HMT 1000

Quality assurance and the development of filters/separators/traps should preferably be performed under test conditions relevant to the actual conditions encountered in practice. For this reason, oil separators must be tested at high temperatures of up to 120°C and, depending on the type of application, at high pressures.

With the modular test system HMT 1000, oil separators (e.g., for the separation of blow-by aerosols in internal combustion engines or the separation of oil mist downstream of compressors) are quickly and accurately characterized and, in particular, successfully tested under practically relevant conditions through isothermal particle measurements up to 120°C:

- Fraction separation efficiency
- Burden/hold time
- Total separation efficiency / gravimetric analysis
- Pressure loss

For many years, numerous companies worldwide have profited from the advantages of the heatable and pressure-resistant Palas test components for isothermal and isobaric particle size and particle quantity measurements on oil mists.

HMT 1000 filter test rigs have been used internationally with great success in the industry since 2001.

Model Variations

HMT 1000 P
Heatable modular testing system for oil nebulizers better as ISO 17536 with +/- 200 mbar control

OPERATION PRINCIPLE

HEATABLE MODULAR TEST SYSTEM

Thanks to the modular layout, the individual components of the test rig, such as the high-resolution heatable light scattering spectrometer Promo® 1000 H, the heatable dilution systems LDD 100 H, and the heatable aerosol generator PLG 2100, can be removed from the HMT 1000 and used for other applications, e.g., measurements directly on the engine.

The heart of the HMT 1000 is the light scattering spectrometer Promo® 1000 H, which measures the particle size and the number of particles (and therefore the concentration) independently of each other but at the same time. With the aid of the Promo® 1000 H, it is possible to perform very quick, precise, reproducible, and isothermal measurements.

Conventional quantitative gravimetric determinations are often not quick or sensitive enough and need more information about the particle size distribution. High-speed and volume-relevant oil separator testing are assured thanks to the excellent correlation between the quantitative distribution measurement and the gravimetric analysis. The clean gas concentration can be determined within 1 minute using the Promo®1000 H system.

The viscosity of the oil – and therefore the particle sizes and particle concentrations in the oil mist – varies as a function of the engine temperature. For this reason, oil separators must be tested at different temperatures, i.e., with varying sizes of the particle (up to approx. 5-8 μm) and particle concentrations (approx. $10^5$to 10^7particles/cm^3) as well as different volume flows, to characterize them in terms of their capacity to separate. Changes to the separation properties of the separator, e.g., due to the change in volume flow, temperature, filter burden, etc., must be determined through a reliable online or in-situ measurement. To avoid condensation and evaporative effects, on the HMT 1000, the complete aerosol guide, including the preparation, sampling, and measurement volume, can be heated to 120°C. As a result, measurements of the isothermal fraction separation efficiency can be performed. Isothermal in-situ measurement, e.g., on the engine

The HMT 1000 test system is mobile and has a modular layout. As a result, the individual components can also be used for other tests and particle measurements, e.g., in-situ measurements on the engine.

The software has been tried and tested in practice and enables almost fully-automated characterization of oil mist separators. This means the results are independent of the person operating the test rig (see "Software" product group: FTControl).

Test rig control

- Automated control of the volume flow
- Automated activation process for the aerosol generator
- Automatic switching between raw gas / clean gas measurement point
- Automatic temperature regulation
- Evaluation and recording of measurement signals, e.g., Dp, rel. humidity, temperature, volume flow, absolute pressure, etc.

Automatic measurement process

- Automatic evaluation of the pressure loss curve
- Automatic measurement of the fraction separation efficiency
- Automatic evaluation of the pressure loss curve under varying burden states, incl. measurement of the fraction separation efficiency

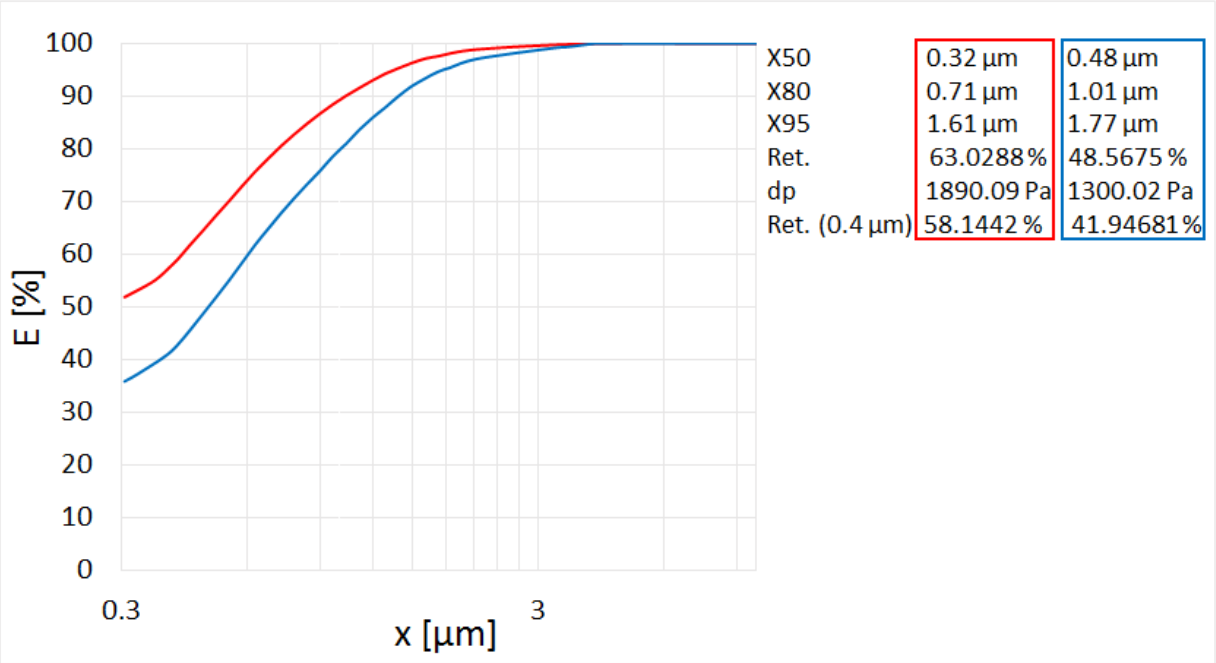

Fig 1: Comparison of different oil separators

Benefits

- Measurement and evaluation of fraction separation efficiency and burden
- Isothermal and isobaric measurement
- All components can be heated to 120°C
- High reproducibility of the testing method
- Internationally comparable measurement results thanks to the widespread use of the measurement system
- Cleaning and calibration can be performed autonomously by the customer
- Easy to operate, even untrained personnel can be instructed quickly in the use of the equipment
- Modular layout offers increased flexibility
- Validation of the clear function of individual components and the overall system during pre-delivery acceptance testing and upon delivery
- Reliable operation
- Short set-up times, extremely low-maintenance
- The unit will reduce your operating costs

DATASHEET

Measurement range (number C_N)	Up to 10^7 particles/cm^3 with LDD100 H
Measurement range (size)	0.18 – 40 μm
Volume flow	1 – 25 Nm^3/h, 1 – 85 Nm^3/h (others on request)
Differential pressure measurement	0 – 5,000 Pa (others on request)
Compressed air supply	6 – 8 bar
Dimensions	Approx. 1,600 • 2,000 • 800 mm (H • W • D)

Applications

- Quality assurance for oil separators
- New and further development of oil separators, e.g. coalescence separators, cyclonic separators and other inertia separators, electrofilters and filter combinations, e.g. for
  - Blow-by aerosols
  - Oil mist downstream of compressors
  - Cooling lubricants on machine tools
  - Aerosols for minimal quantity lubrication

Mehr Informationen:
https://www.palas.de/product/hmt1000