

# PMFT 1000



The PMFT 1000 tests respirators better than the standards EN 149/EN 13274-7 with additional accurate analysis of filter mask efficiency for SARS-CoV-2 (size approximately 120 nm to 160 nm). Both total photometric penetration and fractional efficiency are tested e.g., the efficiency in the whole size range respectively the particle size-dependent penetration.

## OPERATION PRINCIPLE

### PMFT 1000 FOR DEVELOPMENT AND PRODUCTION MONITORING OF HALF MASKS

The measurement of total penetration and penetration via particle size is carried out with the high-precision Promo<sup>®</sup> 1000 aerosol photometer.

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

EN 149

Oil: Media diameter 290 nm | Geom. standard deviation 1.85

Salt: Media diameter 70 nm | Geom. standard deviation 2.5

42 CFR 84 / GB 2626

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 particle penetration via particle size, the PMFT 1000 can also be used to view the tolerances in the particle size distribution according to EN 13274-7 as min. / max. penetration values. In addition, comparative values to other manufacturers are possible (option).

Compared with other standards (42CFR84/NIOSH) is also easy with the 42CFR84 upgrade KIT.

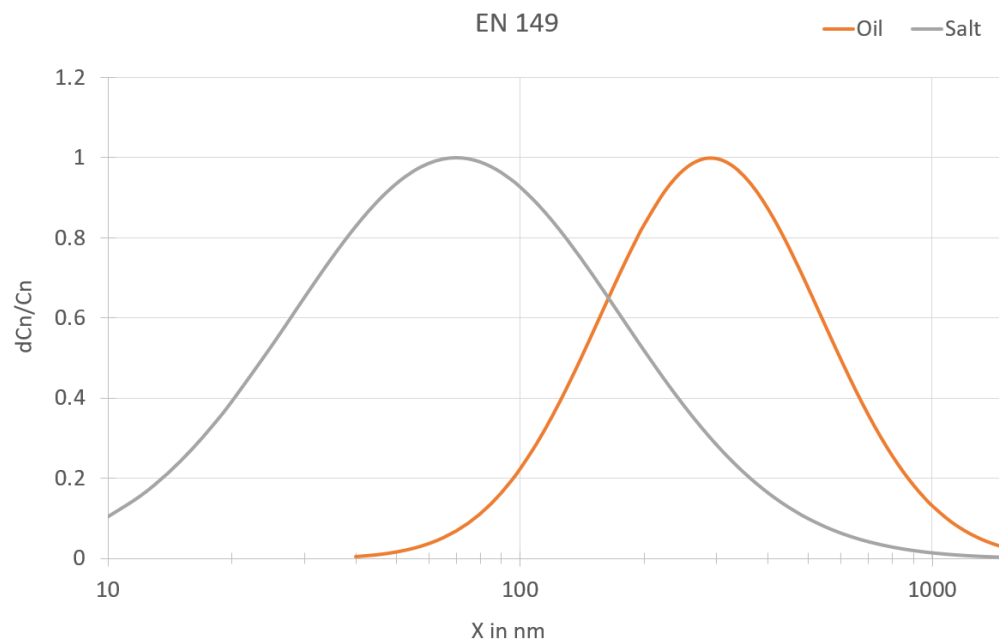


Figure 1: PMFT 1000: The size distribution of the test aerosol according to the standard  
PMFT 1000: The size distribution of the test aerosol according to the standard

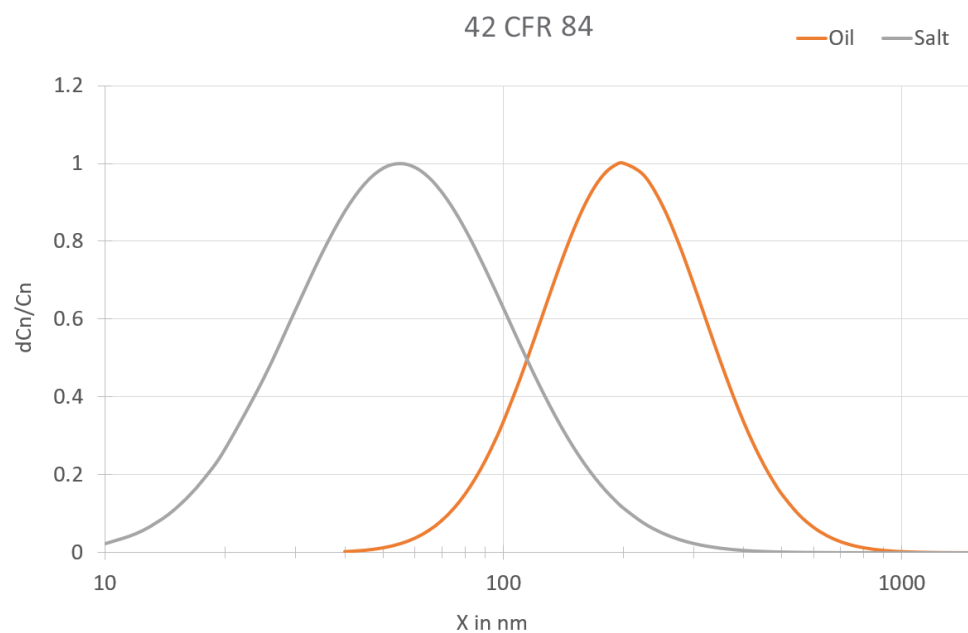


Figure 2: NIOSH Distribution Plot  
NIOSH Verteilungen Plot

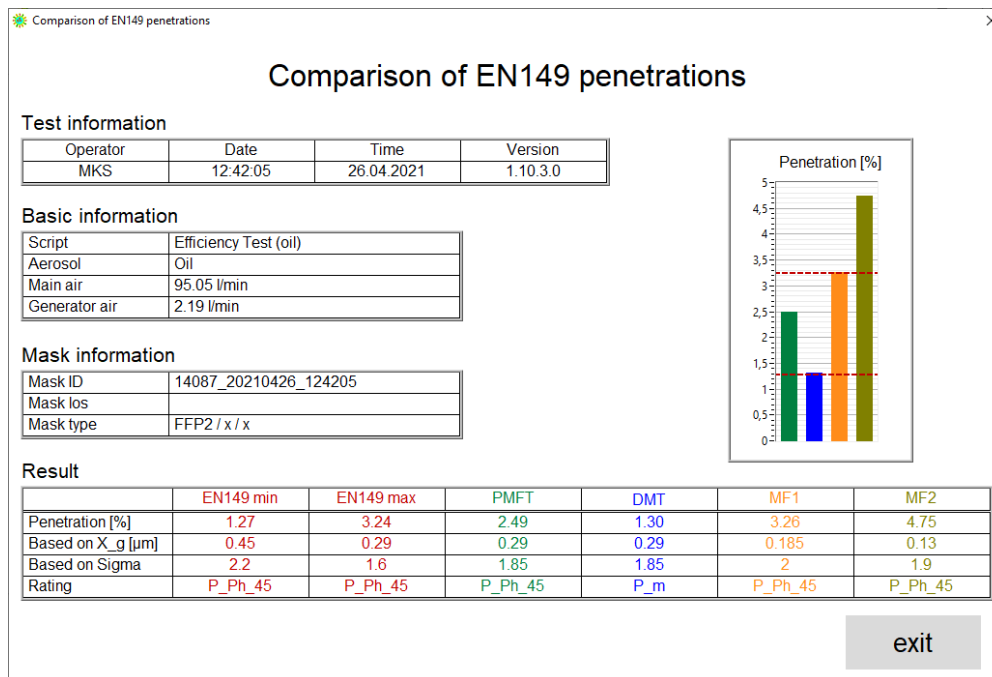


Figure 3: Comparison of EN 149 penetrations.PNG

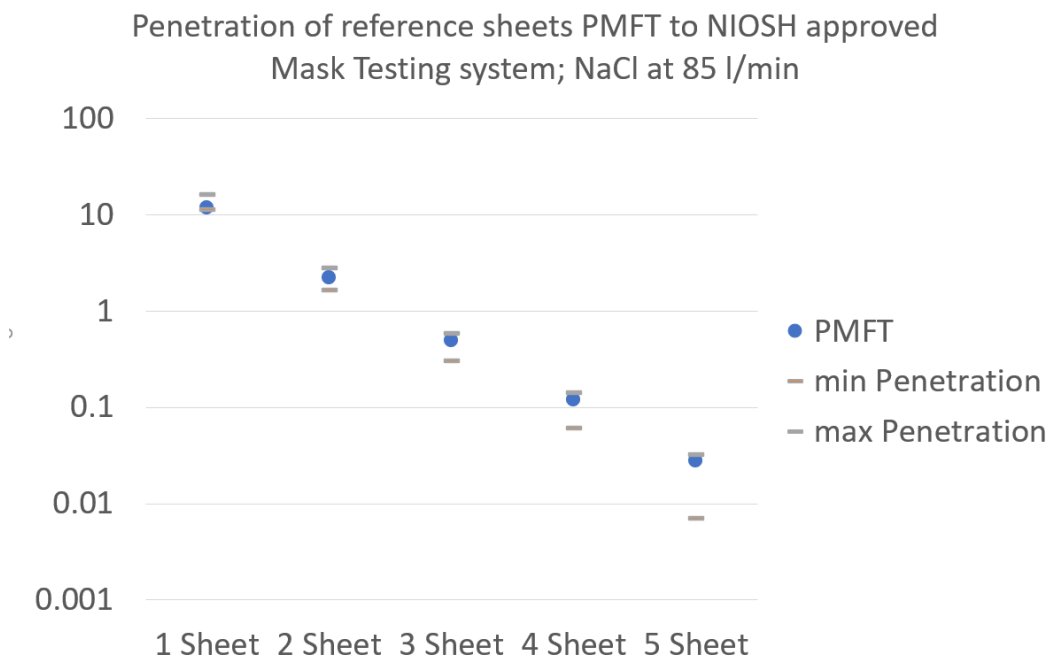


Figure 4: Comparison Niosh  
Comparison Niosh

## Extensions/Accessories

Aerosol generators

|                    | EN 149  |    | EN 13274-7                    | EN 13274-7                     | GB 2626                                | GB 2626                                                   | 42CFR 84                               | 42 CFR 84                             |
|--------------------|---------|----|-------------------------------|--------------------------------|----------------------------------------|-----------------------------------------------------------|----------------------------------------|---------------------------------------|
| Aerosol            | see     | EN | NaCl                          | PaO                            | NaCl                                   | PaO/DOP                                                   | NaCl                                   | DOP                                   |
| Mean diameter      | 13274-7 | EN | 0.06 – 0.1 $\mu\text{m}$      | 0.29 – 0.45 $\mu\text{m}$      | 0.055 – 0.095 $\mu\text{m}$            | 0.165 – 0.205 $\mu\text{m}$                               | 0.055 – 0.095 $\mu\text{m}$            | 0.165 – 0.205 $\mu\text{m}$           |
| Standard deviation | 13274-7 | EN | 2 – 3                         | 1.6 – 2.2                      | < 1.86 (by additional software module) | < 1.6 (by additional software module)                     | < 1.86 (by additional software module) | < 1.6 (by additional software module) |
| Concentration      | see     | EN | 4 – 12 $\text{mg}/\text{m}^3$ | 15 – 25 $\text{mg}/\text{m}^3$ | < 200 $\text{mg}/\text{m}^3$           | (50 $\text{mg}/\text{m}^3$ ) < 200 $\text{mg}/\text{m}^3$ | < 200 $\text{mg}/\text{m}^3$           | < 200 $\text{mg}/\text{m}^3$          |
| Discharge          | -       | -  | -                             | -                              | required                               | required                                                  | required                               | required                              |
| Air flow           | see     | EN | 95 l/min                      | 95 l/min                       | 85 $\pm$ 4 l/min                       | 85 $\pm$ 4 l/min                                          | 85 $\pm$ 4 l/min                       | 85 $\pm$ 4 l/min                      |
| Temperature        | 13274-7 | EN | 22 $\pm$ 3 $^{\circ}\text{C}$ | -                              | 25 $\pm$ 5 $^{\circ}\text{C}$          | 25 $\pm$ 5 $^{\circ}\text{C}$                             | 25 $\pm$ 5 $^{\circ}\text{C}$          | 25 $\pm$ 5 $^{\circ}\text{C}$         |
| Rel. humidity      | see     | EN | < 40 %                        | -                              | 20 – 40 % (by compressed air)          | -                                                         | 20 – 40 % (by compressed air)          | 20 – 40 % (by compressed air)         |
| Measurement device | 13274-7 | EN | Sodium flame photometer       | Light scattering photometer    | particle detector                      | particle detector                                         | Light scattering photometer            | Light scattering photometer           |
| Measuring time     | see     | EN | 30 s                          | 30 s                           | lowest eff. during loading             | lowest eff. during loading                                | lowest eff. during loading             | lowest eff. during loading            |
| Pause time         | 13274-7 | EN | 180 s                         | 180 s                          | lowest eff. during loading             | lowest eff. during loading                                | lowest eff. during loading             | lowest eff. during loading            |
| Exposition         | 120 mg  |    | 120 mg                        | 120 mg                         | 200 $\pm$ 5 mg                         | 200 $\pm$ 5 mg                                            | 200 $\pm$ 5 mg                         | 200 $\pm$ 5 mg                        |
| PMFT re-marks      | O.K.    |    | O.K.                          | O.K.                           | O.K. with upgrade KIT                  | O.K. with upgrade KIT                                     | O.K. with upgrade KIT                  | O.K. with upgrade KIT                 |

Table 2: Overview of standards for face mask penetration testing

The PMFT 1000 has aerosol generators for measuring penetration with oil and salt. Measurement procedures for quick quality control (short test) or testing according to standard (exposure test) are supplied.

Operation and automatic printout of the measurement results are therefore easy, even for inexperienced users.

Software extension

Display of penetration results of the entire tolerance range of the size distribution according to EN 13274-7

- Allows the comparison of different test institutes and test systems
- Facilitates certification
- Shows wide range of standards. Depending on the test operation – i.e., particle size distribution of the test aerosol – one and the same mask can perform very well or fail the test

## BENEFITS

- Test rig working principle better than EN 149 and EN 13274-7, equivalent to GB 2626, 42 CFR 84 and ASTM 2299-3 by additional software option
- Test of community masks equivalent to CWA 17553
- Includes two aerosol generators for oil and NaCl
- Testing of fractional efficiency, e.g., efficiency in whole size range of 100 nm up to 3  $\mu\text{m}$
- Exact analysis of filter and filter mask efficiency for SARS-CoV-2 (size approx. 120 nm up to 160 nm) in the size range between 100 nm and 180 nm we have eight size channels
- Future-proof: Works with any kind of aerosol without adjustments
- Further measurement of differential pressure, e. g., as well within different face velocities to simulate measurement of breath resistance
- Face velocity adjustable between 1.5 – 70 cm/s
- Product capable of fast quality assurance **and** continuous optimization in R&D (display of size distribution)
- Individual face mask adapter for your product

## NORMS AND CERTIFICATES

CCF (Covid Certified Filter), EN 149, EN 13274-7, GB 2626, 42 CFR 84

## DATASHEET

|                                       |                                                                            |
|---------------------------------------|----------------------------------------------------------------------------|
| Aerosols                              | Salts (e.g. KCl, NaCl), liquid aerosols (e.g. DEHS), latex particles (PSL) |
| Test area of the medium               | 100 cm <sup>2</sup>                                                        |
| Measuring range (total penetration)   | 0.0005–100 %                                                               |
| Measurement range (size)              | 0.12 – 40 µm                                                               |
| Volume flow                           | 1 – 27 m <sup>3</sup> /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                            | Ca. 1.800 • 600 • 900 mm (H • B • T)                                       |

## APPLICATIONS

- Development and production monitoring of half masks
- Test of total penetration for respiratory masks
- Exact analysis of filter mask efficiency for e.g., Coronavirus



Mehr Informationen:  
<https://www.palas.de/en/product/pmft-1000>