

3I CORPORATION LIMITED  
UNIT B,4/F, 114 KING FULK STREET, SAN PO KONG, KOWLOON, HONGKONG

The following sample(s) was/were submitted and identified on behalf of the client as:

Sample Description : (A)surgical mask  
Sample color : White  
Composition : Meltblown/spunbond polypropylene  
Style no : KF101  
Supplier : 3I CORPORATION LTD  
Manufacturer : 3I CORPORATION LTD

Sample Receiving Date : Apr 28, 2020  
Testing Period : Apr 28, 2020 - Jun 15, 2020

Test Result(s) : Unless otherwise stated the results shown in this test report refer only to the sample(s) tested, for further details, please refer to the following page(s).

Test Performed : Selected test(s) as requested by applicant

**Conclusion:**

Sample No.	Recommendation level
(A)	FFP1 NR

Signed for and on behalf of  
SGS-CSTC Standards Technical Services (Qingdao) Co., Ltd.

Angel Guo (Account Executive)



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**Test Result**

**Respiratory Protective Devices- Filtering Half Masks to Protect against Particles- Requirements, Testing, Marking\***

(EN 149:2001+A1:2009)

**Clause 7.4 Packaging\***

(EN 149:2001+A1:2009 Clause 8.2)

Test Requirement	Results	Comment
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.	Comply	Pass

**Clause 7.5 Material\***

(EN 149:2001+A1:2009, Clause 8.2 & 8.3.1 & 8.3.2)

Test Requirement	Results	Comment
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.	Comply	Pass
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.	Comply	
When conditioned in accordance with 8.3.1 and 8.3.2 the particle filtering half mask shall not collapse.	Comply	
Any material from the filter media released by the air flow through the filter shall not constitute a hazard or nuisance for the wearer.	Comply	

**Clause 7.6 Cleaning and Disinfecting\***

(EN 149:2001+A1:2009, Clause 8.4 & 8.5 & 8.11)

Test Requirement	Results	Comment
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. With reference to 7.9.2, after cleaning and disinfecting the re-usable particle filtering half mask shall satisfy the penetration requirement of the relevant class.	Not applicable (Not designed to be re-usable)	N.A.



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**Clause 7.7 Practical Performance\***

(EN 149:2001+A1:2009, Clause 8.4)

Test Requirement	Results	Comment
The particle filtering half mask shall undergo practical performance tests under realistic conditions. These general tests serve the purpose of checking the equipment for imperfections that cannot be determined by the tests described elsewhere in this standard.	No imperfections	Pass

**Clause 7.8 Finish of Parts\***

(EN 149:2001+A1:2009, Clause 8.2)

Test Requirement	Results	Comment
Parts of the device likely to come into contact with the wearer shall have no sharp edges or burrs.	No sharp edges or burrs	Pass

**Clause 7.9.1 Total Inward Leakage\***

(EN 149:2001+A1:2009, Clause 8.5)

Test Requirement	Results	Comment
The total inward leakage consists of three components: face seal leakage, exhalation value leakage(if exhalation value fitted) and filter penetration. 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 x 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	Detail refer to Appendix 1	Pass

**Appendix 1: Summarization of Test Data**

Inward Leakage Test Data

Subject	Sample No.	Condition	Walk(%)	Head Side/side(%)	Head up/down(%)	Talk(%)	Walk(%)	Mean(%)
1#	1	A.R.	13.2	16.0	15.5	16.0	12.9	14.7
2#	2	A.R.	12.9	17.3	16.0	16.5	12.3	15.0
3#	3	A.R.	13.4	15.9	15.5	15.6	13.8	14.8
4#	4	A.R.	13.3	15.6	15.6	15.9	12.9	14.7
5#	5	A.R.	13.6	16.4	17.3	17.7	13.9	15.8
6#	6	T.C.	13.8	16.9	17.1	17.1	14.6	15.9
7#	7	T.C.	13.1	16.9	15.8	15.2	13.3	14.9
8#	8	T.C.	13.8	15.7	16.4	16.2	14.6	15.3
9#	9	T.C.	13.1	15.2	16.1	15.8	12.5	14.5
10#	10	T.C.	13.9	17.1	17.2	15.7	13.4	15.5
50 out of the 50 individual exercise results ≤ 25 %						Pass		
10 of the 10 individual arithmetic means ≤ 22%								



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Facial Dimension

Subject	Face length(mm)	Face Width(mm)	Face Depth(mm)	Mouth Width(mm)
1#	120	130	109	59
2#	122	140	115	65
3#	119	160	139	55
4#	112	122	119	63
5#	110	130	118	60
6#	115	119	110	59
7#	112	123	113	55
8#	103	130	100	50
9#	118	139	130	63
10#	120	135	125	50



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**Clause 7.9.2 Penetration of Filter Material\***

(EN 149:2001+A1:2009, Clause 8.11 & EN 13274-7:2019)

Test Requirement			Results	Comment
The penetration of the filter of the particle filtering half mask shall meet the requirements of the following table.			Detail refer to Appendix 2	Pass
Classification	Maximum penetration of test aerosol			
	Sodium chloride test 95 l/min	Paraffin oil test 95 l/min		
	% max.	% max.		
FFP1	20	20		
FFP2	6	6		
FFP3	1	1		

**Appendix 2: Summarization of Test Data**

Penetration of filter material

Aerosol	Condition	Sample No.	Penetration (%)	Assessment
Sodium chloride test	As received	11	4.8	Pass
		12	4.9	
		13	4.8	
	Simulated wearing treatment	14	4.9	
		15	4.8	
		16	4.9	
	Mechanical strength +Temperature conditioned	17	5.1	
		18	5.2	
		19	5.1	
Paraffin oil test	As received	20	14.0	
		21	15.5	
		22	14.5	
	Simulated wearing treatment	23	15.2	
		24	14.8	
		25	14.3	
	Mechanical strength +Temperature conditioned	26	16.6	
		27	18.9	
		28	19.3	
Flow conditioning : Single filter: 95.0 L/min				



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**Clause 7.10 Compatibility with Skin\***

(EN 149:2001+A1:2009, Clause 8.4 & 8.5)

Test Requirement	Results	Comment
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.	No irritation or any other adverse effect to health	Pass

**Clause 7.11 Flammability\***

(EN 149:2001+A1:2009, Clause 8.6)

Test Requirement	Results	Comment
The material used shall not present a danger for the wearer and shall not be of highly flammable nature When tested, the particle filtering half mask shall not burn or not to continue to burn for more than 5 s after removal from the flame.	Detail refer to Appendix 3	Pass

**Appendix 3: Summarization of Test Data**

Flammability

Condition	Sample No.	Result	Assessment
As received	29	Burn for 0.1s	Pass
	30	Burn for 0.1s	
Temperature conditioned	31	Burn for 0.1s	
	32	Burn for 0.1s	

**Clause 7.12 Carbon Dioxide Content of The Inhalation Air\***

(EN 149:2001+A1:2009, Clause 8.7)

Test Requirement	Results	Comment
The carbon dioxide content of the inhalation air (dead space) shall not exceed an average of 1,0 % (by volume)	Detail refer to Appendix 4	Pass

**Appendix 4: Summarization of Test Data**

Carbon Dioxide Content of The Inhalation Air

Condition	Sample No.	Result	Assessment
As received	33	0.5835%	Pass
	34	0.5940%	
	35	0.5960%	
		Mean value :0.59%	



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**Clause 7.13 Head Harness\***

(EN 149:2001+A1:2009, Clause 8.4 & 8.5)

Test Requirement	Results	Comment
The head harness shall be designed so that the particle filtering half mask can be donned and removed easily.	Comply	Pass
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.	Comply	

**Clause 7.14 Field of Vision \***

(EN 149:2001+A1:2009, Clause 8.4)

Test Requirement	Results	Comment
The field of vision is acceptable if determined so in practical performance tests.	Comply	Pass

**Clause 7.15 Exhalation Valve(s)\***

(EN 149:2001+A1:2009, Clause 8.2 & 8.9.1 & 8.3.4 & 8.8)

Test Requirement	Results	Comment
(a) A particle filtering half mask may have one or more exhalation valve(s), which shall function correctly in all orientations.	Not applicable due to exhalation valve	N.A
(b) 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.	Not applicable due to exhalation valve	
(c) 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.	Not applicable due to exhalation valve	
(d) When the exhalation valve housing is attached to the faceblank, it shall withstand axially a tensile force of 10N applied for 10 s.	Not applicable due to exhalation valve	



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**Clause 7.16 Breathing Resistance\***

(EN 149:2001+A1:2009, Clause 8.9)

Test Requirement				Results	Comment
The penetration of the filter of the particle filtering half mask shall meet the requirements of the following table.				Detail refer to Appendix 5	Pass
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		

**Appendix 5: Summarization of Test Data**

**Breathing resistance (mbar)**

As received	Flow rate		Specimen No.36					Specimen No.37					Specimen No.38				
			A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Inhalation	30 l/min		0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.3
		95 l/min	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.7
	160 l/min	1.2	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Exhalation	30 l/min		0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2
		95 l/min	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.7
	160 l/min	1.2	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.2	
Simulated wearing treatment	30 l/min		0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2
		95 l/min	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.7
	160 l/min	1.2	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.2	
Temperature conditioned	30 l/min		0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
		95 l/min	0.7	0.6	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.7
	160 l/min	1.2	1.3	1.2	1.3	1.2	1.3	1.2	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.2	
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



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**Clause 7.17 Clogging\***

(EN 149:2001+A1:2009, Clause 8.9 & 8.10)

Test Requirement	Results	Comment																				
<p><u>Clause 7.17.2 Breathing resistance</u>  <u>Valved particle filtering half masks:</u>                      After clogging the inhalation resistances shall not exceed:                      FFP1: 4 mbar, FFP2: 5 mbar, FFP3: 7 mbar at 95L/min continuous flow                      The exhalation resistance shall not exceed 3 mbar at 160 L/min continuous flow.</p> <p><u>Valveless particle filtering half masks:</u>                      After clogging the inhalation and exhalation resistances shall not exceed:                      FFP1: 3 mbar, FFP2: 4 mbar, FFP3: 5 mbar at 95L/min continuous flow</p>	Optional for single shift device only	N.A																				
<p><u>Clause 7.17.3 Penetration of filter material</u>                      All types (valved and valveless) of particle filtering half masks claimed to meet the clogging requirement shall also meet the requirements.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Classification</th> <th colspan="2">Maximum penetration of test aerosol</th> </tr> <tr> <th>Sodium chloride test 95 l/min</th> <th>Paraffin oil test 95 l/min</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">%</td> <td style="text-align: center;">%</td> </tr> <tr> <td></td> <td style="text-align: center;">max.</td> <td style="text-align: center;">max.</td> </tr> <tr> <td>FFP1</td> <td style="text-align: center;">20</td> <td style="text-align: center;">20</td> </tr> <tr> <td>FFP2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">6</td> </tr> <tr> <td>FFP3</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	Classification	Maximum penetration of test aerosol		Sodium chloride test 95 l/min	Paraffin oil test 95 l/min		%	%		max.	max.	FFP1	20	20	FFP2	6	6	FFP3	1	1	Optional for single shift device only	N.A
Classification		Maximum penetration of test aerosol																				
	Sodium chloride test 95 l/min	Paraffin oil test 95 l/min																				
	%	%																				
	max.	max.																				
FFP1	20	20																				
FFP2	6	6																				
FFP3	1	1																				

**Clause 7.18 Demountable Parts\***

(EN 149:2001+A1:2009, Clause 8.2)

Test Requirement	Results	Comment
All demountable parts (if fitted) shall be readily connected and secured, where possible by hand	Not applicable	N.A

\* Test items were carried out by (Jiangsu Guojian Testing Technology Co., Ltd) (CNAS L10118) assessed as competent, were not included in the CNAS Accredited Schedule for our laboratory.

**pH Value**

Test Method:According to ISO 3071:2020; 0.1mol/l KCL extraction

pH value	6.12	4.0 – 7.5	PASS
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Note: pH value of extraction medium 5.81  
 Temperature of the extraction solution 22.3°C



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Test	Uncertainty
Total inward leakage	2.98%
Penetration of filter material	1.00%
Flammability	1.00%
Carbon dioxide content of the inhalation air	0.93%
Breathing resistance	1.90%
pH Value	3.98%

Sample photo



The statement of conformity in this test report is only based on measured values by the laboratory and does not take their uncertainties into consideration.

\*\*\*End of Report\*\*\*



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