



Dec Group Dosing and Dispensing solutions for filling and discharging

Dec Group has developed a comprehensive range of solution for filling or emptying applications in batch or continuous operations.

These range from dosing powders into reactors in API facilities, through dispensing powder into IBCs in OSD manufacturing plants to final packaging into liners or filling vials, etc., encompassing quantities ranging from milligrams to tons.

Dosing methods

There are different ways of dosing depending on the quantity and the accuracy to be achieved:



Loss-in-weight solution:
Dosing by subtraction from
big bags with DCS® Docl



Continuous conveying and
dosing with PFL Powderflex

- **Volumetric filling** uses a pre-calibrated chamber of fixed or variable volume that can be filled under vacuum and emptied either by pressure or mechanically. Dec's volumetric systems work on the combined pressure and vacuum principle of its PTS Powder Transfer System® principle or xPTS for very small quantities. By carrying out successive filling and emptying cycles, it is possible to fill a container with a predetermined amount of powder. The vacuum effect in the chamber enables high accuracy of 2% RSD on small dosing volumes.
- **Gravimetric Dosing** uses a scale to control the dosing mechanism. Filling can be accomplished either by gravity when sufficient height is available or by PTS Powder Transfer System® for remote applications, those lacking headroom above the equipment, or when several processes must empty through a single filling station. In these cases the powder will be transferred by and accurately dispensed by combining PTS with the DosiValve® system.
- **Gravimetric-Volumetric dosing** is mostly used to achieve very accurate filling for small quantities, where scales become a limited option. Rapid dosing can be realized under gravity but the final adjustment is done volumetrically by using a small calibrated chamber.

Dec Dosing & Dispensing Solutions

Dec provides a range of equipment solutions for filling, emptying and dosing applications.

Loss-in-Weight Dosing

Dec has developed specialist expertise in accurately dosing powder out of a storage hopper or directly out of bags, big bags, or drums, further charging dispensed materials directly into process equipment like reactors or mixers without the need of using any screw feeders or rotary valves.

Dosing is accomplished by installing the discharge station on weighing system load cells and by transferring the powder out of the station, using PTS or PFL Powderflex. This combination, coupled with some additional valves, allows high accuracy dosing and full discharge of the transfer line at the end of the dosing sequence. The weighing system can be connected to the customer control system and can be used for recipe management with connection possibilities to an MES including batch reporting system.

For dosing out of big bags or hoppers, the big bag station frame or hopper is installed on load cells with PTS connected by flexible hose preventing any interference with the scale. When the dosing weight is reached, the outlet of the station is closed by a valve and the line is emptied by operating the PTS during a few cycles.



Positive weighing drum and big bag filling system



Dec Vent Filter

For dosing out of drums or bag stations, the drum emptying station is installed on a scale and the powder is directly transferred by using a suction lance. Operating software takes into account the influence of the lance operator, allowing accuracy to within 50-100 g even over multiple drum changes.

Positive Weighing

Dec provides a large range of solutions for filling bags, drums with liners or big bags that are closely adapted to powder characteristics, regulated containment levels, plant layout and required accuracy.

Filling can be done either by using gravity when sufficient height is available or in a remote place when the head room below the equipment is limited or when several process equipment are to be emptied through one single filling station. In this case the powder will be transferred and accurately dosed by using PTS Powder Transfer System® combined with the dosing unit DosiValve®.

Gravity Charging

Dec has developed various contained dispensing solutions for either filling a single package or a combi-station handling drums and big bags that are fully integrated with a scale breathing vent filter and an inerting system. The weighing system can be connected to the customer's control system or to an MES system.

The dosing mechanism can be a simple rotary valve, a double flap valve, or a feeding screw to a highly accurate DosiValve®, with selection depending on powder flowability and on dispensing accuracy requirements. Overall solution design will also vary according to powder properties, available height and footprint, cleaning requirements, and containment level to be achieved.

Active Charging

When head room is insufficient or a single filling station needs to be shared between multiple sources, Dec can combine transfer and dosing in a single solution that also isolates the filling station from the process equipment thus preventing any influences on the weighing system from any pressure present in the equipment being discharged.

For medium accuracy, PTS Powder Transfer System® is directly integrated on the frame of the weighing system with dosing accomplished by controlling the quantity in the PTS using responsive valves installed in the powder line.

For greater precision, PTS can be combined with DosiValve® to accurately control the quantity discharged in the packaging to be filled. This transfer/dosing combination will be installed on a separate frame and connected to the filling station by flexible bellows.

PFL Powderflex

For continuous conveying and dosing of small to medium amounts of powder (a few hundred grams/h to 200 kg/h), the patented PFL Powderflex solution provides continuous and precise dosing, either for controlled charging of powders into continuous production processes or for predetermined precision dosing.

PFL functions as a kind of peristaltic pump for powders, extracting them from any container and conveying them over distance. Its simple design ensures minimal maintenance thus facilitating rapid product changes. Powder characteristics are not modified during the transfer.

The system comprises two small, calibrated chambers, each equipped with a flat filter in the upper part. A practically continuous powder flow or precise volumetric dosing is generated through a unique valve system. The combined effect of vacuum and pressure alternately fills and empties the chambers at a high frequency. The transfer rate is easily adjusted by adapting the volume of the chamber or by changing the frequency.

Microdosing

For dosing powders in milligram ranges, Dec now offers a microdosing technology that can be implemented in filling lines or continuous processes for various industries, including filling vials, syringes, blisters or inhalers to continuously charging reactors or manufacturing lines.

Dec's microdosing technology permits to accurately dose variable quantities of powder from one mg to 100+ grams and is extremely versatile in accommodating different powders, allowing changes in powder characteristics from one product to another.

The system uses high vacuum to convey the product, allowing powders to be pre-compacted in the dosing chamber allowing for high accuracy and dust free filling.
