

BILIO

TEST REPORT

SCOPE OF WORK

Performance Testing of Face Masks to
*ASTM F2100 Standard Specification for Performance of
Materials Used in Medical Face Masks, 2019 Edition*

REPORT NUMBER

104323028CRT-001

ISSUE DATE

June 16, 2020

PAGES

6

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TEST REPORT

Issued June 16, 2020

Intertek Report No. 104323028CRT-001
Intertek Project No. G104323028

CLIENT

Bilio
950 3rd Street
Oakland, CA 94607
USA

TEST STANDARD

ASTM F2100 *Standard Specification for Performance of Materials Used in Medical Face Masks*, 2019 Edition

AUTHORIZATION

Quote Number: Qu-01068446-5

SAMPLE IDENTIFIED BY THE CLIENT AS

Product Type: Face Masks
Brand Name: Bilio

SAMPLE INFORMATION

Date(s) Samples Received: May 5, 2020 through May 18, 2020
Date(s) of Testing: June 3, 2020 through June 16, 2020

TEST INFORMATION

ASTM F2101 <i>Bacterial Filtration Efficiency</i>	Test data attached
EN 14683:2019 Annex C <i>Differential Pressure</i>	Test data attached
ASTM F2299 <i>Sub-Micron Particulate Filtration</i>	Test data attached
ASTM F1862 <i>Resistance to Penetration by Synthetic Blood</i>	Not tested under this project
16 CFR 1610 <i>Flammability</i>	Not tested under this project

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Issued June 16, 2020

Intertek Report No. 104323028CRT-001

Intertek Project No. G104323028

SECTION 1

CONCLUSION

This test report represents the testing covered by proposal number Qu-01068446-5.

The observations and test results in this report are relevant only to the sample tested. Intertek makes no representations or warranties, express or implied, regarding units that were not tested including, but not limited to, units that may be part of the same lot.

If there are any questions regarding the results contained in this report, or any other services offered by Intertek, please do not hesitate to contact the undersigned.

Please note this Test Report does not represent authorization for the use of any Intertek certification marks.

Project Owner: Benjamin Hanna

Title: Project Engineer

Signature: 

Date: June 16, 2020

Project Reviewer: Jason Allen

Title: Technical Advisor

Signature: 

Date: June 16, 2020

REPORT REVISIONS

Date / Project #	Project Handler/ Reviewer	Description of Change
		None

TEST REPORT

SECTION 2

ASTM F2100-19 TEST DATA

BACTERIAL FILTRATION EFFICIENCY (BFE), ASTM F2101-19

Specimens conditioned for 4-hours at 20.4-22.1°C and 83-86%RH

Test Set-up Information	
Area of Test Specimen (cm ²)	48.3
Specimen Side Facing Challenge	Inside of Mask
Flow Rate (LPM)	28.3
Averaged + Control Plate Count	2363
Mean Particle Size (µm)	2.77, 2.79

Medical Face Mask Barrier Testing					
Plate Count	Mask Specimen				
Stage	1	2	3	4	5
Stage 1	4	4	5	1	3
Stage 2	3	7	1	3	5
Stage 3	10	9	2	11	10
Stage 4	50	88	60	119	97
Stage 5	108	159	101	193	137
Stage 6	1	2	4	3	4
Plate Count Total	176	269	173	330	256
% BFE	92.55	88.61	92.68	86.03	89.16

TEST EQUIPMENT INFORMATION

Description	Control Number	Calibration Date	Calibration Due
Conditioning Chamber	308-H252	2/26/2020	2/26/2021
Timer	308-H358	1/13/2020	1/13/2021
Pipette	308-H294	2/26/2020	2/26/2021
Analytical Balance	308-S268	12/2/2019	12/2/2020

Date of Testing	6/3/2020
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SECTION 3

ASTM F2100-19 TEST DATA

DIFFERENTIAL PRESSURE, EN 14683:2019 ANNEX C

Specimens conditioned for 4-hours at 20-22°C and 82-86%RH

Specimens tested at 20-22°C and 55-62% RH

Medical Face Mask Barrier Testing		
Specimen	ΔP (mm H ₂ O/cm ²)	Flow Rate (L/min)
1	5.4	8
2	5.3	8
3	5.4	8
4	5.6	8
5	5.9	8
Avg.	5.5	8

TEST EQUIPMENT INFORMATION

Description	Control Number	Calibration Date	Calibration Due
Conditioning Chamber	308-H252	2/26/2020	2/26/2021
Flow Meter	308-H384 & H385	4/8/2020	4/8/2021
Ambient Conditions Monitor	308-A402	6/24/2019	6/24/2020
Digital Manometer	308-H383	7/19/2019	7/19/2020

Date of Testing	6/4/2020
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SECTION 4

ASTM F2100-19 TEST DATA

PARTICULATE FILTRATION EFFICIENCY (PFE), ASTM F2299-17



Test Method: ASTM F2299/F2299M-03 (reapproved 2017) Determining the Initial Efficiency of Materials Used in Medical Face Masks to Penetration by Particulates Using Latex Spheres

Testing parameters per ASTM F2100-19 Standard Specification for Performance of Materials Used in Medical Face Masks

IBR JN: 21681E

Performed for: Intertek
Location: Courtland, NY
Contact: Benjamin Hanna

Date: 15 June 2020

Description of Samples: Flatsheet media, G104323028, Bilio, CRT2005181446-001

Test Area: 45.22 cm²
Source: Intertek
Date Samples Received: 20 May 2020

Fluid: Air
Flow Rate : 28.3 lpm
Face Velocity: 10.4 cm/s
Challenge: 0.1µm (±15% CV) Latex Microspheres (Neutralized)



Filter ID	Differential Pressure (mmH ₂ O)	Port	Particles / 2 ft ³	
21681-21	23.4	Upstream	7842950	Temp: 21.5 °C
		Downstream	1103723	RH: 40.7 %
			Efficiency (%)	BP: 745 mmHg
21681-22	24.9	Upstream	7898525	Temp: 21.6 °C
		Downstream	1169301	RH: 40.5 %
			Efficiency (%)	BP: 745 mmHg
21681-23	26.7	Upstream	7546700	Temp: 21.7 °C
		Downstream	1222042	RH: 41.3 %
			Efficiency (%)	BP: 745 mmHg
21681-24	26.9	Upstream	6847325	Temp: 21.8 °C
		Downstream	1195097	RH: 40.9 %
			Efficiency (%)	BP: 745 mmHg
21681-25	24.1	Upstream	6801125	Temp: 21.6 °C
		Downstream	1042587	RH: 40.6 %
			Efficiency (%)	BP: 745 mmHg

Notice: These data relate only to the samples tested. This report may be copied only in its entirety.
Performed By: DN Data Location: DN259

Manufacturer	Model Number	Serial Number	IBR ID	Range of Use	Cal Due
Alicat Scientific	M-50SLPM-D/5M	99929	AF-113	5-45 SLPM	9/3/2020
Dwyer	DHII-007	Date Code: A31X	MAN-31	0.1-10.0 inH ₂ O	2/17/2021
Vaisala	HMT330	L5220038	RH-206	12-75%RH/16-27C	1/9/2021
Testo	511	39111389/505	MAN-51	300-1200 hPa	8/29/2020
PMS	Lasair III 110	116514	N/A	0.1-5.0 µm	6/26/2020
PMS	Lasair III 110	102709	N/A	0.1-5.0 µm	9/1/2020

Reviewed By: 
Daniel R. Miller, Air Labs Manager

Revision	Editorial / Technical	Description	Approved By	Release Date
		Initial release	DRM	6/16/2020