

The truth and illusion of a measurement standard...

The European standard EN 149 is not sufficient for the evaluation of masks' protection efficiency against virus infections.

Follow-up tests by the German DEKRA have revealed that 13 out of 27 masks that were distributed by the state of Baden-Württemberg do not protect sufficiently against the Corona virus. This result can also be extended to other states and at the national level. This is despite the fact these masks had supposedly already undergone a two-stage testing procedure. So how could this happen? One reason is the European standard EN 149.

The EN 149 standard is a technical test standard printed next to the CE certification on FFP2 masks. This standard states that only 6% of the particles pass through the filter. But what particle? " This is not clearly clarified," explains Dr. Maximilian Weiß, CEO of Palas GmbH. "The approved measurement technology is not capable of recognizing different particle sizes. As a result, tested particles and test results tend to vary significantly." After all, larger particles are naturally easier to filter than the smallest particles.

Designed for occupational safety instead of infection control

This is understandable when considering the origin of the EN 149 standard. It is a standard for occupational safety, intended for masks worn by construction workers or painters, for example.

Exhaled aerosol particles carrying corona viruses, for instance, are many times smaller than dust particles. Up to 20% of the virus concentration from the ambient air may be transmitted and inhaled through FFP2 masks. The consequences: False sense of security as well as a lack of effective protection, especially in hospitals and nursing homes.

No standard measurement procedures

An additional factor for the varying results are the different test aerosols and measurement techniques. Palas GmbH has performed a penetration measurement on 83 masks according to the EN 149 standard and used the capability of the PMFT 1000 test rig to display the measurement results for test aerosols with different size distributions. This very accurately shows the wide leeway of the standard. The results can be seen in the graph below. Depending on the testing procedure - i.e. the particle size distribution of the test aerosol - the same mask can perform extremely well or it can actually fail the test. For Dr. Weiß one thing is clear: "We are relying on a standard that is unworthy of the term".

Additionally, the graph clearly shows that testing sites (mask testing sites 1-3) produce very different results. This has been determined by Palas through comparative measurements. Further differences, e.g. due to the different measurement technology, are not factored in and will lead to additional discrepancies in the results of the test sites.

The average transmittance at test site 1 is 2.1% and at test site 3 6.84%. This too illustrates the wide spectrum of acceptable masks in accordance with the EN 149 standard and the problems for manufacturers of protective masks. According to the calculations, 7.1% of the tested masks would be above the limit value of 6% at the first test site, and 57.1% at the third test site.

Further information:

- Newspaper article: „Die Welt“ [Corona: Jede dritte FFP2-Maske schützt laut Experten nur unzureichend - WELT](#)

- <https://www.researchgate.net/publication/347836170> A critical review of filtering-face-piece filtration efficiency determination applying EN 149

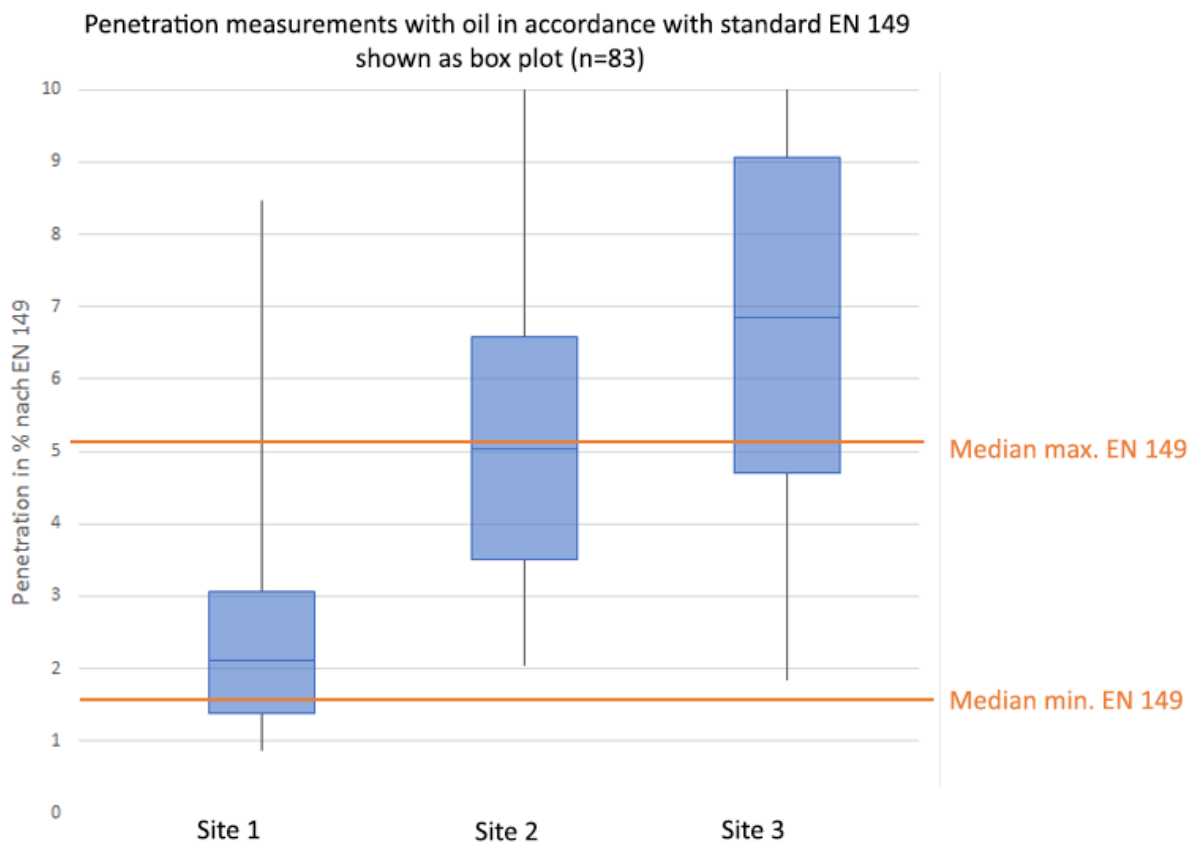
About Palas:

The Palas GmbH (www.palas.de) is a leading developer and manufacturer of high-precision devices for the generation, measurement and characterization of particles in the air. With numerous active patents Palas® develops technologically leading and certified fine dust and nanoparticle measuring devices, aerosol spectrometers, generators and sensors as well as associated systems and software solutions. Palas® was founded in 1983 and employs about 90 employees at the company headquarters in Karlsruhe. Palas GmbH is a subsidiary of Brockhaus Capital Management AG, which is listed in the Prime Standard at the Frankfurt Stock Exchange (BKHT, ISIN: DE000A2GSU42).

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Illustrations:



Graph 1: Penetration measurements with oil according to EN 149 recorded by Palas GmbH.

Results to be presumed from various testing sites.



Fig. 1: Dr. Maximilian Weiß in front of the PMFT 1000 test rig