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TEST REPORT

EN 149:2001+A1:2009 Respiratory protective devices—Filtering half masks to protect against particles—Requirements, testing, marking

The following samples were submitted and identified on behalf of the client as:

- Product : Filtering half mask
Report No. : KZ2021740
Client : Universal Certification and Surveillance Service Trade Ltd.Co.
Model(s) : AD-1001
Number of samples : 100
Received date : 2020.07.21
Date(s) of tests : 2020.07.21-2020.08.03

DESCRIPTION OF SAMPLES

Table with 3 columns: General information, Classification, Main components. Rows include Manufacturer (AnDum Protective Equipment Technology), Manufacturer address (No. 216, Qianjie, Hengshanqiao Town), and Main components (White folding mask).

Approve: Fu Kejie (Authorized Signatory, Lab Director)
Reviewer: Fu Danhua
Chief Tester: Feng Yun



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Conditions:

The test results presented in this report relate to the samples tested only.

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Conclusion

Test Items		Conclusion
Clause 7.3	Visual inspection	Not tested
Clause 7.4	Package	Pass
Clause 7.5	Material	Pass
Clause 7.6	Cleaning and disinfecting	N/A
Clause 7.7	Practical performance	Pass
Clause 7.8	Finish of parts	Pass
Clause 7.9.1	Total inward leakage	Pass
Clause 7.9.2	Penetration of filter material	Pass
Clause 7.10	Compatibility with skin	Pass
Clause 7.11	Flammability	Pass
Clause 7.12	Carbon dioxide content of the inhalation air	Pass
Clause 7.13	Head harness	Pass
Clause 7.14	Field of vision	Pass
Clause 7.15	Exhalation valve	N/A
Clause 7.16	Breathing resistance	Pass
Clause 7.17	Clogging	N/A
Clause 7.18	Demountable parts	N/A
Clause 9	Marking	Not tested

Remarks: Pass = Meet EN 149:2001+A1:2009 FFP2 Requirement
 Fail = Below EN 149:2001+A1:2009 FFP2 Requirement
 N/A = Not Applicable

Disclaimer Measurement Uncertainty:

Unless otherwise agreed upon, Pass or Fail verdicts are given based on the measured values without any considerations of measurement uncertainties. Please note, every test method has a measurement uncertainty which has been evaluated by the laboratory according to ISO/IEC 17025 requirements.

By taking measurement uncertainties into account it might happen that measured values can neither be assessed as Pass nor as Fail.

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Test Results

- 7.3 Visual inspection** **Not tested¹**
 The visual inspection shall include the marking and the information supplied by the manufacturer.
Note 1: As requested by the client, marking and information supplied by the manufacturer was not inspected
- 7.4 Package** **Pass²**
 Particle filtering half masks shall be offered for sale packaged in such a way that they are protected against mechanical damage and contamination before use.
Note 2: In accordance with the requirement.
- 7.5 Material** **Pass³**
 Materials used shall be suitable to withstand handling and wear over the period for which the particle filtering half mask is designed to be used.
 After undergoing the conditioning described in 8.3.1 none of the particle filtering half masks shall have suffered mechanical failure of the facepiece or straps.
 Any material from the filter media released by the air flow through the filter shall not constitute a hazard or nuisance for the wearer.
 When conditioned in accordance with 8.3.1 and 8.3.2 the particle filtering half mask shall not collapse.
Note 3: In accordance with the requirement.
Samples 01, 02, 03 were conditioned in accordance with 8.3.1, None of the samples conditioned suffered mechanical failure or collapse.
Samples 04, 05, 06 were conditioned in accordance with 8.3.2 None of the specimens conditioned suffered collapse.
- 7.6 Cleaning and disinfecting** **N/A⁴**
 If the particle filtering half mask is designed to be re-usable, the materials used shall withstand the cleaning and disinfecting agents and procedures to be specified by the manufacturer.
Note 4: Single shift use only.
- 7.7 Practical performance** **Pass⁵**
 The particle filtering half mask shall undergo practical performance tests under realistic conditions.
Note 5: No imperfections.
Samples: 07, 08, subject details: BDN, FQQ.
- 7.8 Finish of parts** **Pass⁶**
 Parts of the device likely to come into contact with the wearer shall have no sharp edges or burrs.
Note 6: No sharp edges or burrs.
- 7.9.1 Total inward leakage** **Pass⁷**
 For particle filtering half masks fitted in accordance with the manufacturer's information, at least 46 out of the 50 individual exercise results (i.e. 10 subjects × 5 exercises) for total inward leakage shall be not greater than 25% for FFP1, 11% for FFP2, 5% for FFP3 and, in addition, at least 8 out of the 10 individual wearer arithmetic means for the total inward leakage shall be not greater than 22% for FFP1, 8% for FFP2, 2% for FFP3
Note 7: FFP2 respirator. Test results are shown in Annex A Table 7.9.1-A&B.

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7.9.2 Penetration of filter material

Pass⁸

The penetration of the filter of the particle filtering half mask shall meet the following requirements.

Sodium chloride test 95 L/min

Paraffin oil test 95 L/min

	Sodium chloride test 95 L/min	Paraffin oil test 95 L/min
FFP1	≤20%	≤20%
FFP2	≤6%	≤6%
FFP3	≤1%	≤1%

Note 8: FFP2 respirator. Test results are shown in Annex A Table 7.9.2.

7.10 Compatibility with skin

Pass⁹

Materials that may come into contact with the wearer's skin shall not be known to be likely to cause irritation or any other adverse effect to health.

Note 9: Samples from 37 to 41 (A.R.) and from 56 to 60 (T.C.) were tested. No irritation or any other adverse effect to health.

7.11 Flammability

Pass¹⁰

When tested, the particle filtering half mask shall not burn or not to continue to burn for more than 5s after removal from the flame.

Note 10: Test results are shown in Annex A Table 7.11.

7.12 Carbon dioxide content of the inhalation air

Pass¹¹

The carbon dioxide content of the inhalation air (dead space) shall not exceed an average of 1.0 % (by volume).

Note 11: Test results are shown in Annex A Table 7.12.

7.13 Head harness

Pass¹²

The head harness shall be designed so that the particle filtering half mask can be donned and removed easily.

The head harness shall be adjustable or self-adjusting and shall be sufficiently robust to hold the particle filtering half mask firmly in position and be capable of maintaining total inward leakage requirements for the device.

Note 12: Samples from 49 to 53 (A.R.) and from 61 to 65 (T.C.) were tested. Head harness can be donned and removed easily, adjustable or self-adjusting and have sufficiently robust to hold the particle filtering half mask firmly.

7.14 Field of vision

Pass¹³

The field of vision is acceptable if determined so in practical performance tests.

Note 13: Samples from 54 to 55 (A.R.) were tested. Pass the practical performance tests and no adverse comments.

7.15 Exhalation valve

N/A¹⁴

A particle filtering half mask may have one or more exhalation valve(s), which shall function correctly in all orientations.

If an exhalation valve is provided it shall be protected against or be resistant to dirt and mechanical damage and may be shrouded or may include any other device that may be necessary for the particle filtering half mask to comply with 7.9.

Exhalation valve(s), if fitted, shall continue to operate correctly after a continuous exhalation flow of 300 L/min over a period of 30 s.

When the exhalation valve housing is attached to the faceblank, it shall withstand axially a tensile force of 10 N applied for 10 s.

Note 14: No exhalation valve.

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7.16 Breathing resistance

Pass¹⁵

Classification	Maximum permitted resistance (mbar)		
	Inhalation		Exhalation
	30 L/min	95 L/min	160 L/min
FFP1	0.6	2.1	3.0
FFP2	0.7	2.4	3.0
FFP3	1.0	3.0	3.0

Note 15: FFP2 respirator. Test results are shown in Annex A Table 7.16.

7.17 Clogging

N/A¹⁶

7.17.2 Breathing resistance

7.17.2.1 Valved particle filtering half masks

After clogging the inhalation resistances shall not exceed
 FFP1:4mbar, FFP2:5mbar, FFP3:7mbar at 95 L/min continuous flow;
 The exhalation resistance shall not exceed 3mbar at 160 L/min continuous flow.

7.17.2.2 Valveless particle filtering half masks

After clogging the inhalation and exhalation resistances shall not exceed
 FFP1:3mbar, FFP2:4mbar, FFP3:5mbar at 95 L/min continuous flow.

7.17.3 Penetration of filter material

	Sodium chloride test 95 L/min	Paraffin oil test 95 L/min
FFP1	≤20%	≤20%
FFP2	≤6%	≤6%
FFP3	≤1%	≤1%

Note 16: Single shift use only.

7.18 Demountable parts

N/A¹⁷

All demountable parts (if fitted) shall be readily connected and secured, where possible by hand.

Note17: No demountable parts.

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9 Marking

Not tested¹⁸

9.1 Packaging

The following information shall be clearly and durably marked on the smallest commercially available packaging or legible through it if the packaging is transparent.

9.1.1 The name, trademark or other means of identification of the manufacturer or supplier.

9.1.2 Type-identifying marking.

9.1.3 Classification

The appropriate class(FFP1, FFP2 or FFP3) followed by a single space and then:"NR" if the particle filtering half mask is limited to single shift use only. Example: FFP3 NR, or "R" if the particle filtering half mask is re-usable.

Example: FFP2 R D.

9.1.4 The number and year of publication of this European Standard.

9.1.5 At least the year of end of shelf life. The end of shelf life maybe informed by a pictogram as shown in Figure12a, where yyyy/mm indicates the year and month.

9.1.6 The sentence ' see information supplied by the manufacturer ', at least in the official language(s) of the country of destination, or by using the pictogram as shown in Figure 12b.

9.1.7 The manufacturer's recommended conditions of storage (at least the temperature and humidity) or equivalent pictogram, as shown in Figures 12c and 12d.

9.1.8 The packaging of those particle filtering half masks passing the dolomite clogging test shall be additionally marked with the letter "D" .This letter shall follow the classification marking preceded by a single space.

9.2 Particle filtering half mask

Particle filtering half masks complying with this European Standard shall be clearly and durably marked with the following:

9.2.1 The name, trademark or other means of identification of the manufacturer or supplier.

9.2.2 Type-identifying marking.

9.2.3 The number and year of publication of this European Standard.

9.2.4 Classification

The appropriate class (FFP1,FFP2 or FFP3) followed by a single space and then:"NR" if the particle filtering half mask is limited to single shift use only, Example: FFP3 NR, or "R" if the particle filtering half mask is re-usable.

Example:FFP2 R D.

9.2.5 If appropriate the letter D (dolomite) in accordance with clogging performance. This letter shall follow the classification marking preceded by a single space (see 9.2.4).

Examples FFP3 NR D, FFP2 R D

9.2.6 Sub-assemblies and components with considerable bearing on safety shall be marked so that they can be identified.

End of Test Results

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Annex A: Summarization of Test Data

Table 7.9.1-A Inward leakage test data

Test specification: EN 149:2001+A1:2009 Clause 8.5

Subject	Sample No.	Condition	Walk (%)	Head side/ side (%)	Head up/down (%)	Talk (%)	Walk (%)	Mean (%)
LDK	09	A.R	5.71	5.02	2.74	2.99	3.05	3.90
TYM	10	A.R	5.19	5.64	5.35	4.56	5.11	5.17
ZC	11	A.R	6.92	5.05	5.36	6.84	6.04	6.04
SY Y	12	A.R	3.91	3.63	4.04	3.64	4.07	3.86
WW	13	A.R	4.87	3.90	3.67	4.25	3.36	4.01
WNQ	14	T.C	3.61	3.10	3.42	4.86	3.18	3.63
CQW	15	T.C	5.94	5.52	6.07	5.88	5.11	5.70
CGF	16	T.C	6.81	6.93	6.18	8.33	5.95	6.84
YWJ	17	T.C	3.87	4.66	4.72	6.03	4.18	4.69
SXL	18	T.C	4.30	4.78	4.50	5.11	4.93	4.72
$\frac{50}{10}$ out of the 50 individual exercise results $\leq \frac{11}{8}$ % $\frac{10}{10}$ out of the 10 individual arithmetic means $\leq \frac{11}{8}$ %					Pass			

Table 7.9.1-B Facial dimension

Subject	Face Length (mm)	Face Width (mm)	Face Depth (mm)	Mouth Width (mm)
LDK	118	123	113	58
TYM	95	140	114	53
ZC	105	121	115	47
SY Y	106	132	104	55
WW	102	133	106	49
WNQ	106	135	110	80
CQW	112	128	111	52
CGF	105	122	112	57
YWJ	125	160	110	65
SXL	99	121	98	55

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Table 7.9.2 Penetration of filter material

Test specification: EN 149:2001+A1:2009 Clause 8.11

Aerosol	Condition	Sample No.	Penetration (%)	Assessment
Sodium chloride test	As received	19	0.77	Pass
		20	1.07	
		21	1.03	
	Simulated wearing treatment	22	1.20	
		23	1.40	
		24	1.66	
	Mechanical strength + Temperature conditioned	25	1.73	
		26	1.43	
		27	1.69	
Paraffin oil test	As received	28	2.17	
		29	2.45	
		30	2.08	
	Simulated wearing treatment	31	4.17	
		32	4.47	
		33	4.38	
	Mechanical strength + Temperature conditioned	34	5.57	
		35	5.43	
		36	5.60	
Flow conditioning: single filter: 95.0 L/min				

Table 7.11 Flammability

Test specification: EN 149:2001+A1:2009 Clause 8.6

Condition	Sample No.	Result	Assessment
As received	42	DNI	Pass
	43	DNI	
Temperature conditioned	44	DNI	
	45	DNI	

Remark: DNI=Did not ignite

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Table 7.12 Carbon dioxide content of the inhalation air

Test specification: EN 149:2001+A1:2009 Clause 8.7

Condition	Sample No.	Result	Assessment
As received	46	0.27 %	Pass
	47	0.28 %	
	48	0.27 %	

Table 7.16 Breathing resistance (mbar)

Test specification: EN 149:2001+A1:2009 Clause 8.9

	Flow rate	66					67					68					
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
As received	Inhalation	30 L/min	0.43	0.55	0.48	0.42	0.51	0.50	0.52	0.45	0.51	0.45	0.47	0.43	0.47	0.50	0.48
		95 L/min	1.45	1.66	1.46	1.38	1.58	1.45	1.40	1.62	1.54	1.39	1.49	1.44	1.50	1.55	1.51
	Exhalation	160 L/min	2.13	2.18	2.17	1.93	2.24	2.03	2.19	2.28	2.17	2.32	2.12	2.11	2.10	2.15	2.21
Simulated wearing treatment	Inhalation	30 L/min	0.44	0.45	0.48	0.49	0.44	0.51	0.47	0.53	0.51	0.47	0.50	0.51	0.57	0.54	0.45
		95 L/min	1.57	1.71	1.62	1.62	1.65	1.64	1.65	1.77	1.58	1.45	1.66	1.68	1.66	1.57	1.60
	Exhalation	160 L/min	2.10	2.15	2.28	2.03	2.20	2.13	2.14	2.18	1.98	2.17	2.17	2.30	2.12	2.11	2.05
Temperature conditioned	Inhalation	30 L/min	0.52	0.47	0.48	0.49	0.49	0.54	0.49	0.53	0.48	0.48	0.56	0.51	0.56	0.54	0.45
		95 L/min	1.60	1.61	1.72	1.57	1.55	1.66	1.69	1.58	1.44	1.52	1.72	1.74	1.66	1.59	1.60
	Exhalation	160 L/min	2.07	2.09	2.19	2.25	2.10	2.23	2.15	2.11	2.07	2.28	2.31	2.24	2.30	2.17	2.36
Assessment		Pass															

A: facing directly ahead; B: facing vertically upwards; C: facing vertically downwards; D: lying on the left side; E: lying on the right side

End of Annex A

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Annex B: Estimates of the uncertainty of measurement

Clause	Test	Uncertainty
7.4	Packaging	Not applicable
7.5	Material	See Note 1
7.6	Cleaning and disinfecting	Not applicable
7.7	Practical performance	See Note 1
7.8	Finish of parts	Not applicable
7.9.1	Total inward leakage	± 5.0%
7.9.2	Penetration of filter material-Sodium chloride	± 4.5%
7.9.2	Penetration of filter material-Paraffin oil	± 6.0%
7.10	Compatibility with skin	Not applicable
7.11	Flammability	See Note 1
7.12	CO ₂ content of the inhalation air	± 7.0%
7.13	Head harness	Not applicable
7.14	Field of vision	See Note 1
7.15	Exhalation valve(s)	See Note 1
7.16	Breathing resistance	± 4.0%
7.17.2	Breathing resistance after clogging	± 7.5%
7.17.3	Filter penetration after clogging - Sodium chloride	± 4.5%
7.17.3	Filter penetration after clogging - Paraffin oil	± 6.0%
7.18	Demountable parts	Not applicable

Note 1 The acceptance criterion for this test is a straightforward “Pass/Fail”, rather than a numerical value. Consequently, as there is no value to be reported, uncertainty has not been reported either.

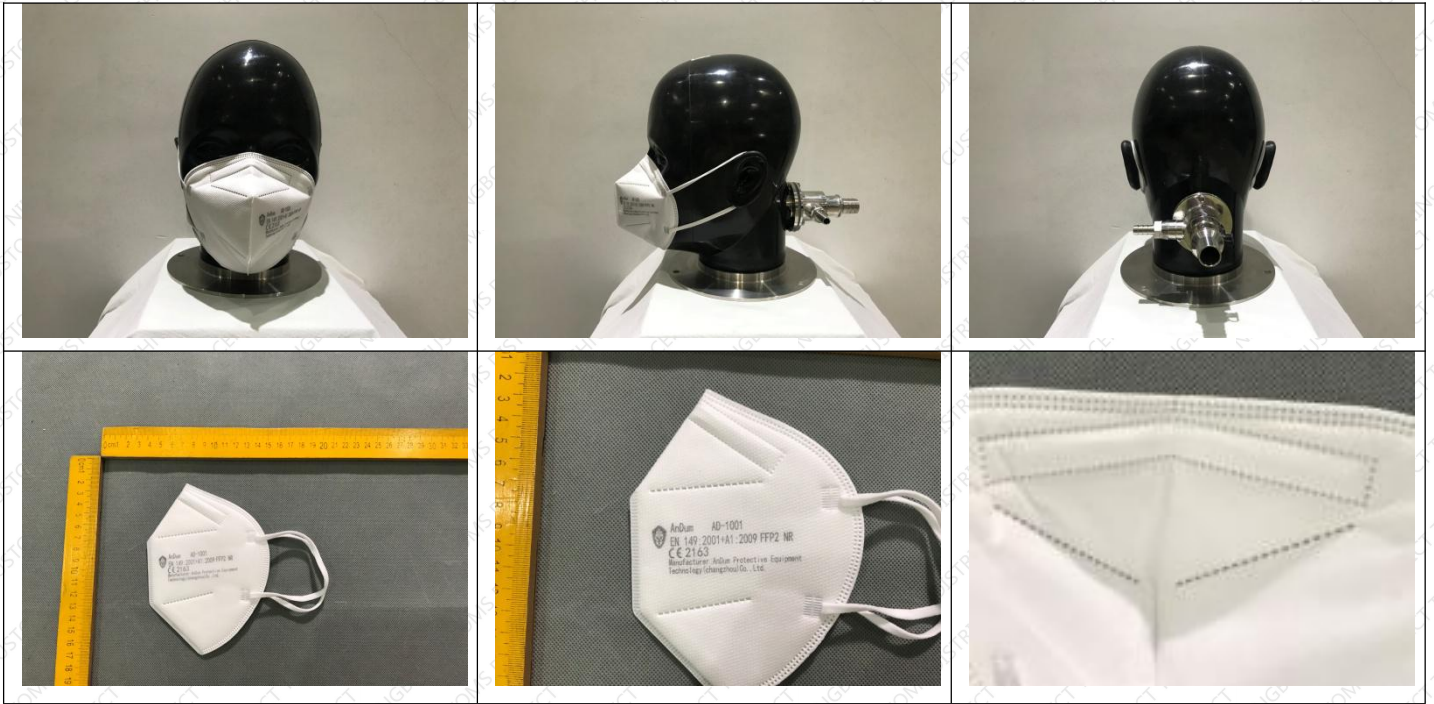
Note 2 The uncertainty value is based on a standard uncertainty multiplied by a coverage factor $k=2$, which provides for a confidence level of approximately 95%. Values expressed as a percentage (%) are relative.

Note 3 It should be noted that the above values have not been taken into account when making assessment to the pass/fail criteria.

End of Annex B

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Annex C: Photos of sample



End of Annex C