Print View

MAG 3000

Aerosol generator for the generation of monodisperse and uncharged droplets, dp = 0.2 – 8 μm

Description

Fig. 1: MAG 3000

Function

The MAG 3000 operates based on the Sinclair-LaMer principle (1943). It comprises a core source to generate condensation cores with a particle diameter of approx. 85 nm, a vaporizer to vaporize the particle-forming material, a reheating unit, and a condensation flue, in which the particle-forming material condenses on the condensation core. The condensation process here is heterogeneous.

The centerpiece of the MAG 3000 is the core source developed by Palas® with bypass technology. **No drying system!**

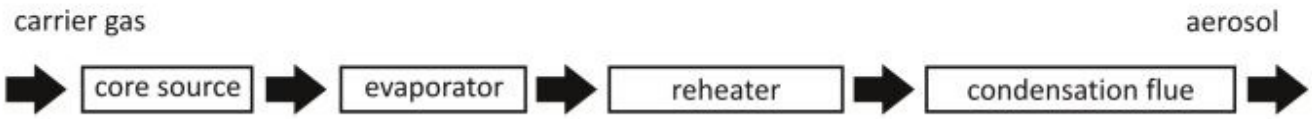

Fig. 2: Setup of Sinclair-LaMer aerosol generator

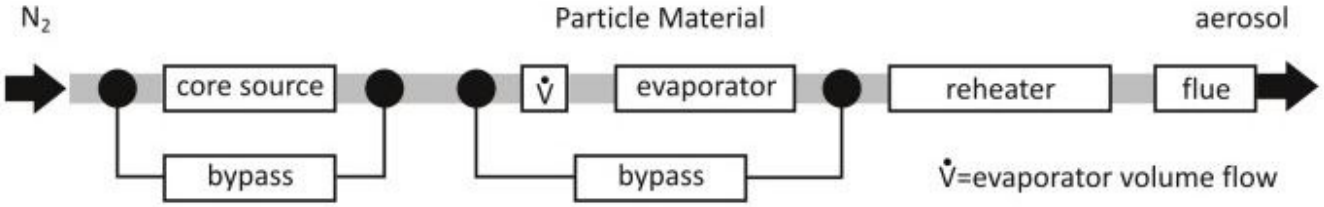

Fig. 3: Setup of MAG 3000 aerosol generator

The new core source atomizes approx. 20 mL saline solution in only 10 hours and requires no drying system due to the very small droplets.

Conventional Sinclair-LaMer generators, including past generators by Palas® GmbH, use a so-called Collison atomizer. The concentration constancy, high mass flow, and resulting need for a drying system did not meet our quality requirements with respect to reliability and easy operation.

Startup and particle size adjustment

1. Temperature change in the vaporizer (Fig. 3)

If the temperature is increased in the vaporizer, then more vapor is generated per period, resulting in more particle material being available to each core at the same core concentration and the particle diameter increases. This process stabilizes within a few minutes.

2. Bypass around the vaporizer (Fig. 3)

This bypass enables the particle size to be rapidly changed by a factor of approx. 2.5 in approx. 10 seconds. By opening this bypass valve, less vapor is released from the vaporizer and the particle diameter decreases.

3. Bypass around the core source (Fig. 3)

By opening the bypass valve on the core source, fewer cores reach the vaporizer and larger particles are generated in approx. 10 seconds. This bypass is used to generate particles > 5 μm.

4. The MAG 3000 meets all definitions concerning monodispersity as per VDI 3491 - page 4.

Fig. 4 presents the tight particle size distributions able to be generated with the MAG 3000.

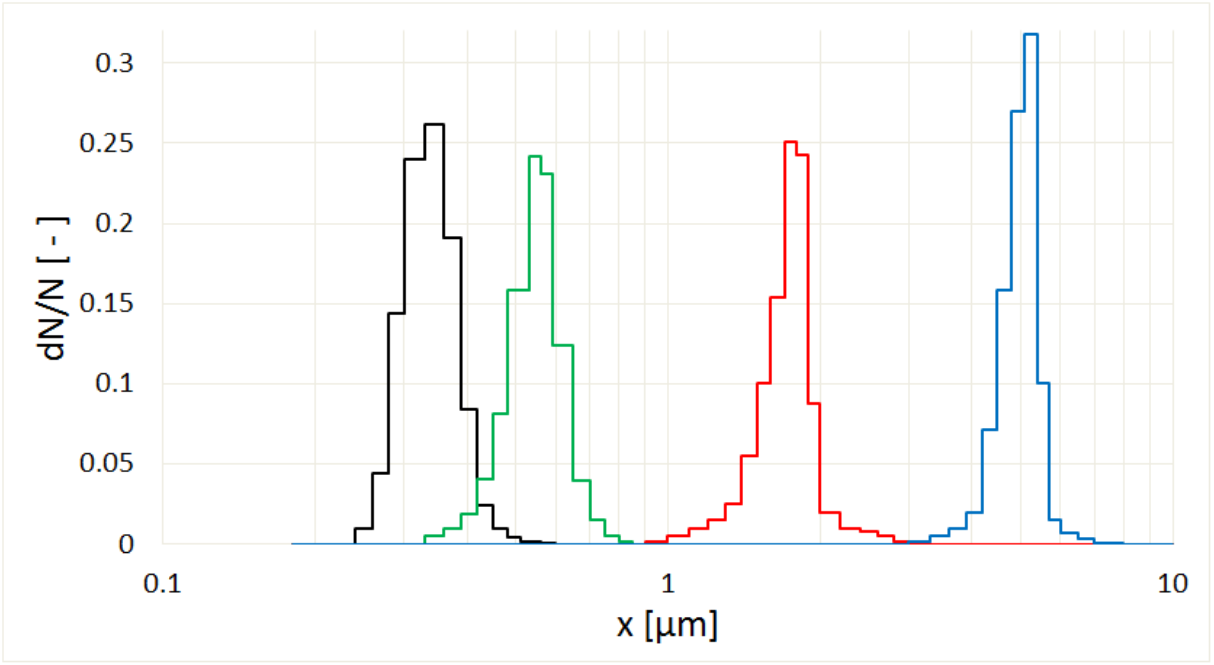

Fig. 4: Monodisperse particle size distributions

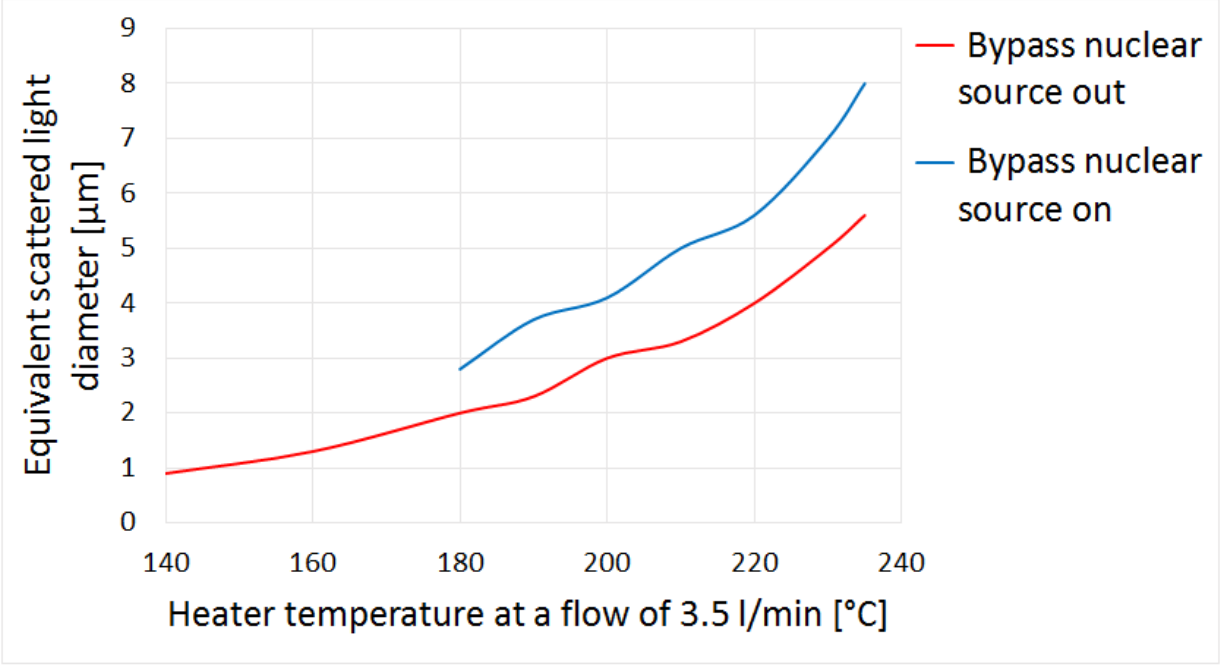

Fig. 5: Example of a MAG 3000 calibration curve for DEHS

MAG 3000

Benefits

- Particle size adjustable from approx. 0.2 to 8 μm for DEHS (other particle materials upon request)
- Reproducible particle size adjustment (uncharged aerosols)
- Minimal use of the saline solution, approx. 20 mL in 10 h
- No drying system, no silica gel
- Reliable bypass adjustments for evaporator and core source
- Rapid particle size modification up to factor 2.5 within approx. 10 seconds using the bypass adjustments
- Robust design
- Reliable function, high reproducibility
- Low maintenance
- Reduces your operating expenses

MAG 3000

Datasheet

Parameter	*Description*
Volume flow	3.5 – 4.5 l/min
Power supply	115 – 230 V, 50 – 60 Hz
Dimensions	610 • 300 • 300 mm (H • W • D)
Weight	Approx. 22 kg
Particle material	DEHS, others on request
Carrier/dispersion gas	N_2
Aerosol outlet connection	Outlet 1: $Ø_{inside}$ = 8 mm, $Ø_{outside}$ = 10 mm; Outlet 2: $Ø_{inside}$ = 18 mm, $Ø_{outside}$ = 20 mm
Mean particle diameter (number)	0.2 - 8 μm (DEHS)
Geometric standard deviation (number)	< 1.15
Maximum concentration (number)	10^6 particles/cm^3
Filling quantity	300 ml (DEHS), 70 ml (salt solution)

MAG 3000

Applications

- Calibrating particle measurement devices
- Comparison of device parameters in relation to particle size:
  - Resolution capacity
  - Classification accuracy
  - Lower counting efficiency rate
  - Upper counting efficiency rate
  - Border zone error
- Inhalation tests
- Tracer particles/flow visualization
- Filter inspection

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