Re-imagining Inhaled Drug Product Stability

Solve degradation, shelf life, and safety challenges with active material science innovations

Your product, actively protected™

Aptar
CSP Technologies

Active material science solutions to mitigate degradation risk for nasal and oral inhaled drug delivery devices

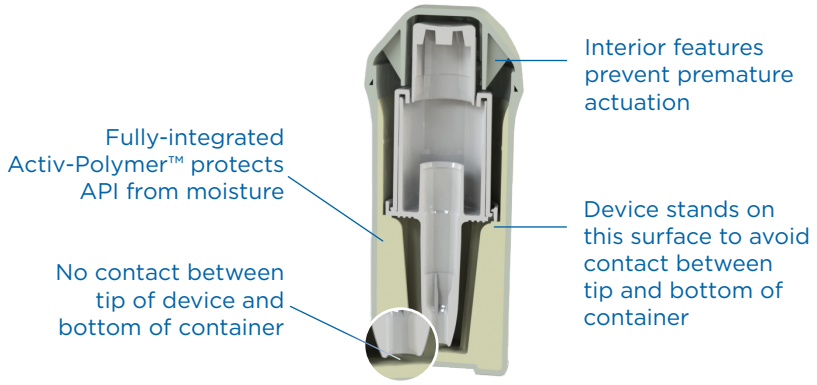
Nasal and oral dry powder inhalation devices face unique stability challenges that need to be managed to meet label claims, maintain potency, and improve patient adherence. Additionally, liquid-based delivery systems, often used for rescue medications, require robust and reliable packaging solutions to assure optimal user experience during emergencies.

From keeping powder formulations dry within a delivery system, to controlling the build-up of powder in the delivery channel, to maintaining the integrity of APIs within capsule- and reservoir-based DPIs, Aptar CSP Technologies can custom-design a solution to meet your drug product's needs.

Our proprietary 3-Phase Activ-Polymer™ platform technology can be engineered to adsorb moisture, scavenge oxygen or VOCs, mitigate nitrosamine risks, and protect product integrity and stability. This proprietary technology can be deployed in a variety of ways to meet the diverse needs of these drug delivery systems.

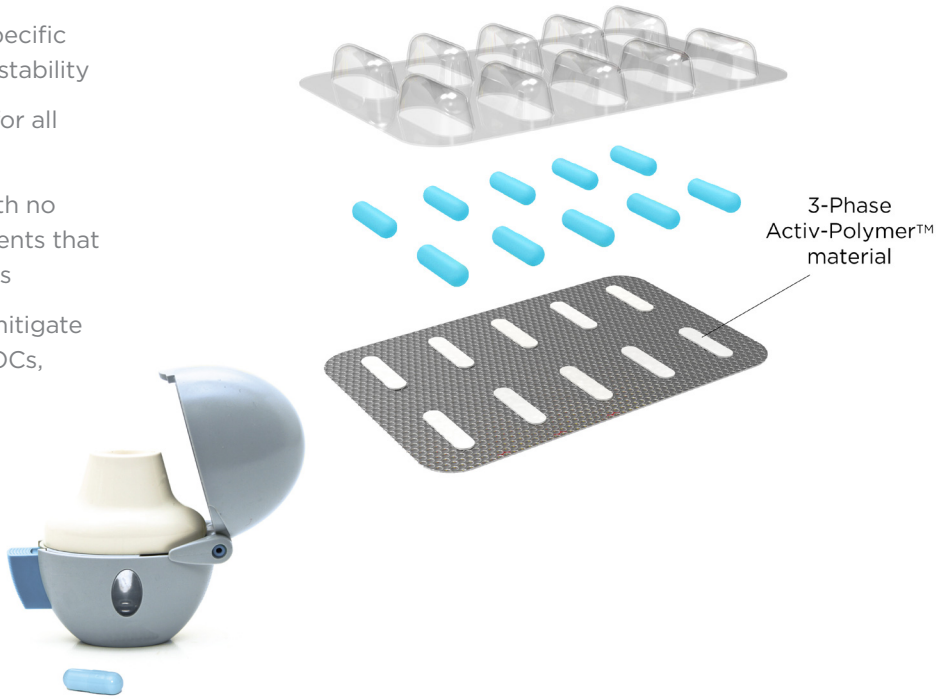
UDSp Container Closure Systems

- Activ-Polymer™ technology delivers optimal microclimate protection to assure API integrity from manufacturing to patient use
- Protects against moisture to prevent build-up in delivery channels and assure accurate dosage
- Internal features prevent premature actuation
- Easy-to-open beak design assures fast patient access to drug



Activ-Blister™ Solutions for Capsule-Based DPIs

- Activ-Blister™ solutions delivers an API-specific microclimate around each dose to assure stability
- Assures greater efficacy and compliance for all capsule-based DPIs
- Activ-Polymer™ film heat staked to foil with no adhesives, eliminating risk of residual solvents that can offgas and interact with drug products
- Active technology can be engineered to mitigate risks associated with moisture, oxygen, VOCs, nitrosamines and nitrosamine precursors, and other environmental factors
- Smaller footprint enables delivery of more doses than traditional alu/alu solutions



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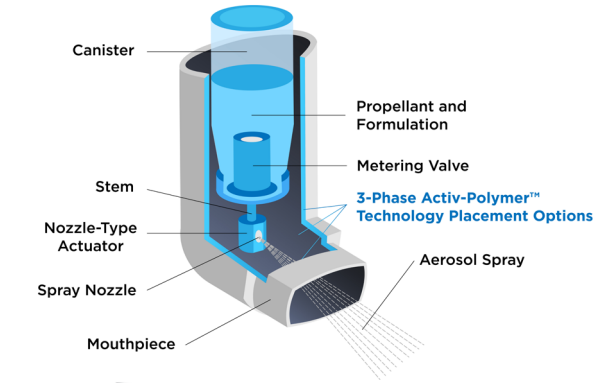
Fully-integrated Activ-Polymer™ Solutions for pMDIs, MDIs, and Reservoir-Based DPIs

- Activ-Polymer™ technology seamlessly integrates into a delivery system by replacing a current polymer part with an active molded component that provides the same physical function while delivering active material science performance
- Customizable molecule scavenging includes adsorption of formaldehyde and other degradants for devices made from acetal
- Prevents post-actuation particle build up at the stem valve, spray nozzle and mouthpiece
- Maintains drier environment for the device's delivery pathway to ensure better dosage delivery for patients
- High-performance moisture-adsorbing active foil pouch option eliminates need for drop-in desiccant solution for foil-pouched inhalers



High-Performance Moisture Adsorbing Active Foil Pouch Powered by 3-Phase Activ-Polymer™ technology

Container Closure Systems for BDSI and UDSI Devices

- Clips hold devices securely to prevent movement when carrying, dropping, or opening the case
- Features developed to meet rescue medication guidelines
- Bold color options make rescue medications easy to spot in an emergency
- Designed with digital health in mind
- Collaboration between Aptar family of companies to deliver ergonomically designed solutions for improved user experience

Benefits of partnering with Aptar CSP Technologies

- **Extend shelf life, mitigate degradation risk, and meet regulatory requirements**
  Advanced product protection for controlling humidity, oxygen and reactive impurities, including nitrosamine mitigation.
- **Improved patient experience**
  Drier environment for the device's delivery pathway reduces build up and ensures better dosage delivery. Container closure systems are ergonomically designed for ease of use.
- **Solutions to meet rescue medication guidelines**
  Built-in design features prevent premature actuation and easy-to-open designs assure fast patient access.
- **Seamless integration and speed to market**
  Replace an existing component with an activated component to control the moisture within your device without impacting your design. Leverage ready-to-fit container closure systems for Aptar Pharma devices.
- **Expand market access to ICH Zones 3 and 4**
  One solution to fulfill global market needs.
- **Full partner from concept to commercialization**
  End-to-end development support from design to formulation development, stability, regulatory submission and market launch.

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