

## Determination of filtration performance of respiratory protective device Non-powered air-purifying particle respirator (KN95) applying EN 149 and EN 1822



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<b>Order ref</b>	<b>W5FFPT200035-01, dated 9.7.2020</b>
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The results are only valid for the tested sample(s).

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<b>Assignment</b>	<b>Determination of filtration performance of respiratory protective device Non-powered air-purifying particle respirator (KN95) applying EN 149 and EN 1822.</b>
<b>Sample details</b>	<p>The customer delivered total of 12 samples. All samples were tested. Samples are detailed in Appendix 1. Sample package are presented in Appendix 7</p> <p>Samples were received 13.7.2020 The measurements were made 16.-17.2020</p>
<b>Methods</b>	<p>Respiratory protective devices performance was determined applying EN 149:2001 /1/ and EN 1822 /2/.</p> <p><b>Deviating from the standard the test aerosols used in the test were DEHS (Di-Ethyl-Hexyl-Sebacat) oil based solution and KCl (potassium chloride) instead of paraffin oil mist and NaCl (sodium chloride) aerosols.</b></p> <p><b>DEHS and KCl fractional efficiency curves are used in estimating a response given by flame photometer or photometer.</b></p> <p><b>Calculated flame photometer response is used when evaluating NaCl performance simulated by KCl aerosol. Particle is considered as spherical when calculating volume/mass penetration distribution.</b></p> <p><b>Calculated photometer response is based on diffraction ratio of total particle area is used when evaluation paraffin oil mist performance simulated by DEHS aerosol. Particle is considered as spherical when calculating area penetration distribution.</b></p> <p><b>Particle size distribution to simulate paraffin oil mist has median particle size of 0.37 <math>\mu\text{m}</math> with geometric mean deviation of 1.9 and respectively for NaCl particle size distribution has median particle size of 0.08 <math>\mu\text{m}</math> with geometric standard deviation of 2.5. These are average value requirements presented in EN 13274-7:2019.</b></p> <p>Test area for each sample is <math>\sim 95 \text{ cm}^2</math></p> <p>Respiratory protective device was installed material testing device build according to EN 779, which can be applied measuring according to EN 1822.</p> <p>Breathing resistance and fractional efficiencies was measured in continuous air flow rate of 95 l/min according to EN 149. Breathing resistance results are presented as pascals instead of mbars. 1 mbar = 100 Pa.</p> <p>Instruments used in the tests are presented in appendix 6.</p> <p>The samples were tested in a condition they were received.</p>

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**Results**

**Results presented in this test report relies heavily on calculations and should be treated as such. Real life responses from flame photometer or photometer may be drastically different from the results presented in this report.**

**It is recommended, to use fractional efficiency curve presented in Appendix 3 when evaluating device performance.**

Summary of test results are presented in Appendix 1.

Breathing resistance and air flow rates are presented in Appendix 2.

Average fractional efficiency curve and sample efficiency measurements are presented in Appendix 3.

Average calculated particle and mass or area penetrations from generated aerosol particle size distribution are presented in Appendix 4.

Test aerosol particle numbers measured in determination of fractional efficiency is presented in Appendix 5.

The results are only valid for the tested samples.

**References**

/1/ SFS-EN 149 + A1. Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing, marking

/2/ SFS-EN 1822-3. HIGH EFFICIENCY AIR FILTERS (EPA, HEPA AND ULPA). PART 3: TESTING FLAT SHEET FILTER MEDIA

/3/ EN 13274-7:2019 Respiratory protective devices. Methods of test. Part 7: Determination of particle filter penetration

**Espoo 22.7.2020**

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Appendices

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Distribution

Customer, electronically approved

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## TEST RESULTS

### GENERAL

Test no.:	204206	Date of test:	16.7.2020	Supervisor:	AK
Test requested by:	Papival SA	Device receiving date:			
Device delivered by:	Papival SA	13.7.2020			

### DEVICE TESTED

Model	Manufacturer
Non-powered air-purifying particle respirator (KN95)	Guangdong aozhen Pharmaceutical Co. Ltd
Type of media	Construction
Synthetic	Respiratory protective device, half cup

### TEST DATA

Test air flow rate	Test air temperature	Test air relative humidity	Test aerosols
95 l/min	22 - 22 °C	42 - 51 %	DEHS & KCl

### RESULTS

Sample	Breathing resistance	Calculated filtration efficiencies from simulated		Estimated filtration class
		Paraffin oil mist, %	NaCl, %	
1	107 Pa	97.0	98.9	<b>FFP2</b>
2	102 Pa	94.6	97.2	
3	107 Pa	95.6	98.0	
4	110 Pa	95.9	98.1	
5	53 Pa	91.6	95.2	
6	56 Pa	91.2	95.2	
7	117 Pa	96.2	97.8	
8	128 Pa	98.2	99.3	
9	138 Pa	97.2	98.4	
10	60 Pa	89.6	95.0	
11	102 Pa	96.5	97.9	
12	109 Pa	97.2	98.6	
Average	<b>99 Pa</b>	<b>95.1 ± 2.7</b>	<b>97.5 ± 1.5</b>	
Remarks:	Efficiencies have been calculated for paraffin oil and NaCl test aerosol particle distributions presented in EN 13274-7.			
	Results are presented as filtration efficiency from overall particle area or mass from calculated aerosol particle size distributions			
NOTE:	The performance results cannot by themselves be quantitatively applied to predict filter performance in service.			
	The results relate only to the tested item.			

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