

Metered Dose Inhaler Spacer

Technology Available for Licensing*



The CFDRC MDI Spacer

Increasing numbers of children and seniors require inhalation therapy for asthma, and other pulmonary diseases. Metered Dose Inhalers (MDIs) dispense aerosolized drugs that are inhaled by patients. An inhaler spacer reduces aerosol droplet size by evaporation for deep lung penetration. This also reduces the number of larger droplets that deposit in the upper airways, get swallowed, and contribute to side effects.

Advantages of the CFDRC Spacer:

Compared to available MDI inhaler spacers, the CFDRC spacer provides:

- Less Drug Loss on Spacer Walls,
- More Drug Deep into Lungs
- Easier Inhalation

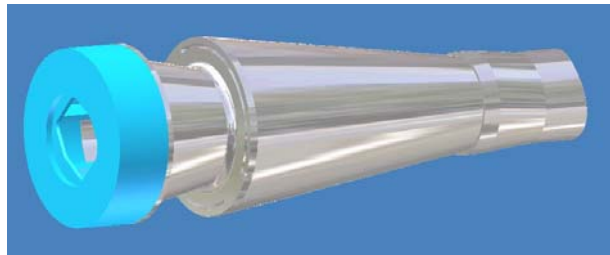
The conical shape of the CFDRC spacer is combined with air slits to generate an air cushion that keeps drug aerosols off of the spacer walls. Mixing outside air with the dispensed spray inside the spacer slows the flow of drug, allowing more time for evaporation and reducing the size of droplets. Introducing outside air also makes inhalation easier for breathing impaired patients by reducing resistance.

In addition to its drug delivery advantages, the conical shape of the CFDRC spacer can also be made collapsible for convenient storage.

* Patent Pending

A unique one-way valve, modeled after the tricuspid valve in the heart, opens more easily than other valves during inhalation and closes completely during exhalation. This helps breathing impaired patients to get more dispensed drug deep into the lungs and to hold the drug there longer before exhaling.

Computer simulations and prototype testing indicate that the CFDRC inhaler spacer delivers up to 15% more drug with up to 30% higher efficiency than the market leader. Details of test results are available to parties interested in licensing the Inhaler Spacer.



MDI Spacer coated with non-electrostatic anodized aluminum to reduce drug loss

CFDRC seeks partnerships with suppliers and/or manufacturers of spacers for MDI inhalers and other respiratory care products. This technology is ideal for invigorating an existing spacer product line to improve market share or as the beginning of a new product line for companies entering the market. CFDRC help partners produce designs customized for specific drug formulations, MDIs, and patient populations.



www.cfdrc.com

CFDRC PEDIATRIC SPACER (Patent Pending)

The CFDRC Metered Dose Inhaler (MDI) Spacer technology delivers a higher fraction of dispensed drug deep into the lungs and wastes less drug than other spacer technologies. An exploded view of an anodized aluminum prototype showing the component parts of the spacer is shown below. Prototypes have also been made from polycarbonate and other plastics. The mouthpiece adaptor and valve are made of Krayton and silicone plastics.



Exploded View of the CFDRC MDI Spacer

About CFDRC: CFD Research Corporation (CFDRC) provides high-value engineering solutions by developing physics-based simulations software, advanced analysis, innovative designs and prototypes (over 25 patents awarded or pending). Patents include a hemodialysis catheter, fuel injectors for gas turbines, a dielectrophoresis cell sorter, an electrostatic air sampler, laser-controlled flame stabilization, electrothermal mixing and cleaning technologies for microsystems, and synthetic microvascular networks.

CFDRC has been serving U.S. Federal agencies and global Fortune-100 companies and growing steadily since its inception in 1987. CFDRC provides competitive advantages to its industrial partners by applying unique combination of our hardware, software, expertise and intellectual property. A number of our partners have commended CFDRC for the positive impacts made on their businesses.

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