

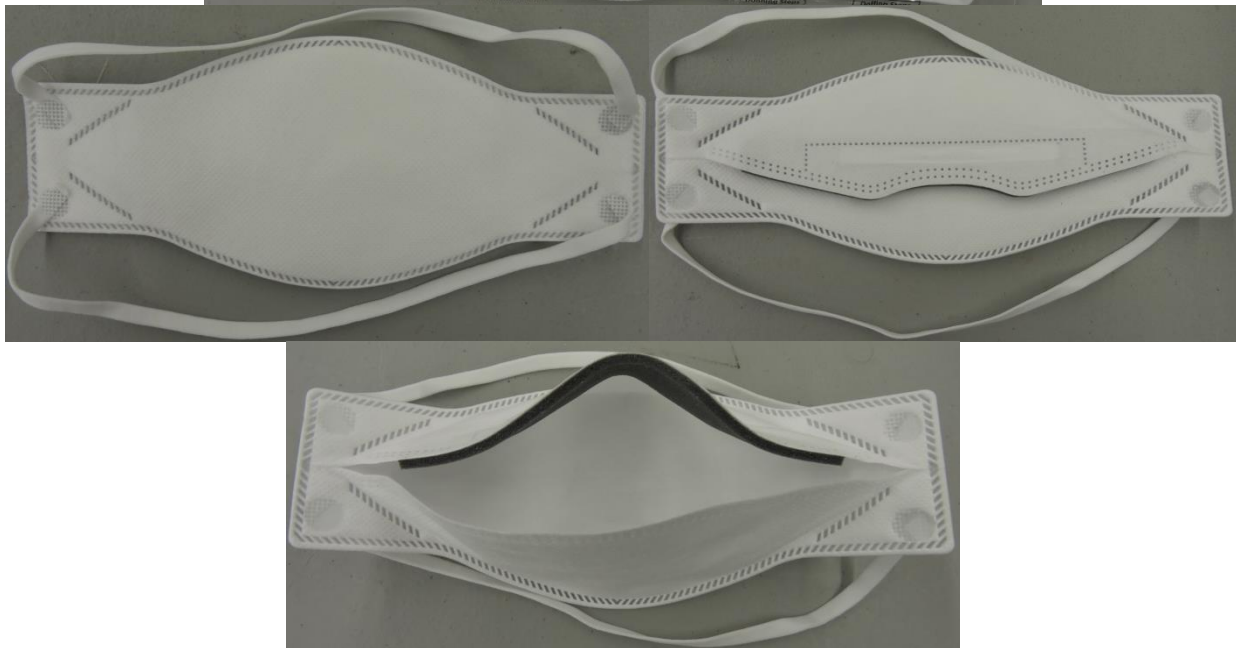
Report For: Ronco
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 Concord, Ontario
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Laboratory #: 883284-22
Report Date: FINAL
 March 30, 2022
Received Date: March 2, 2022

Attention: Dariush Firouzi
Specimen: #1: 6225 Flat Folded N95 Respirators

TEST REPORT

One specimen, consisting of respirators was submitted to CMTL for assessment of headstrap strength, airflow resistance, particulate filter efficiency, fluid resistance and flammability, to evaluate acceptability with CSA Z94.4.1:21. The headstrap strength test was performed at the CMTL Head Office.



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Per Steve Brown
 Authorized By Stephen Brown
 Per Iwona Sawczak
 Technician, Iwona Sawczak



Performance of Filtering Respirators per
CSA Z94.4.1:21

Characteristic	Clause	Barrier	Summary Results
Particle Filtration Efficiency (%)	6.3.3	≥95.00	Pass
Mechanical Headstrap Strength, Observations and Proof Load (Newtons per attachment point)	5.9.1	≥10	Pass
Airflow (Inhalation) Resistance, mmH ₂ O (Pa)	6.3.2	≤10.2 (100)	Pass
		≤17.8 (175)	Pass
		≤35.0 (343)	Pass
Airflow (Exhalation) Resistance, mmH ₂ O (Pa)	6.3.2	≤10.2 (100)	Pass
		≤17.8 (175)	Pass
		≤25.0 (245)	Pass
Flammability, Class	6.3.4.3	1	Pass
Fluid Resistance maximum pressure in mmHg (kPa) for pass result	6.3.4.2	160 (21.3)	Pass

N/A = Non-Applicable



PARTICLE FILTRATION EFFICIENCY

Twenty-five submitted specimens were evaluated for particle filtration efficiency in accordance with CSA Z94.4.1:21, section 6.3.3 test procedure to evaluate acceptability with requirements for CA-N-type filters.

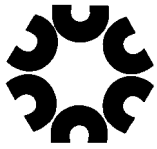
Twenty of the specimens were conditioned (C) within a CSZ environmental control chamber for 25±1 hour at a 85±5% relative humidity and 38°C ± 2.5°C, then tested within 10 hours of extraction from the chamber as indicated in NIOSH standard procedure TEB-APR-STP-0059. The remaining five specimens were unconditioned (U) and tested without pre-conditioning per CSA Z94.4.1:21, section 6.3.3.2.2.1.

The particle filtration efficiency was performed on a TSI 8130A automated filter tester, and challenged under unidirectional airflow at 85 L/min ± 4 L/min with an aerosol of sodium chloride (NaCl) particles. The particles were generated by an aerosol generator and neutralized to their Boltzmann equilibrium state. The particles were considered to have an average count median diameter of 0.075 ± 0.020 micrometers and a geometric standard deviation not exceeding 1.86.

RESULTS

Specimen #	Conditioned	Flow Rate	Initial Filter Resistance (Pa)	Maximum Allowable Leakage (%)	Initial Leakage (%)	Maximum Leakage (%)	Particle Filtration Efficiency (%)	Requirement (≥95.00%)	
								Result	Overall Result
1	C	85	82	5.0	0.5	0.5	99.5	Pass	Pass
2	C	85	86	5.0	0.5	0.5	99.5	Pass	
3	C	85	87	5.0	0.4	0.4	99.6	Pass	
4	C	85	97	5.0	0.5	0.5	99.5	Pass	
5	C	85	91	5.0	0.7	0.7	99.3	Pass	
6	C	85	89	5.0	0.5	0.5	99.5	Pass	
7	C	85	97	5.0	0.5	0.5	99.5	Pass	
8	C	85	92	5.0	0.4	0.4	99.6	Pass	
9	C	85	101	5.0	0.5	0.5	99.5	Pass	
10	C	85	94	5.0	0.6	0.6	99.4	Pass	
11	C	85	90	5.0	0.5	0.5	99.5	Pass	
12	C	85	85	5.0	0.4	0.4	99.6	Pass	
13	C	85	80	5.0	0.4	0.4	99.6	Pass	
14	C	85	89	5.0	0.5	0.5	99.5	Pass	
15	C	85	89	5.0	0.5	0.5	99.5	Pass	
16	C	85	92	5.0	0.5	0.5	99.5	Pass	
17	C	85	88	5.0	0.7	0.7	99.3	Pass	
18	C	85	95	5.0	0.5	0.5	99.5	Pass	
19	C	85	99	5.0	0.5	0.5	99.5	Pass	
20	C	85	92	5.0	0.5	0.5	99.5	Pass	
21	U	85	85	5.0	0.5	0.5	99.5	Pass	
22	U	85	88	5.0	0.5	0.5	99.5	Pass	
23	U	85	85	5.0	0.5	0.5	99.5	Pass	
24	U	85	86	5.0	0.4	0.4	99.6	Pass	
25	U	85	85	5.0	0.5	0.5	99.5	Pass	

Note: As per CSA Z94.4.1, section 6.2 the minimum efficiency for each of the 25 filters are to be determined and recorded and must be equal to or greater than 95.00% filtration efficiency.



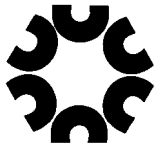
AIRFLOW (INHALATION) RESISTANCE

Ten submitted specimens were evaluated for airflow (inhalation) resistance based on TEB-APR-STP-0007 using a TSI 8130A automated filter tester considered by NIOSH to be an acceptable pressure drop measurement.

Tests were performed with the salt generator turned-off under no loading conditions. Using hot-melt glue the filtering facepiece respirators were sealed onto flat plates with joint for connection to the resistance apparatus for measurements of pressure drop.

RESULTS

Specimen #	Maximum Allowable Resistance (mmH ₂ O) Inhalation	Maximum Allowable Resistance (Pa) Inhalation	Actual Resistance (mmH ₂ O) Inhalation	Actual Resistance (Pa) Inhalation	Requirement (≤10.2 mmH ₂ O) (≤100 Pa) (≤17.8 mmH ₂ O) (≤175 Pa) (≤35.0 mmH ₂ O) (≤343 Pa)	
					Result	Overall Result
1	35	343	8.1	79	Pass	Pass
2	35	343	8.8	86	Pass	
3	35	343	8.9	87	Pass	
4	35	343	8.9	87	Pass	
5	35	343	8.7	85	Pass	
6	35	343	8.7	85	Pass	
7	35	343	8.9	87	Pass	
8	35	343	9.0	88	Pass	
9	35	343	9.3	91	Pass	
10	35	343	8.8	87	Pass	



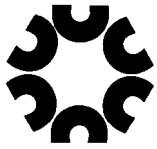
AIRFLOW (EXHALATION) RESISTANCE

Ten submitted specimens were evaluated for airflow (exhalation) resistance based on TEB-APR-STP-0003 using a TSI 8130A automated filter tester considered by NIOSH to be an acceptable pressure drop measurement.

Tests were performed with the salt generator turned-off under no loading conditions. Using hot-melt glue the filtering facepiece respirators were sealed onto flat plates, and mounted in reverse, with joint for connection to the resistance apparatus for measurements of pressure drop.

RESULTS

Specimen #	Maximum Allowable Resistance (mmH ₂ O) Exhalation	Maximum Allowable Resistance (Pa) Exhalation	Actual Resistance (mmH ₂ O) Exhalation	Actual Resistance (Pa) Exhalation	Requirement (≤10.2 mmH ₂ O) (≤100 Pa) (≤17.8 mmH ₂ O) (≤175 Pa) (≤25.0 mmH ₂ O) (≤245 Pa)	
					Result	Overall Result
1	25	245	8.1	80	Pass	Pass
2	25	245	8.6	84	Pass	
3	25	245	8.6	84	Pass	
4	25	245	8.5	83	Pass	
5	25	245	8.3	81	Pass	
6	25	245	8.4	82	Pass	
7	25	245	8.5	83	Pass	
8	25	245	8.6	85	Pass	
9	25	245	8.5	84	Pass	
10	25	245	8.6	84	Pass	



FLAME SPREAD

The specimen, consisting of 5 masks, was tested in accordance to 16 CFR 1610 (1-1-16 Edition).

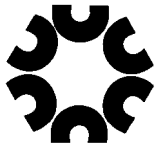
RESULTS

Specimen #1	Specimen #	RESULT	CONCLUSION
	1-1	IBE	Classified as Class 1
	1-2	IBE	
	1-3	IBE	
	1-4	IBE	
	1-5	IBE	

IBE: Ignited but extinguished

Test: Flame Resistance 45° angle test. One-Second Flame Impingement.
Type of fabric: Without a raised fiber surface
Surface tested: Face
Type of test: Original State
Direction tested: Length
Testing Conditioning: Specimens conditioned at 105°C for 30 min, then placed in desiccator
Requirements: The flame spread time for textile products without a raised fibre surface must be greater than 3.5 seconds.
Date of Receipt: March 2, 2022
Date of Test: March 25, 2022

Note: For a test plan of 5 specimens, no failure is allowed for an Acceptable Quality Limit of 4.0%.



FLUID RESISTANCE

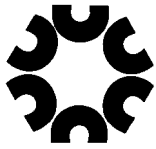
ASTM F1862/F1862M-17 at 160 mmHg (21.3 kPa) pressure

RESULTS

Specimen #	Test Pressure (mmHg)	Total Number of Specimens	Number of Pass Specimens
1	160	32	32

Material construction type	6225 Flat Folded N95 Respirators
Supplier	Ronco
Lot number	Unknown/Not Provided
Date of receipt	March 2, 2022
Date of test	March 29, 2022
Fluid velocity (cm/s)	642
Volume of impact fluid (ml)	2
Angle of pneumatic valve to horizontal	2°
Description target area mask	Outer surface
Distance from tip cannula to mask (in)	12
Technique to enhance visual detection	Cotton swab used to lightly daub on the surface
Conditioning parameters	21±5°C, 85±5% R.H for minimum of 4 hours

NOTE: The outside surface of the mask is exposed to the blood stream in order to observe whether penetration occurred on the inner surface of the mask that could be contacting the wearer's face. Penetration on the inner facing of the mask constitutes failure (ASTM F1862/F1862M-17 section 4.2).



MECHANICAL HEADSTRAP STRENGTH



Report For:	Cambridge Materials Testing Limited 6991 Millcreek Drive, Unit 13 MISSISSAUGA, Ontario L5N 6B9	Laboratory #:	883695-22
Attention:	Derek Wild	Report Date:	March 14, 2022
Specimen:	CMTL Mississauga Lab # 883284, Customer: Ronco Respirator Performance Properties	Received Date:	March 04, 2022
		Customer P.O.#:	

PROOF LOAD TEST REPORT

The submitted specimens were subjected to proof load testing in accordance with CSA Z94.4.1-21, Section 5.9.1. Testing was performed by donning the mask body on to a head form. A proof load of 10 N per attachment point was then applied to the elastomeric strap for 10 seconds. The proof load was then removed and the specimen was examined for failure. Testing machine was operated in accordance with ASTM A370-21 paragraph 8 with a test speed of 200mm/minute.

RESULTS

Specimen	Observations
1	There was no evidence of breakage, tearing, separation from the point of fixation to the respirator body, permanent deformation or other obvious loss of function in the securing mechanism.
2	There was no evidence of breakage, tearing, separation from the point of fixation to the respirator body, permanent deformation or other obvious loss of function in the securing mechanism.
3	There was no evidence of breakage, tearing, separation from the point of fixation to the respirator body, permanent deformation or other obvious loss of function in the securing mechanism.

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Per Nicholas Wolfenberg Authorized By
Per Reghan Hopper Technician