GRIMM mini-CAST
Model 7.881

Applications

- Basic aerosol research
- PMP - Validation/Calibration
- Health effect studies
- Filter testing

Highlights

- Constant soot generation
- Defined size distribution and concentration
- Easy to operate
- Compact and rugged all-in-one design
- Portable
- Flow control via critical orifices

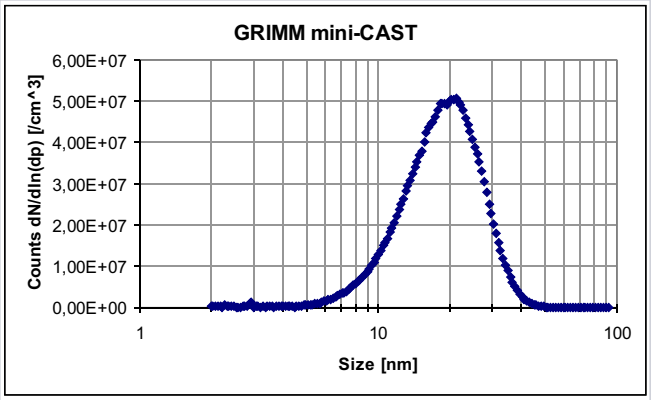
Real soot particles - easy to use

The model 7.881 GRIMM mini-CAST (Combustion Aerosol Standard) produces suspended and active combustion soot particles in the nanometer size range. Since the characteristics of the soot particles are very similar to those emitted by combustion engines, CAST generators are often used to simulate combustion processes in a controlled environment.

The GRIMM mini-CAST is targeted at applications such as validating the PMP test system in automotive or basic research on soot formation and aging.

The unit is easy to use, for example a switch on the front plate of the unit changes the modal particle diameter between 23nm and 41nm. The gas flows are controlled via critical orifices.

With its reliable method to generate and stabilize the soot particles the GRIMM mini-CAST provides an extremely constant particle output with typical concentrations in the range 10^7 - 10^8 particles/cm^3

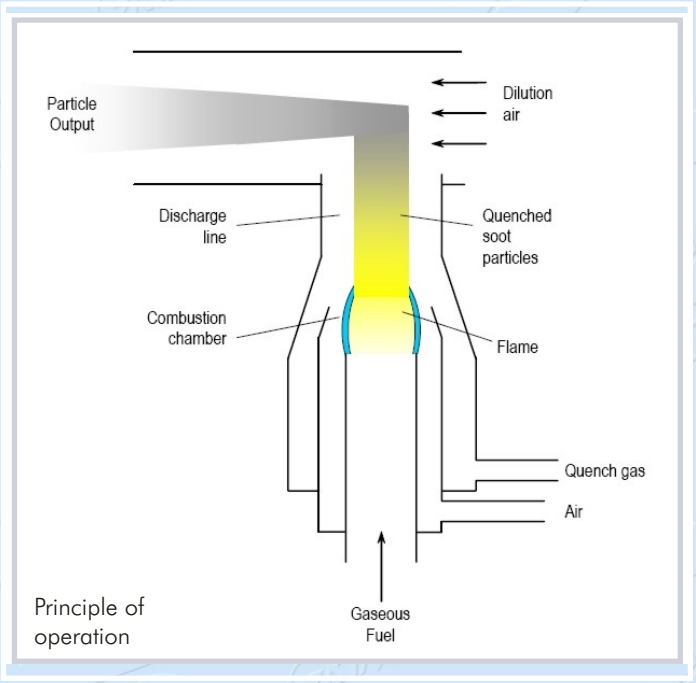


Typical particle size distribution of generated soot particles

Model 7.881 - mini-CAST

Specifications

Particles	Real combustion soot particles
Particle size range	10 - 100nm, modes can be switched to be at 23nm or 41nm for PMP use Particle size distribution is unimodal
Concentration range	10^7 - 10^8 particles/cm^3
Elementary carbon	75 % - 97%
Accuracy	< 5% for number concentration, < 2 % of selected mean size
Repeatability	< ± 5 %
Output flow rate	2 - 5 L/min and higher
Mass output	10 mg/m^3 - 100 mg/m^3
Mass flow controller	Integrated, computer controlled
Temperature of aerosol	80 - 140 °C
Operation temperature	10 - 35 °C
Gas quality	Dry and particle free
Oxidation & dilution air	Particle free ambient air
Quench gas	Inert gas
Fuel requirement	Oil free, purity > 99.0%
Gas supply	External
Power requirement	115V/220 V
Case dimension (HxWxD)	22 cm x 26 cm x 30 cm
Weight	5 kg



Principle of operation

Operating Principle

The GRIMM mini-CAST is a soot generator that uses a diffusion flame to form soot particles during pyrolyse. Within the patented soot generating burner the flame is mixed with quenching gas at a definite flame height. As a consequence the combustion processes are quenched and a particle flow arises out of the flame and leaves the combustion chamber. Sufficient quenching stabilizes soot particles and inhibits condensation in the particle stream when it escapes from the flame unit into the ambient air condition. Subsequently air is supplied to dilute the particle stream.

For operation the gas inlets of the GRIMM mini-CAST are connected through flow restrictors and critical orifices to the corresponding gas sources. The state of the flame and the features of generated soot particles respectively are primarily given as a result of the flow settings.

By means of varying the flow settings the particle size can be adjusted in a predefined range of particle size, e.g. 10 to 50 nm. The flame supplies soot particles within a range of 10^6 – 10^7 particle/cm^3). These are diluted by quench gas and as an option, subsequently by adding dilution air.

Publications

J. Schlatter, Application of CAST for comparison of instruments
L. Jing, Standard Combustion Aerosol Generator (SCAG) for Calibration Purposes
M. Mohr et al, Comparison study of particle measurement systems for future type approval application
M. Kasper, CAST - Combustion Aerosol Standard: Principle and New Applications

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