PMFT 4000

The PMFT 4000 was specially developed for use in the quality control of masks, filter media and particulate filters. It tests particle filters for full-face masks better than the standards EN 143, ISO 16900-3 and NIOSH 42 CFR 84, with additional exact analysis of the filter mask efficiency for SARS-CoV-2 (size approx. 120 nm to 160 nm). In addition, it is possible to test face masks based on the standards EN 149/EN 13274-7 and GB 2626.

The photometric total penetration and the fractional efficiency, i.e. the efficiency over the particle size or the particle size-dependent penetration, are tested simultaneously.

Operation principle

PMFT 4000 as an all-rounder in the testing of almost all mask and filter types

The measurement of the total penetration and the penetration over the particle size is carried out simultaneously with the highly precise aerosol photometer Promo® Sense in raw and clean gas.

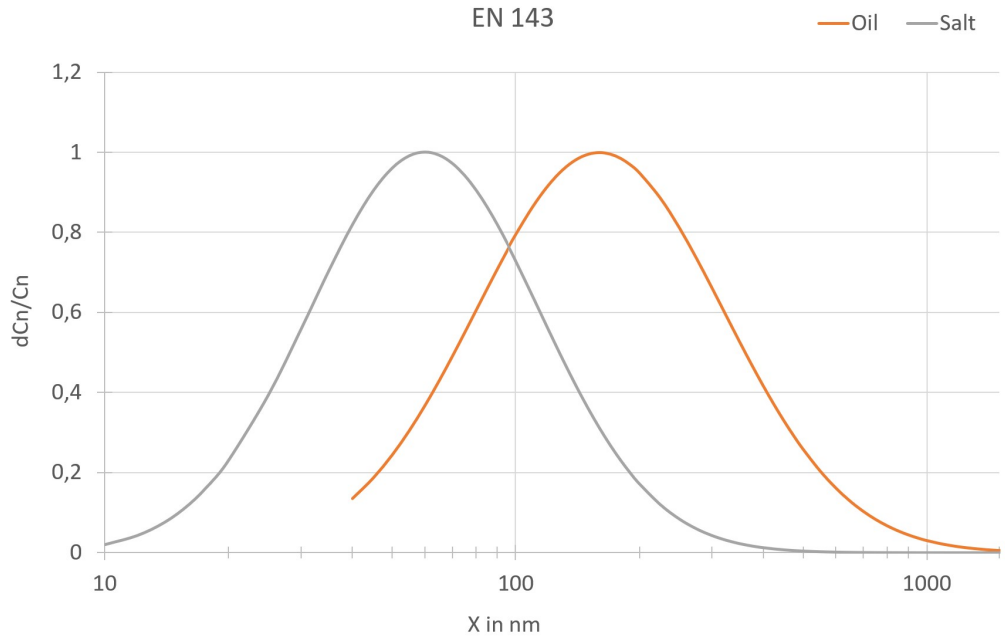
This allows an efficiency measurement of up to 99.9995% at higher particle concentrations in the raw gas. The measurement time is only about 30 seconds.

The size distribution of the test aerosol is as follows according to the standard:

EN 143

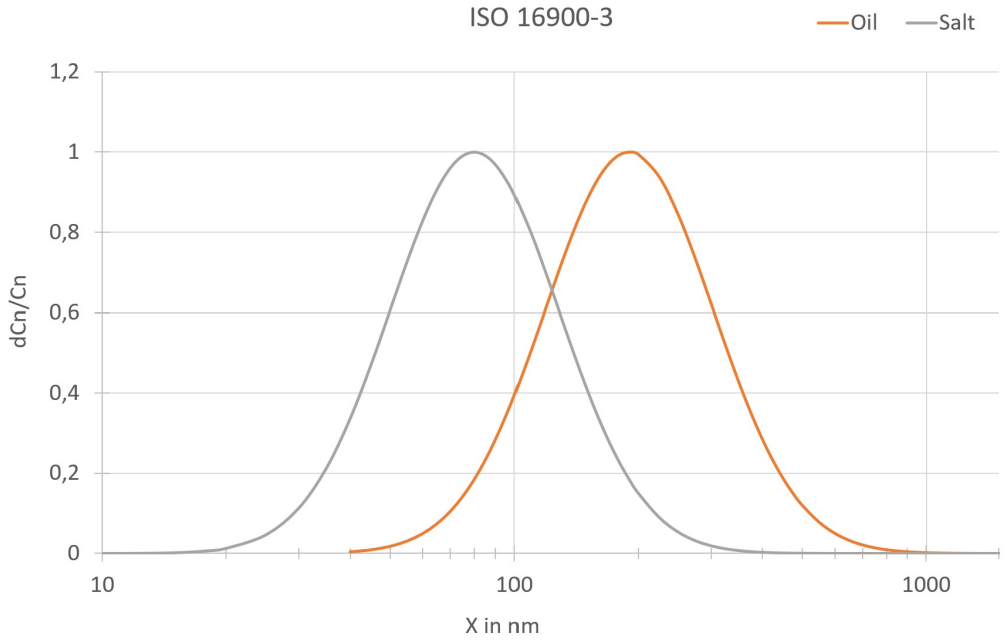
Oil: Media diameter ca. 160 nm | Geom. standard deviation ~ 2

Salt: Media diameter ca. 60 nm | Geom. standard deviation ~ 1.9



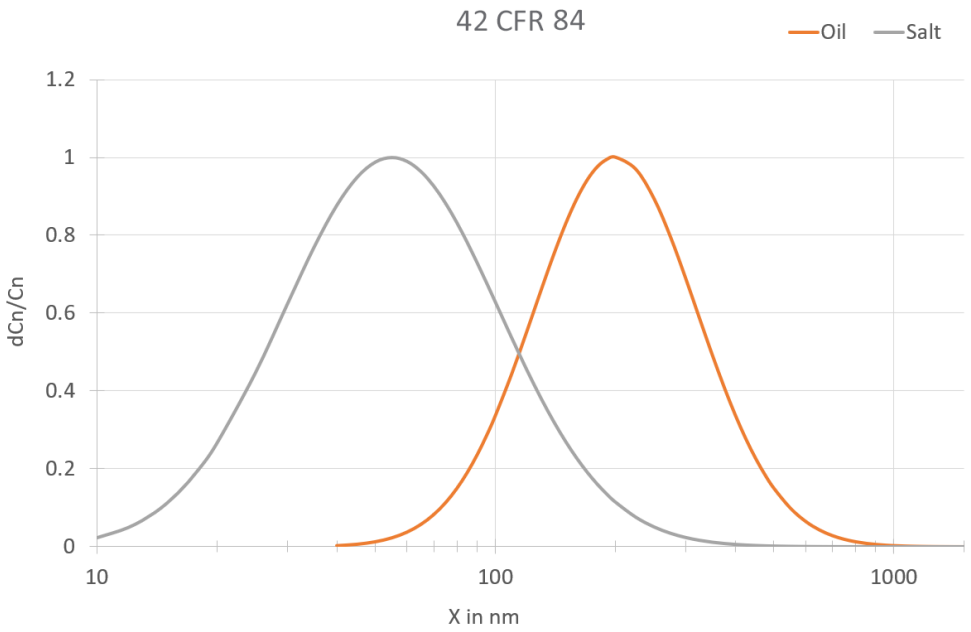
ISO 16900-3

Oil: Media diameter 190 nm | Geom. standard deviation 1.4 - 1.8
Salt: Media diameter 80 nm | Geom. standard deviation 1.4 - 1.8



42 CFR 84

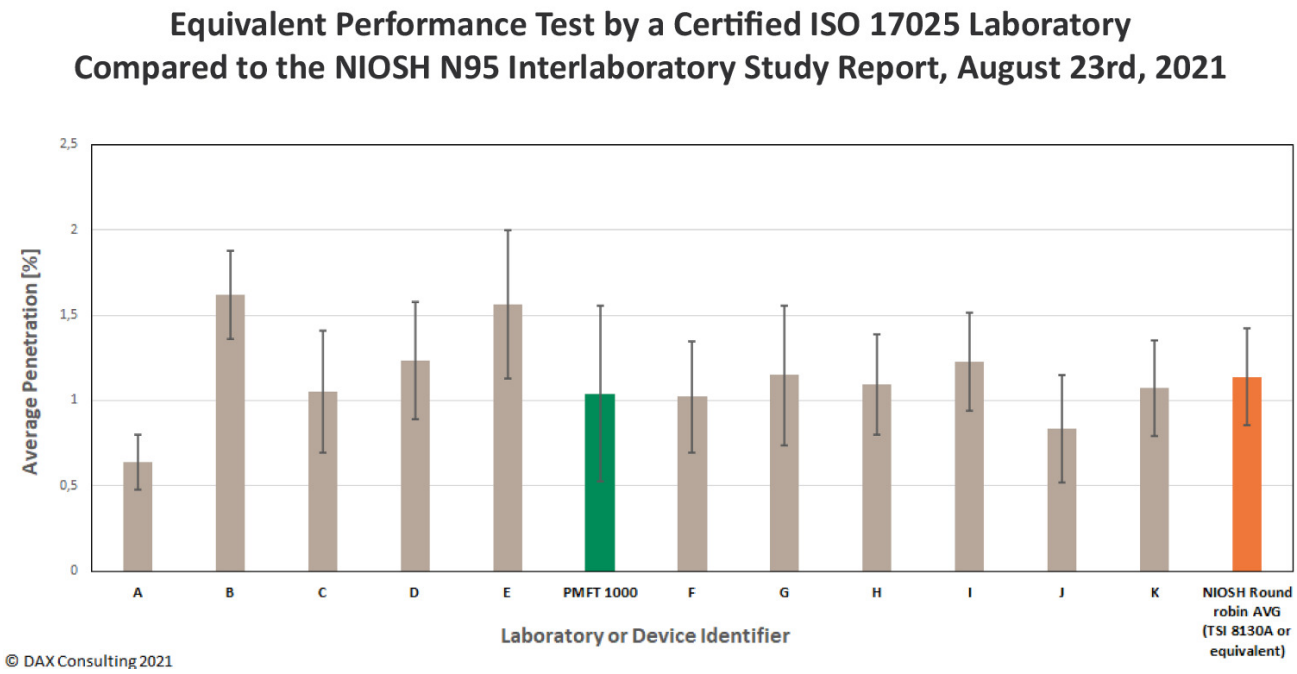
Oil: Media diameter 200 nm | Geom. standard deviation <1.6
Salt: Media diameter 55 nm | Geom. standard deviation <1.86



Based on the measurement of the particle penetration via the particle size, the PMFT 4000 can also be used to consider the tolerances in the particle size distribution according to EN 13274-7 as min. / max. penetration value.

Comparative measurements

International comparisons regarding overall penetration were successfully carried out at SGS in the USA:



	EN 143	EN 143	ISO 16900-3	ISO 16900-3	42 CFR 84	42 CFR 84
Aerosol	NaCl	PaO	NaCl	PaO	NaCl	DOP
Mean diameter	approx. 0.06 μm	approx. 0.16 μm	0.06 – 0.1 μm	0.16 – 0.21 μm	0.055 – 0.095 μm	0.165 – 0.205 μm
Standard deviation	approx. 1.9	approx. 2	1.4 – 1.8	1.4 – 1.8	< 1.86 (by additional software module)	< 1.6 (by additional software module)
Concentration	4 –12 mg/m³	15 – 35 mg/m³	8 – 35 mg/m³	15 – 35 mg/m³	< 200 mg/m³	< 200 mg/m³
Discharge	required	-	required	-	required	required
Air flow	95 l/min	95 l/min	to be defined	to be defined	85 ± 4 l/min	85 ± 4 l/min
Temperature	22 ± 3 °C	24 ± 8 °C	22 ± 3 °C	24 ± 8 °C	25 ± 5 °C	25 ± 5 °C
Rel. humidity< 40 %	< 40 %	20 - 80 %	< 40 %	20 – 80 %	20 – 40 % (by compressed air)	20 – 40 % (by compressed air)
Measurement device	Sodium flame photometer	Light scattering photometer	Sodium flame photometer	Light scattering photometer	Light scattering photometer	Light scattering photometer
Measuring time	30 s	30 s	30 s	30 s	lowest eff. during loading	lowest eff. during loading
Pause time	180 s	180 s	180 s	180 s	lowest eff. during loading	lowest eff. during loading
Exposition	120 mg	120 mg	150 mg	150 mg	200 ± 5 mg	200 ± 5 mg
PMFT remarks	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.

Table 2: Overview of standards for filter testing of personal protection masks

Extensions/Accessories

The PMFT 4000 is equipped with aerosol generators for measuring penetration with oil and salt. Measurement procedures for quick quality control (short test) or for testing according to standards (exposure test) are included in the delivery and are prepared for use. A corona discharge with the CD 2000 A is integrated.

This makes it easy to use and automatically print out the measurement results, even for inexperienced users.

BENEFITS

- Short test times of up to 30 s for overall efficiency up to 99.9995%
- Simultaneous measurement with Promo Sense including output of fractional efficiency and pressure drop
- 2 X Promo Sense aerosol spectrometer with long-life LED light source for highest measurement stability
- Delivered with two aerosol generators for NaCl and oil
- Integrated corona discharge with CD 2000 A
- Testing of fractional efficiency, e.g. efficiency in the entire size range from 145 nm to 5 μm
- On-site calibration possible – customer calibration of particle size possible
- Individual configuration of performance at customer request

NORMS AND CERTIFICATES

US 42 CFR 84, GB2626, EN 143/EN 149 (referencing EN 13274-7), ISO 23328-1

DATASHEET

Aerosols	Salts (e.g. KCl, NaCl), liquid aerosols (e.g. DEHS), latex particles (PSL)
Test area of the medium	100 cm^2
Measuring range (total penetration)	0.0005 - 100 %
Measurement range (size)	0.145 – 40 μm
Volume flow	1 – 27 m^3/h - pressurized operation
Power supply	115 – 230 V, 50/60 Hz
Installation conditions	+10 – +40 °C
Differential pressure measurement	0 – 1,200 Pa
Inflow velocity	1.5 – 70 cm/s (others on request)
Compressed air supply	6 – 8 bar
Dilution factor	1 : 27 / 1 : 700
Test conditions according to standard	+19 – +23 °C
Dimensions	Approx. 1,800 • 600 • 900 mm (H • W • D)

APPLICATIONS

- Testing of full face mask filters for use with standard filter fittings according to EN 148-1
- Measurement of total penetration of respirators
- Exact analysis of filter mask efficiency, e.g. coronavirus
- Media test for HEPA quality

Mehr Informationen:
https://www.palas.de/en/product/pmft-4000