

1. Basic information

Antibacterial respirator **BreaSAFE** is designed for protection of respiratory organs of the user against SARS-CoV-2 only, according to the instruction manual of the manufacturer.

The tests are designed for the needs of module B, samples of the respirator BreaSAFE for laboratory tests were provided by the manufacturer on 16. April 2020 in quantity of 8 pcs and on 21. April 2020 in quantity of 6 pcs. The samples were recorded in the Book of samples of the laboratory under numbers 2364 – 2370 and 2611 – 2616 with the request number S-264/2020.

2. Test regulations, methods and procedures

The following norms and regulations were used during the tests:

ČSN EN 149:2002+A1:2009, ČSN EN 149+A1 CORRECTION 1:2018 Protecting aids for respiratory organs.

Filtrating half-masks for protection against particles. Requirements, testing, marking.

RfU – PPE-R/02.075 version 1

Update of methods

Was not used

Differences and additions of testing specifications

The tests were performed in accordance with RfU – PPE-R/02.075 version 1

3. Used devices

Stopwatch JVD ST 80.2

Thermometer type Centigrade 0.1

Testing device for assessment of breathing resistances INSPEC

Device for testing by aerosol NaCl from MOORE'S type 1100

Generator of aerosol NaCl type 4000

Device for testing of filters by aerosol of paraffin oil LORENZ type BIA

Manometer GDH 200-07

Rotameter Yokogawa P052

Rotameter Yokogawa P161

Artificial lungs INSPEC

Sheffield head

IR analyzer CO2 Guardian II

IR analyzer CO2 Guardian NG

Teflon rotameter Cole-Parmer

Metrological securing

Metrological securing of the devices is performed in compliance with the metrological order OSRI-ZL

4. Tests

Test results

The tests were performed in the laboratory of protection of the respiratory system and in the textile laboratory OSRI-ZL.

4.1 Testing by outer evaluation article 8.2

Filtrating half-masks do not have any sharp parts nor burrs. The marking meets the requirements of the technical regulation.

4.2 Assessment of penetration of aerosols article 8.11

4.2.1 Test by sodium chloride

sample	condition	penetration %
2364	AR	5.33
2365	AR	5.16
2366	AR	5.24

Note: AR – as received

Highest measured value of aerosol NaCl penetration

sample	condition	penetration in %	time of the highest measured value in minutes
2364	AR	4.89	3

4.2.2 Test by paraffin oil

sample	condition	penetration %
2367	AR	1.9
2368	AR	2.3
2369	AR	2.1

Penetration of paraffin oil aerosol after dosage of 120 mg of oil

sample	condition	penetration in %
2367	AR	2.5

4.3 Assessment of concentration of carbon dioxide in inhaled air article 8.7

sample	condition	concentration of CO ₂ in vol. %
2611	AR	0.38
2612	AR	0.44
2613	AR	0.42
average		0.41

4.4. Practical test by wearing article 8.4

The half-mask slightly presses on the nose, other negative findings in the tested half-mask were not determined.

4.5 Assessment of breathing resistances article 8.9

4.5.1 Inhaling resistance

sample	condition	resistance in Pa	
		at 30 l/min	at 95 l/min
2364	AR	57	150
2365	AR	65	151
2366	AR	57	155

4.5.2 Exhaling resistance

sample	condition	position				
		forward	up	down	left	right
		Pa	Pa	Pa	Pa	Pa
2364	AR	260	260	262	262	260
2365	AR	256	255	259	250	252
2366	AR	278	276	280	271	272

Table of measurement uncertainties

Number of the test in the report	Total extended relative uncertainty in %
4.3.1	4.16
4.3.2	2.00
4.4	3.25
4.6	1.91

Presented measurement uncertainties are an extended standard uncertainty calculated on the basis of a determinant deviation, which is multiplied by coefficient $k=2$ (which ensures approximately 95% reliability interval).

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