

Drug delivery devices based on pulmonary and nasal delivery has excellent potential for the future but require specialised equipment for its filling, checking and assembly

Inhalers take several forms: Metered Dose Aerosol Inhalers (MDI or pMDI) were the first developed, but with the push to CFC free drug delivery systems, Dry Powder Inhalers (DPI), and Multiple Dose Dry Powder Inhalers (MDPI) were developed.

The pMDI tends to be fairly standard, though even here we deliver specialised machinery for on-line aerosol leak detection, preventing the need for expensive quarantining and the dosing of the cohesive inhalation powders directly into the pMDI can. Laser image control of the spray plume and other checking functions such as capacitance mass determination and X ray inspection to confirm the filling process is within the registered Design Space for PAT realtime release are available.



Development in GMP suite of bespoke inhalation powder fillers

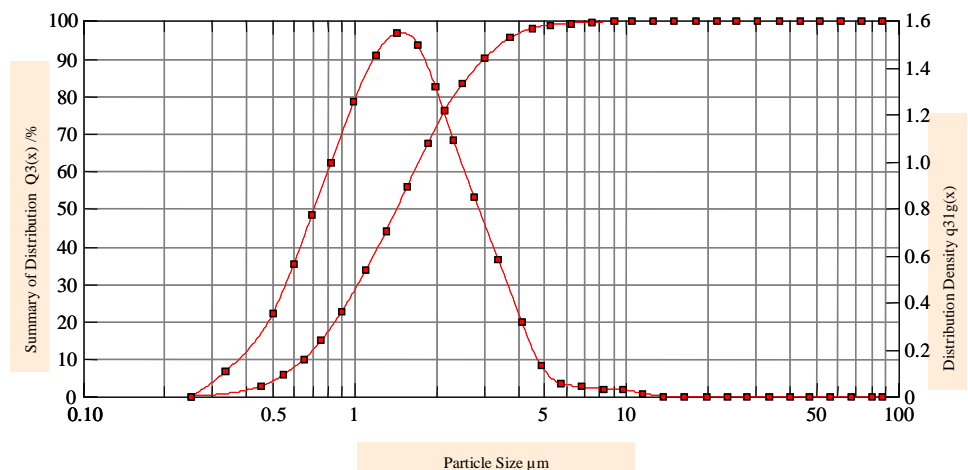


High containment isolator for custom filling machinery for highly potent pharmaceutical powders



Drum powder doser for microdosing cohesive powders down to below 1 microgramme fill weights.

Powder particle size analysis for cohesive powders for inhalation



# Special purpose machinery for innovative inhalation powder blisters.

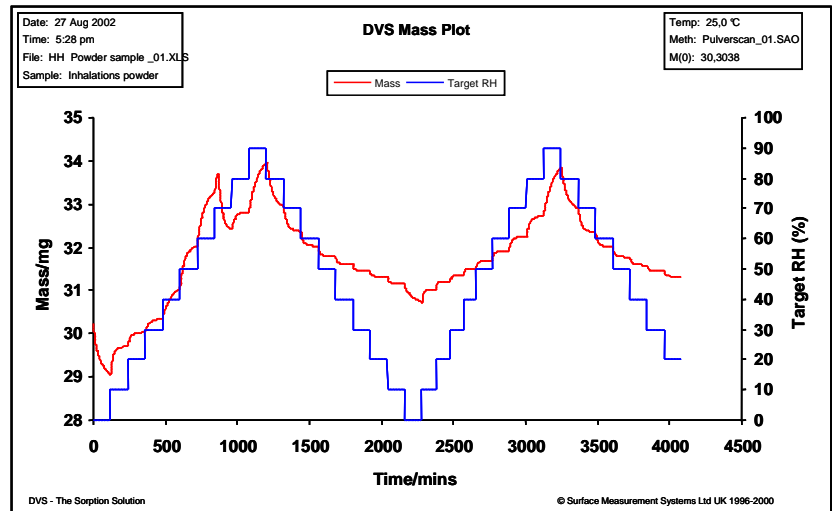
INHALATION & POWDER TECHNOLOGY

Technology overview

Custom Machinery

Production Equipment

DVS analysis for sensitivity of powders for inhalation to humidity to optimise filling conditions.



However, with dry powder inhalers and MDPI systems, each manufacturer usually has their own customized inhalation device calling for special purpose filling equipment.

Powder inhalers vary according to whether they are active or passive, dosing principle (reservoir or premeasured individual doses), the type of powder dispersion, inhalation resistance and powder formulation ( pure API or drug and carrier- many devices use lactose as an excipient). Cold form aluminium blister packs are however a common format. Reelfed production and assembly solutions are therefore required.

The powder fill weight dosed in manufacturing /filling is also customised ( microdosing typically 1 – 15 mg when packaging single doses in capsules or blisters or filling 400 – 2,000 mg when filling reservoirs).

High potency powders, such as OHC Category 4, present their own issues, such as for example the complete system, both the powder filing station and the blister packer to be Wash in Place (WIP).

