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Bagging at optimum output

F&B Reporter investigates guidelines you need to follow to specify for a bulk bag filler and criteria for determining which bulk container system your company should implement.

Exponential growth in the use of bulk bags has spawned an entire manufacturing segment dedicated to producing specialised equipment that not only fills and discharges bulk bags, but offers various degrees of automation and integrates filling and unloading operations with upstream and downstream equipment.

This is according to David Boger, Flexicon Corporation's vice-president of sales and marketing, who adds: "As the number of equipment options increases, so should the ability of the specifier to evaluate stand-alone equipment and integrated systems against current and anticipated needs."

Boger outlines the six most important parameters to consider when satisfying any individual bulk bag filling requirement with top efficiency and cost effectiveness.

1. Anticipate maximum capacity

The difficult but critical question is how many bulk bags will you need to fill per week during the useful life of your next bulk bag filler? With few exceptions, buying a more costly filler with higher capacity than you now need will be less costly than replacing a filler you outgrow, unless that filler can be retrofitted with performance enhancements at a later date.

Where your volume falls should partly influence your decision to specify a manual, semi-automated or fully automated machine. When gauging the capacity and payback of manual equipment against automated equipment, you need to determine the average pace at which operators can attach, detach and cinch bag spouts; remove filled bags; load pallets; and conduct all other filler-related operations throughout an entire shift, while avoiding fatigue or injury.

For the lowest volume applications, a basic manually-operated filler will maximise your return on investment. The cost of a scale system can be avoided by placing the entire filler onto an all-purpose plant scale, provided that the filler is properly equipped for in-plant mobility. If a forklift is unavailable to remove filled bags - as is required by the above-mentioned fillers - configurations are available with a three-sided base that provide access from the open side using a pallet jack. This low-profile configuration can also be utilised to conserve height in low-headroom applications.

The time required to prepare empty bags for filling, and to remove filled bags from beneath the filler, can have a greater influence on maximum filling capacity than the rate at which material enters the bag. As such, adding a roller conveyor allows filled bags to be rolled out of the filling area for spout cinching and pallet/bag removal, while another bag is being filled.

Adding such a conveyor system, however, generally requires a filler with rear posts and a cantilevered fill head equipped with hooks that release bag loops automatically. So if higher capacity is in your future, a rear post configuration may be your best choice today.

Increasing the capacity of systems equipped with roller conveyors to the next level generally entails adding an automated pallet dispenser. This dispenser places pallets and slip sheets onto the roller conveyor upstream of the filling operation, further reducing the time required for each filling cycle by limiting manual operations within the filling station exclusively to loading empty bags.

2. Evaluate safety against manual operations required

With manual and semi-automated filling operations, the potential for worker fatigue and injury can increase according to required output per shift, relative to the type of bulk bag equipment specified.

The connection points of a conventional filler are often beyond the reach of most operators, even when short bags are being filled. But adding the height of a roller conveyor to the height of a bulk bag to the length of its bag loops puts the connection points for bulk bags of only 122cm in height at approximately 213cm above the floor.

This requires an operator to stand on a platform, a ladder or on the roller conveyor while straining to reach overhead spout connection points and inserting hands between temporarily

disabled moving parts. Difficult-to-reach spout connection points can therefore compromise safety as well as capacity - two problems that can be solved with the addition of a fill head that lowers and pivots to the operator at floor level.

Repetitive manual tasks such as releasing bag hooks, placing pallets on a roller conveyor or actuating bulk material delivery, also increase the potential for error and injury, justifying semi- or fully automated equipment for all but the lowest-volume applications.

3. Ensure dust is contained

Even the most rudimentary filler is likely to be equipped with an inflatable spout seal to hold the bag spout firmly in place during filling. However, not every fill head is vented to a dust collector to filter displaced air and dust, and to vacuum ambient dust in the operator's vicinity during disconnection and cinching. It is therefore important to confirm that the filler you are considering is so equipped, particularly when contamination of the product or plant environment cannot be tolerated.

4. Determine your multi-function filling needs

If your plant fills drums, boxes or other containers as well as bulk bags, multi-function fillers can boost production, undercut the cost of separate equipment, and reduce the amount of floor space required.

Multi-function fillers can be switched from bulk bag to drum-filling mode in seconds by positioning the swing-arm-mounted drum-filling chute under the fill head discharge port. The chute automatically rotates to deliver material to all four drums on a pallet. Similar adapters for boxes, totes or other containers are also available with varying levels of automation.

5. Match the feed source to the material and filler

Filling capacity, accuracy and efficiency are often limited by the ability of upstream equipment to feed material consistently and in sufficient volumes. High capacity, semi- or fully-automated fillers therefore require high-capacity feeding systems that are typically automated and feed material into the filler by gravity or by a metering device.

The ability to gravity-feed material depends on whether a material storage vessel can be located above the filler, and on the material's flow characteristics. The more free-flowing it is, the more accurately its flow can be varied (down to dribble-feed rate) by a slide gate or other valve that must close the instant a precise target weight has entered the bag.

For products that are easily aerated, pneumatic conveying systems should be avoided, since the conveying process can cause the material to require a much lengthier deaeration cycle to achieve the desired fill weight and package stability. If sufficient headroom exists above the filler, a surge capacity equivalent to the weight of a filled bag can be employed to reduce cycle times, while maintaining accurate fill weights. This configuration allows bag change-over to occur while the subsequent batch is in the process of being weighed.

When a pneumatic conveyor is used as the material delivery system, the filter-receiver can be sized to hold the weight of an entire bulk bag to apply this method. For the same reason, a surge hopper above the filler can be considered when utilising mechanical metering devices moving material to the filler from both storage vessels and plant processes.

6. Comply with sanitary requirements

If your application must meet sanitary requirements, your filler choices should be limited to designs that are accepted by agencies to which you must comply, or to which you elect to comply for assurance that sanitary conditions can be maintained.

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Bulk container systems

Frankie Rose, senior designer and project manager at WestWeigh Systems says that a flexible intermediate bulk container (FIBC) system is the ultimate in bulk storage and transport, barring silo storage and direct product loading. There are a wide range of systems to choose from and your choice will depend on the following criteria:

1. Product to be bagged
2. Bagging rate (per hour)
3. Target weight - dependent on product density and bag size
4. Space of area for the intended FIBC bagging system
5. End use (in-house or market) of the filled FIBC bag

If you are only looking for a low tonnage (up to eight bags per hour, product dependent) a basic system is ideal, while a high-speed semi-automatic system can range from 25-50 bags per hour (depending on the product).

WestWeigh Systems Bulk Bag Systems recently introduced a Carousel Bagging System - with the ability to bag up to 50 bags per hour - complete with bag vibration and dust extraction.

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