lowerable version, by which the discharge hose can be kept tight during the entire emptying process even without a lifting device. After discharge, the bulk materials are conveyed to the indoor silos, as described above, mostly by pneumatic pressure.

DELIVERY BY SILO VEHICLES

Bulk products - very often crystal sugar, whole milk and skim milk powder but also lactose and corn meal - are delivered by silo vehicles and stored in corresponding outdoor silos. Some of these silos are specially insulated and air dehumidified in order to avoid condensate. For the storage of bulk products tending to dust explosion, like maltodextrin, appropriate constructional features such as rupture disks are installed for prevention.

Product discharge from outdoor silos with the aid of the proven vibration-bottom technique ensures „first in, first out“, meaning the products that were stored first will also be discharged first. Then the stored products are ready for fully automatic call-off by the downstream vacuum weighing system.

Outdoor silos of nickel chromium steel, partly insulated.

VACUUM WEIGHING SYSTEM

The vacuum weighing systems developed by AZO have been continuously advanced in design and have become state of the art for mixer feeding even in the confectionery industry. There are two different systems to suit the particular requirements, i.e. the number of ingredients involved: a single-pipe system and a multi-pipe version with multiport valve. With both systems the bulk products are dosed safely into the conveying line by a combined discharge and dosing device.

Conveying scale for kneader feeding.

Vacuum weighing system for mixer with manifold valve.

Liquid weighing systems for highly viscous liquids.

By the underpressure in the conveying scale the single bulk products will be sucked into the conveying scale via a multiport valve. The sequence of components in the reape is sticked to. Shortly before the desired weight is reached, the scale is switched from coarse to fine metering in order to achieve high accuracy.
In this way, the material heel in the multiport valve is the same with all ingredients, and the weighing accuracy is maximized even at very high throughput rate. The manifold valve has the advantage that in case of limited space above mixers, kneaders or conches it allows conveying a multitude of accurately and exactly weighed ingredients horizontally into the mixing process.

The entire dosing and weighing process is preset, monitored throughout, and the formulation exactly documented via the process leading system.

LIQUID WEIGHING SYSTEMS

Since confectionery production also requires liquids to be mixed into the process, AZO uses liquid weighing systems for this purpose - with additive or loss-in-weight technology, depending on viscosity.
Additive weighing is appropriate for free-flowing liquids whose behaviour is similar to that of water. For highly viscous liquids similar to the behaviour of oils, the producer uses the loss-in-weight technology, which means that the scales are continually filled, and the quantity withdrawn is weighed.
With these patented weighing systems, product discharge can be supported by using pressurization in addition.

The systems described above and industrially used in large numbers provide the stated user benefits. In addition, they are interesting to the confectionery industry because of the short time of amortisation.

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