Test Report No. T16612-01-1 Issue 1
*Custom testing derived from*
*ASTM F3502-21 Standard Specification for Barrier Face Coverings*
*Subsections 8.1 Sub-Micron Particulate Filtration Efficiency and 8.2 Airflow Resistance*
Happy Masks
Model 3
04 November 2021

Authorized by:

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Manager
Respiratory and Chemical Protective Equipment

Performed by:

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ICS® INC. LABORATORIES

Issued to: Happy Masks
3826 Grand View Blvd. Unit 1653
Los Angeles, CA 90066
USA

Date: 04 November 2021
Report: T16612-01-1
Issue: 1


**Summary:**

Five Model 3 face coverings underwent custom testing for resistance to inhalation airflow and sub-micron particulate filtration efficiency. The testing was generally derived from ASTM F3502-21, the Standard Specification for Barrier Face Coverings. Inhalation airflow resistance and sub-micron particulate filtration efficiency were run at 6 LPM at the request of the client. The samples were submitted by Happy Masks for research and development purposes. The results of the testing are outlined in the following pages.

**Objectives:**

Custom Testing Derived From: ASTM F3502-21, "Standard Specification for Barrier Face Coverings" Edition approved: 15 February, 2021 **(Five resistance and five filtration efficiency measurements @ 6 LPM)**

**Materials:**

| *Model Number* | *Description* | *Qty* |
|---|---|---|
| Model 3 | Cloth facemasks | 5 |

Date provided by the Client: 02 November 2021
Date Testing Authorized: 01 November 2021
Dates of tests: 04 November 2021
Manufacturer/Supplier Happy Masks

**Equipment:**

*Humidity chamber*, Weisstechnik Conditioning Chamber (EQ1329-01)
*TSI 8130A Filter Tester*, test bench configured for sodium chloride aerosol (EQ1325-01)
*Sodium Chloride*, 99+%, Fisher Chemical, (C0015-03)

**Procedure:**

All tests were conducted in a standard laboratory atmosphere unless otherwise specified. The equipment and instrument calibrations were verified current and within specification prior to use. Pressure transducer response of the instrument was validated against a standard provided by the manufacturer. The materials for assessment were inventoried, numbered, and logged upon receipt.

The custom filter efficiency test and airflow resistance test were derived from the procedure outlined in ASTM F3502-21, subsection 8.1 and subsection 8.2, respectively. The five samples provided by the client each underwent testing. The face coverings were conditioned at 85 % +/- 5 % relative humidity and 38 $^{o}$C +/- 2.5 $^{o}$C for 25 hours prior to testing.

The aerosol challenge was turned off prior to the airflow resistance measurement. Each face covering was assembled into a fixture and subjected to a challenge airflow rate of 6 LPM at the request of the client. The flow rate and resistance data were recorded for each sample.

**Procedure (cont.):**

The face coverings were then challenged with a sodium chloride aerosol, with a challenge concentration less than 200 mg/m$^3$, neutralized to a Boltzmann equilibrium state at 25 °C +/-5 °C and a relative humidity of 30 % +/- 10 %. Particle size distribution was verified to be a count median diameter of 0.075 +/- 0.020 microns, with a geometric standard deviation not exceeding 1.86. The evaluation was performed by depositing sodium chloride aerosol at an airflow rate of 6 LPM at the request of the client. A spacer screen with > 70 % open area was placed below the samples. The stabilization time was set to 10 s. The measurement time was set to 10 s.

Flow rate was maintained at 6 LPM for the efficiency testing. The flow rate, resistance, and penetration data were recorded for each sample. Results are reported with resistance measured on the validated instrument and efficiencies rounded to the tenth's place for both values.

**Results:**

The results of the barrier face covering performance testing at the client-requested airflow rate of 6 LPM are provided in Table I.

**Table I**

Barrier Face Covering Performance Results @ 6 LPM – Model 3

| ***Sample ID*** | ***Flow Rate (LPM)*** | ***Initial Resistance ($mmH_2O$)*** | ***Instantaneous Penetration (%)*** | ***Instantaneous Filter Efficiency (%)*** |
|---|---|---|---|---|
| | | | | |
| **Model 3-01** | 6 | 0.6 | 8.4 | 91.6 |
| **Model 3-02** | 6 | 0.6 | 3.7 | 96.3 |
| **Model 3-03** | 6 | 0.5 | 3.5 | 96.5 |
| **Model 3-04** | 6 | 0.6 | 5.7 | 94.3 |
| **Model 3-05** | 6 | 0.5 | 4.5 | 95.5 |
| **Client Specification:** | **6** | | | |

**Photographs:**

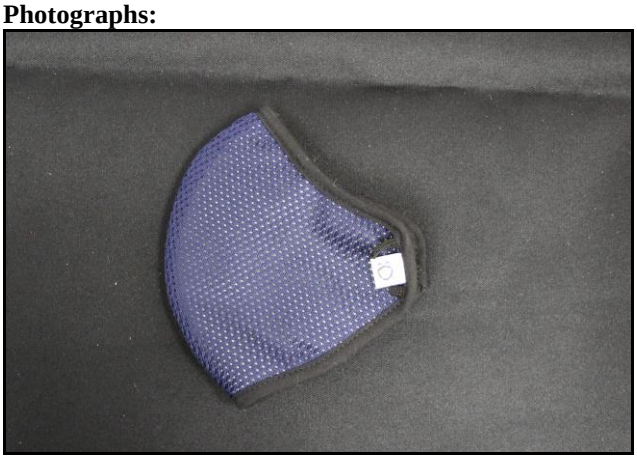

**Figure 1:** Model 3 Face coverings as submitted by the client

**Figure 2:** Typical sample affixed to test plate

**Figure 3.** Typical sample under test

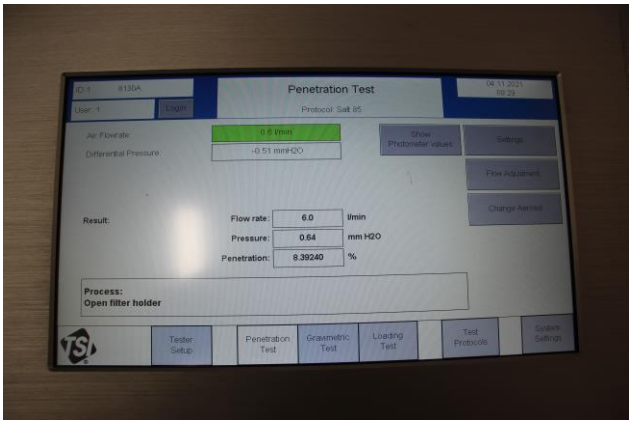


**Figure 4**. Exemplar TSI 8130 A result screen

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3. ICS shall keep documents and information related to Client confidential and will not disclose any such information to third parties without written consent. ICS will disclose such information in response to compulsory legal process, (only after providing Client with notice-of and/or a copy of such process).
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7. ICS shall retain copies of testing job files (including reports) for a period of at least six (6) years and when applicable, evidentiary test samples for a length of time agreed to or deemed appropriate. If Client requests additional copies of Reports during this period, an additional charge will apply for the preparation and delivery of such reports.
8. Test reports are valid for certification purposes for one year from date of issue, inclusive of retest or variant additions, which must be performed within one year of date of issue to avoid full retest.
9. Client is responsible for procuring, at its cost, insurance protecting the value of its property, extending to provided samples.
10. For the safety of our personnel, Client must advise if samples are known or suspected to contain hazardous substances. Safety Data Sheets must be provided upon request.
11. ICS represents that Services shall be performed according to terms and specification agreed to by Client, and in a manner consistent with good laboratory practice. No other Representations to client, express or implied, and no warranty or guarantee is included or intended in this agreement, or in any other report or document related to the services. ICS does not guarantee product performance or compliance.
12. Schedules are confirmed upon acceptance of quotation. All reasonable efforts will be made to comply with provided timeline. Guarantees are neither implied nor promised.
13. Certain work may be subcontracted to ICS-approved laboratories as required or applicable. Client will be notified of this in advance.
14. Client agrees to pay any and all additional costs associated with unexpected or above-standard communications and/or consultations with Client or third parties as designated by Client.
15. Client agrees to pay any and all additional costs for work additional to the original scope of work as agreed to by Client.
16. Client understands and agrees that ICS, in entering into this Contract and by performing services hereunder, does not assume, abridge, abrogate or undertake to discharge any duty or responsibility of Client to any other party or parties. No one other than Client shall have any right to rely on any Report or other representation or conduct of ICS and ICS disclaims any obligations of any nature whatsoever with respect to such third parties.
17. For statements of conformity (pass/fail/"meets") regarding qualitative test results, ICS utilizes simple acceptance as its basis. For most statements of conformity relating to quantitative test results, the decision rule and associated uncertainty is inherent in the standard method. As such, simple acceptance is typically applied. Results on or near pass/fail thresholds or otherwise upon Client request or appeal will be evaluated with reference to the measurement uncertainty of relevant testing practices, equipment and other inputs/variables.
18. Client agrees, in consideration of ICS undertaking to perform the test(s) hereunder, to protect, defend and indemnify ICS from any and all claims, damages, expenses either direct or consequential for injuries to persons or property arising out of or in consequence of the performance of the testing, inspection and reporting hereunder and/or the performance of the products tested or inspected hereunder, unless caused by the negligence of ICS.
19. It is agreed that if ICS should be found liable for any losses or damages attributable to the services hereunder in any respect, its liability shall not exceed the amount of the fee paid by Client for services rendered and Client's sole remedy at law or in equity shall be the right to recover that sum.
20. Quotations are valid for 30 days from date of issue. Standard Terms: 30% Laboratory/Testing fees invoiced and payable upon acceptance of quotation. 15 days net. Any change to these terms requires written approval by the President, Executive Vice President or Accounting Manager. ICS retains the right to require prepayment in full at any time. Cancelled jobs will be invoiced for work performed and/or set-up costs incurred. All jobs will be assessed a $25 sample disposition fee. Shipping costs over $25 incurred by ICS for sample returns will be invoiced at cost +10%.
21. ICS hereby objects to any conflicting terms contained in any order, acceptance or other subsequent correspondence submitted by Client.
22. In the event that payment is not received within 15 days of invoice date, Client agrees to pay a late payment charge on the unpaid balance equal to 1-1/2% per month or the maximum charge allowed by law, whichever is less, and all costs and expenses, including attorney's fees where recovery of the same is not prohibited by law, incurred by ICS in collecting such invoices.
23. All costs associated with compliance with any subpoena (s) for documents, testimony in a court of law, or for any other purpose relating to work performed by ICS in connection with work performed for that Client, shall be paid by Client. Client shall also pay costs related to deposition and trial testimony.
24. Cancelled/discontinued orders: Client responsible for all administrative and testing charges up to point of cancellation.