

**PERSONAL PROTECTIVE EQUIPMENT**

**RESPIRATORY PROTECTIVE EQUIPMENT WORKSHOP**

**REPORT ON THE STUDIES**

**Order number:** 1218/PB-COV/2020/NO

**Subject of the order:** Performance of tests on filtering half mask type AM2 FFP2 NR

**Orderer:** EUROPROFIL Sp. z o.o.  
11-015 Olsztynek  
ul. Zielona 11

**Main contractor:** Renata Głodek

**Authorised by:**

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head of the testing and  
calibration laboratories/

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*This test report shall contain the results of the tests covered by the scope of accreditation and the tests*

**Object of tests:**

43 filtering half masks type AM2 FFP2 NR were submitted for testing by EUROPROFIL Sp. z o.o.; 11-015 Olsztynek; ul. Zielona 11. The research object is shown in photo 1.



Photo: 1. filtering half masks type AM2 FFP2 NR (EUROPROFIL Sp. z o.o.).

<b>Place of testing:</b>	Personal Security Department Respiratory protective equipment workshop 90-133 Łódź, ul. Wierzbowa 48
<b>Registration number of samples:</b>	NO1/169/2020
<b>Date of receipt of samples for testing:</b>	28.08.2020
<b>Date of testing:</b>	19.10.2020
<b>Identification of the test method used:</b>	
Penetration by NaCl:	method and requirements according to EN 149:2001+A1:2009
Penetration of paraffin oil mist:	method and requirements according to EN 149:2001+A1:2009
Breathing resistance:	method and requirements according to EN 149:2001+A1:2009
Flammability:	method and requirements according to EN 149:2001+A1:2009
Total internal leakage:	method and requirements according to EN 149:2001+A1:2009
CO2 content of the inhaled air:	method and requirements according to EN 149:2001+A1:2009
Operational tests:	method and requirements according to EN 149:2001+A1:2009
Non-accredited tests:	
Organoleptic evaluation:	method and requirements according to EN 149:2001+A1:2009

According to the requirements of the standard, the samples were prepared for testing by submitting them to following tests:

- mechanical strength test according to section 8.3.3 of EN 149:2001 + A1:2009,
- thermal conditioning in accordance with section 8.3.2 of EN 149:2001 + A1:2009,
- simulation of conditions of use according to point 8.3.1 of EN 149:2001 + A1:2009.

**Note:**

The report contains thirteen (13) pages.  
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**MEASUREMENT RESULT SHEET  
PENETRATION WITH THE NaCl  
according to EN 149:2001+ A1:2009**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample number	Penetration NaCl, % (flow rate 1,6 dm <sup>3</sup> s <sup>-1</sup> )		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non- conformity with standard requirements <sup>1</sup>
	Measured value	Uncertainty (U95)		
22 MS, TC	0,90	0,08	FFP1 < 20% FFP2 < 6% FFP3 < 1 %	Filtering half masks meet the requirements of section 7.9.2 of EN 149:2001 + A1:2009 for NaCl aerosol with first and second class protection (FFP1, FFP2).
28 MS, TC	0,59	0,05		
25 MS, TC	0,59	0,05		
02 N	1,46	0,12		
03 N	1,00	0,08		
04 N	0,78	0,07		
09 SCU	0,86	0,07		
18 SCU	1,14	0,10		
23 SCU	0,92	0,08		

The results given relate to the samples supplied only.

MS - sample after mechanical strength test

TC - sample after thermal conditioning

N - new sample

SCU - sample after simulated conditions of use

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <2,5%.

**PARAFFIN OIL MIST PENETRATION MEASUREMENT RESULTS SHEET**  
**according to EN 149:2001+ A1:2009**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample No.	Penetration of paraffin oil mist, % (flow rate 1,6 dm <sup>3</sup> S <sup>-1</sup> )		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non- conformity with standard requirements <sup>1</sup>
	Measured value	Uncertainty (U95)		
36 MS, TC	4,58	0,37	FFP1 < 20% FFP2 < 6% FFP3 < 1%	half masks meet the requirements of point 7.9.2 of EN 149:2001 + A1:2009 for paraffin oil mist within the first and second class protection (FFP1, FFP2).
21 MS, TC	4,43	0,36		
20 MS, TC	4,24	0,34		
45 N	1,60	0,13		
46 N	2,10	0,17		
47 N	2,30	0,19		
11 SCU	1,90	0,16		
12 SCU	2,20	0,18		
17 SCU	2,00	0,16		

The results given relate to the samples supplied only.

MS - sample after mechanical strength test

TC - sample after thermal conditioning

N - new sample

SCU - sample after simulated conditions of use

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <sup>^</sup>2,5%.

**RESULTS SHEET FOR THE MEASUREMENT OF THE INHALATION RESISTANCE**  
according to EN 149:2001+ A1:2009

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample No.	Inhalation resistance, Pa						Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
	Flow rate 0,5 dm <sup>3</sup> s <sup>-1</sup>		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Flow rate 1,6 dm <sup>3</sup> S <sup>-1</sup>		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	
	Measured value	Uncertainty (U95)		Measured value	Uncertainty (U95)		
34 N	43	4	FFP1 < 60 Pa FFP2 < 70 Pa FFP3 < 100 Pa	162	13	FFP1 < 210 Pa FFP2 < 240 Pa FFP3 < 300 Pa	Filtering half masks meet the requirements of section 7.16 of EN 149:2001 + A1:2009 for NaCl aerosol with first and second class protection (FFP1, FFP2).
35 N	47	4		167	14		
50 N	46	4		174	14		
14 TC	42	4		149	12		
16 TC	42	4		156	13		
38 TC	49	4		173	14		
11 SCU	45	4		169	14		
12 SCU	46	4		161	13		
23 SCU	40	4		149	12		

The results given relate to the samples supplied only.

N - new sample

TC - sample after thermal conditioning

SCU - sample after simulated conditions of use

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <2,5%.

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**EXHAUST RESISTANCE MEASUREMENT  
RESULTS SHEET**  
according to EN 149:2001+ A1:2009

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample No.	Head model position during the test	Exhalation resistance, Pa (flow rate 2,7 dm <sup>3</sup> S <sup>-1</sup> )		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
		Measured value	Uncertainty (U95)		
34	looking forward	164	14	FFP1 < 300 Pa FFP2 < 300 Pa FFP3 < 300 Pa	Filtering half masks meet the requirements of point 7.16 of EN 149:2001 + A1:2009 for exhalation in the first, second and third class of protection (FFP1, FFP2, FFP3).
	looking upward	204	17		
	looking downward	176	15		
	looking right	169	14		
	looking left	175	14		
35	looking forward	190	16		
	looking upward	192	16		
	looking downward	188	16		
	looking right	190	16		
	looking left	196	16		
50	looking forward	212	17		
	looking upward	200	16		
	looking downward	213	18		
	looking right	210	17		
	looking left	212	17		

The results given relate to the samples supplied only.

N - new sample

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance £2,5%.

EXHAUST RESISTANCE MEASUREMENT  
RESULTS SHEET

Object of tests: filtering half masks type AM2 FFP2 NR

Sample No.	Position of the head model during the test	Exhalation resistance, Pa (flow rate 2,7 dm <sup>3</sup> s <sup>-1</sup> )		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
		Measured value	Uncertainty (U95)		
14 TC	looking forward	194	16	FFP1 < 300 Pa FFP2 < 300 Pa FFP3 < 300 Pa	Filtering half masks meet the requirements of point 7.16 of EN 149:2001 + A1:2009 for exhalation in the first, second and third class of protection (FFP1, FFP2, FFP3).
	looking upward	192	16		
	looking downward	174	14		
	looking right	149	12		
	looking left	165	14		
16 TC	looking forward	177	15		
	looking upward	214	18		
	looking downward	172	14		
	looking right	191	16		
	looking left	186	15		
38 TC	looking forward	200	16		
	looking upward	202	17		
	looking downward	194	16		
	looking right	189	16		
	looking left	203	17		

The results given relate to the samples supplied only.

TC- sample after thermal conditioning

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <2,5%.

EXHAUST RESISTANCE MEASUREMENT  
RESULTS SHEET

Object of tests: filtering half masks type AM2 FFP2 NR

Sample No.	Head model position during the investigation	Exhalation resistance, Pa (flow rate 2,7 dm <sup>3</sup> s <sup>-1</sup> )		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
		Measured value	Uncertainty (U95)		
11 SCU	looking forward	209	17	FFP1 < 300 Pa FFP2 < 300 Pa FFP3 < 300 Pa	Filtering half masks meet the requirements of point 7.16 of EN 149:2001 + A1:2009 for exhalation in the first, second and third class of protection (FFP1, FFP2, FFP3).
	looking upward	205	17		
	looking downward	191	16		
	looking right	206	17		
	looking left	204	17		
12 SCU	looking forward	200	16		
	looking upward	230	19		
	looking downward	206	17		
	looking right	214	18		
	looking left	212	17		
23 SCU	looking forward	212	17		
	looking upward	214	18		
	looking downward	192	16		
	looking right	182	15		
	looking left	194	16		

The results given relate to the samples supplied only.

SCU - sample after simulated conditions of use

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance £2,5%.



**FLAMMABILITY MEASUREMENT RESULT SHEET**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample No.	Test result	Requirements according to EN 149:2001+A1:2009	Assessment of conformity/non-conformity with standard requirements
01 N	The half mask does not burn	The half mask should not burn at all or not longer than 5 seconds after removal from the flame.	Filtering half masks meet the requirements of point 7.11 of EN 149:2001 + A1:2009.
48 N	The half mask does not burn		
08 TC	The half mask does not burn		
15 TC	The half mask does not burn		

The results given relate to the samples supplied only.

N - new sample

TC - sample after thermal conditioning

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TOTAL INTERNAL LEAKAGE MEASUREMENT SHEET according to standard EN 149:2001+ A1:2009

Object of tests: filtering half masks type AM2 FFP2 NR

Research participant	Sample No.	Total internal leakage (TIL), %										average TIL, %	
		A		B		C		D		E		Measured value	Uncertainty (U95)
		Measured value	Uncertainty (U95)	Measured value	Uncertainty (U95)	Measured value	Uncertainty (U95)	Measured value	Uncertainty (U95)	Measured value	Uncertainty (U95)		
1	49 N	0,07	0,01	0,00	0,01	0,00	0,01	1,75	0,06	0,20	0,01	0,40	0,34
2	40 N	2,19	0,07	2,22	0,07	3,00	0,09	2,91	0,09	4,88	0,15	3,04	0,50
3	42 N	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4	43 N	0,16	0,01	0,18	0,01	0,88	0,03	0,88	0,03	1,98	0,06	0,82	0,34
5	44 N	0,80	0,03	1,01	0,04	0,86	0,03	0,79	0,03	1,11	0,04	0,91	0,07
6	13 TC	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,01
7	26 TC	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,01	0,29	0,01	0,08	0,06
8	27 TC	0,00	0,00	0,00	0,00	0,00	0,00	0,10	0,01	0,00	0,00	0,02	0,03
9	37 TC	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,01	0,02	0,01	0,01	0,01
10	41 TC	0,00	0,00	0,00	0,00	0,14	0,01	0,00	0,01	0,00	0,01	0,03	0,03

The results given relate to the samples supplied only; A - walk, B - head L/R, C - head up/down, D - speech, E - walk

N - new sample

TC - sample after thermal conditioning

Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
46 of the 50 individual exercise results should not be greater than: 25% for FFP1; 11% for FFP2; 5% for FFP3 and at least 8 of the 10 arithmetical averages of participants should not be greater than: 22% for FFP1; 8% for FFP2; 2% for FFP3	Filtering half masks meet the requirements of point 7.9.1 of EN 149:2001+A1:2009 given for total internal leakage in the first, second and third class of protection (FFP1, FFP2, FFP3).

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <2,5%.

**A CHART FOR MEASURING THE CONTENT OF CO2 IN THE INHALATION AIR  
according to EN 149:2001+ A1:2009**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Sample No.	CO2 content of the inhaled air, % Vol		Average CO2 content of the inhaled air, % Vol.		Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements <sup>1</sup>
	Measured value	Uncertainty (U95)	Measured value	Uncertainty (U95)		
31 N	0,77	0,04	0,83	0,05	The CO2 content of the inhaled air should not exceed approximately 1 % vol.	Filtering half masks meet the requirements of point 7.12 of EN 149:2001 + A1:2009.
32 N	0,84	0,05				
33 N	0,89	0,05				

The results given relate to the samples supplied only.

N - new sample

<sup>1</sup>) Conformity/non-conformity assessment was carried out using the bivalent acceptance principle with the protective band; acceptance limit (AL) = tolerance limit (TW) - protective band (w); w is equal to expanded uncertainty (U95). Risk of erroneous acceptance <2,5%.

**RESULTS SHEET FOR IN-SERVICE TESTING MEASUREMENTS**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Tested parameter	Positive assessment	Negative assessment	Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements
Tightness of adhesion of the facial part	4	0	The half mask should not have defects affecting its acceptance by the user.	Filtering half masks meet the requirements of point 7.7 of EN 149:2001 + A1:2009.
Headband comfort	4	0		
Connection strength	4	0		
Communication	4	0		
Field of vision	4	0		
Harmlessness to the skin	4	0		

The results given relate to the samples supplied only - tested samples: 07 N and 10 N.

N - new sample

**ORGANOLEPTIC EVALUATION SCOREBOARD  
according to EN 149:2001 +A1:2009\*)**

**Object of tests: filtering half masks type AM2 FFP2 NR**

Parameter being evaluated	Requirements according to EN 149:2001+A1:2009 (tolerance limit - TW)	Assessment of conformity/non-conformity with standard requirements
Labelling	7.3	Filtering half masks meet the requirements
Packaging	7.4	Filtering half masks meet the requirements
Materials	7.5	Filtering half masks meet the requirements
Cleaning and disinfection	7.6	Not applicable
Finishing of elements	7.8	Filtering half masks meet the requirements
Exhaust valves	7.15	Not applicable
Removable elements	7.18	Not applicable

The results given relate to the samples supplied only. All supplied samples were tested.

**END OF REPORT**