

Determining the Respirability of an Inhalation Powder Using a Thermal Mass Flowmeter



- Measurement of even the quickest actions due to extremely short response time
- High repeatability
- Easy installation
- Flexible connections for all common compressed air systems
- Negligible pressure loss
- Correct measurement of dynamic processes due to wide measuring ranges

1 Problem

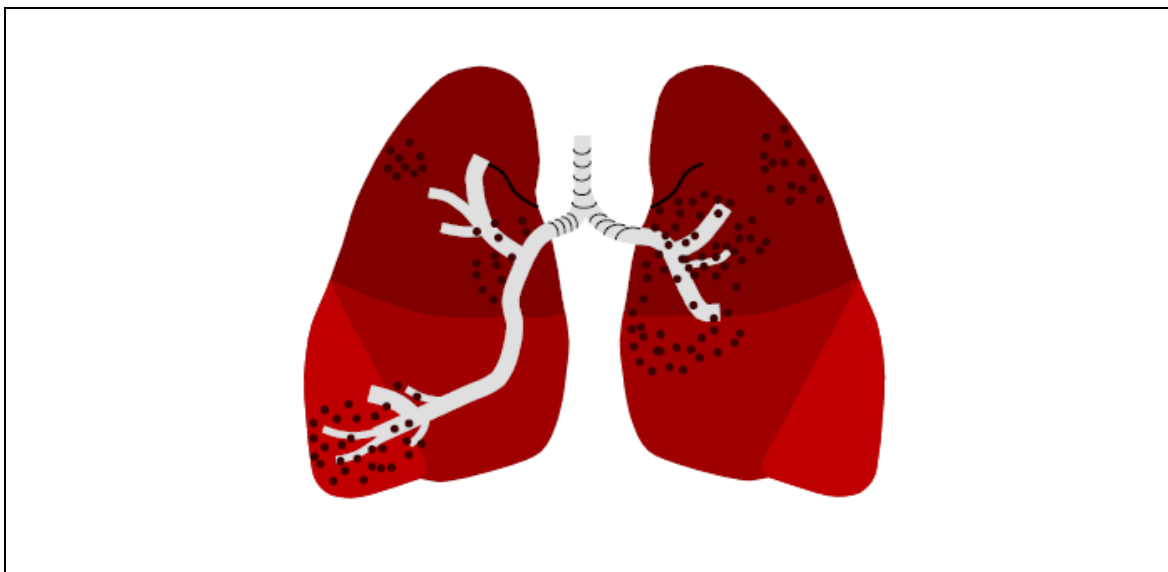
There are two very important characteristics regarding the production of a medicament:

- the dosage of the active ingredients and
- the storage life of the medicament.

These characteristics are important for the production process of inhalation powders like those used for asthma sprays. They depend considerably on the respirability of the medicament.

Suitability for respiration is only given in a specific particle size range. As a result it is mandatory for powders that are taken in via the lungs to determine the ideal particle size for dosing the active ingredients plus the exact moment in time from which on the decomposition or agglutination of the powder is likely to occur.

From these factors results the maximum storage life printed on the medicament package.



2 Solution

The material test is performed with a test equipment which blows in a defined powder quantity through special test chambers with various levels. This is done using a short air shot.

The blowed-in powder quantity deposits in “single portions” (depending on the particle size) on the individual levels of these “artificial” lungs. This allows for quick measurement of the respirable percentage of the “inhaled” powder. Additionally, the extent to which the powder agglutinates and becomes useless after a specific time period is determined.

A characteristic quantity that is especially important for this measurement is the air passing the “artificial” lungs. The air quantity can be determined in an optimal way using the thermal mass flowmeter FMT200-ECO2 from ABB. The decisive factor is the extremely short response time in conjunction with the wide dynamic measuring range. This easy and quick method for determining the particle size helps to do away with time-consuming and cost-intensive analyses.

3 Features of the used components


Instrumentation	
	<p>Thermal mass flowmeter FMT200-ECO2</p> <ul style="list-style-type: none">• Dynamic measuring range 1:100• Response time $T_{63} < 24$ ms; $T_{98} < 90$ ms• Variable mechanical connection concept• Variable adjustable output signals• Flexible connection to the test stand's signal processing equipment• Calibration based on PTB normal• DKD calibration possible

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