PPE Testing Laboratory

210217-VIT-B – Filtration Efficiency Test Report

Client Name: Vitacore Industries
Client Contact: Yang Fei
yang@vitacore.ca
Job ID: 210217-VIT-B
Date: 3/1/2021

Executive Summary

Twenty CAN99 respirators were tested for filtration efficiency in accordance with test method TEB-APR-STP-0059. Three samples were selected at random and subjected to a 200 mg NaCl loading test. The respirators were identified as Type I, and the remaining 17 respirators were assessed for initial filtration efficiency. **All CAN99 respirators exhibited filtration efficiency greater than 99% (Table 2).**

Sample Description

Table 1. Sample and testing info.

Sample Name	Number of Samples	Analysis ID	Date Samples Received	Test Date
CAN99	20	210217-VIT-B-1	2/17/2021	2/18-24/2021

Test Method

Filter efficiency testing was performed in accordance with NIOSH Procedure TEB-APR-STP-0059 on a TSI® CERTITEST® Automated Filter Tester Model 8130A. Respirators were challenged with sodium chloride aerosol neutralized to a Boltzmann equilibrium state at 25 ± 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 respirators were conditioned at 85 ± 5% relative humidity and 38 ± 2°C for 25 ± 1 hour prior to filter efficiency testing. Three respirators were chosen at random from the submitted samples and subjected to a 200 mg sodium chloride aerosol loading test, at a flow rate of 85 litres per minute (LPM). Based on the aerosol loading, the respirators were identified as a Type I, and the remaining 17 samples were assessed for initial filtration efficiency.

Room G8, Ground Floor, Leon Blackmore Pavilion
902 W 10TH Avenue, Vancouver, BC, Canada V5Z 1M9
TEL: 604-875-4111 Ext. 67418 | FAX: 604-875-5918 | EMAIL: PPEtesting@vch.ca

Results

All samples exhibited minimum filtration efficiencies over 99% (Table 2).

*Table 2. Inhalation Resistance, Penetration, and Filtration Efficiency according to NIOSH Method TEB-APR-STP-0059 for twenty **CAN99 Respirators**.*

Sample ID	Initial Inhalation Resistance (mm H2O)	Maximum Penetration (%)	Filter Efficiency (%)
210217-VIT-B-1-1	9.97	0.406	99.594
210217-VIT-B-1-2	10.07	0.126	99.874
210217-VIT-B-1-3	10.2	0.124	99.876
210217-VIT-B-1-4	10.07	0.092	99.908
210217-VIT-B-1-5	10.52	0.095	99.905
210217-VIT-B-1-6	9.5	0.534	99.466
210217-VIT-B-1-7	9.41	0.127	99.873
210217-VIT-B-1-8	9.71	0.128	99.872
210217-VIT-B-1-9	10.29	0.107	99.893
210217-VIT-B-1-10	10.4	0.089	99.911
210217-VIT-B-1-11	10.13	0.096	99.904
210217-VIT-B-1-12	10.06	0.115	99.885
210217-VIT-B-1-13	10.39	0.099	99.901
210217-VIT-B-1-14	10.32	0.154	99.846
210217-VIT-B-1-15	10.14	0.120	99.880
210217-VIT-B-1-16	10.3	0.131	99.869
210217-VIT-B-1-17	10.21	0.142	99.858
210217-VIT-B-1-18	11.66	0.199	99.801
210217-VIT-B-1-19	11.09	0.252	99.748
210217-VIT-B-1-20	10.04	0.110	99.890

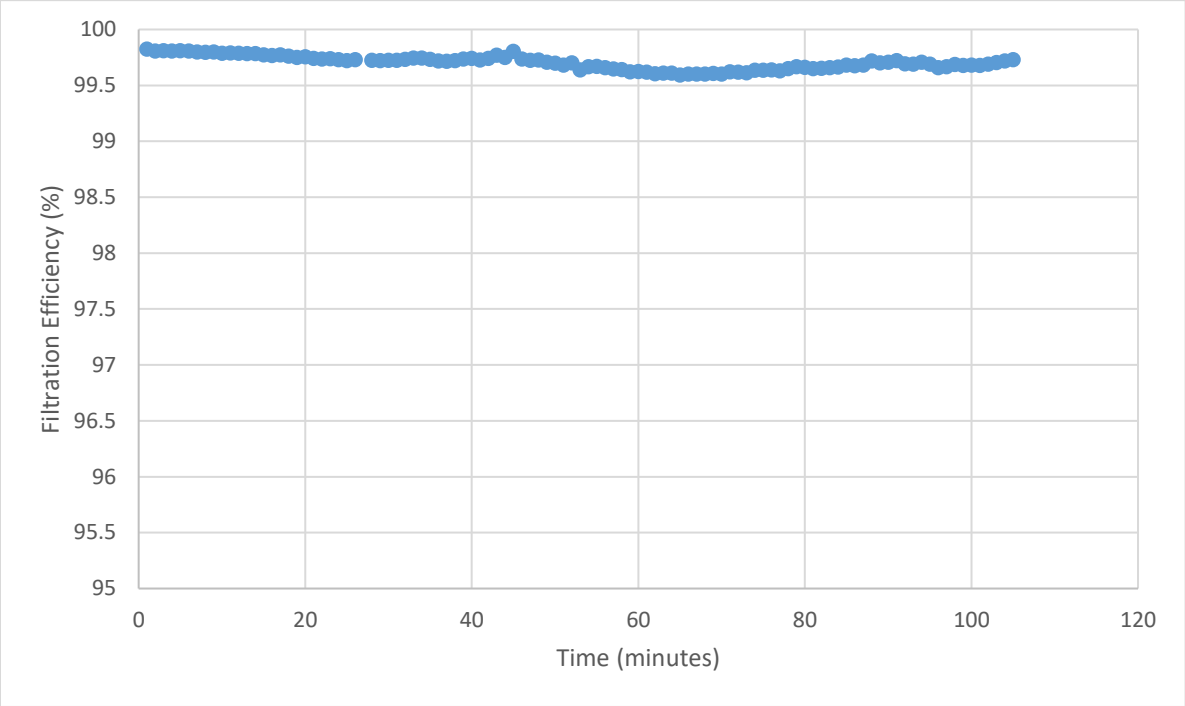

Figure 1. Filtration efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-1.***

Run Time (minutes)	Flow Rate (litres per minute)	Penetration (%)	Filtration Efficiency (%)	Inhalation Resistance (mm H_2O)	NaCl Mass Loading (mg)
1	85.22	0.176	99.824	9.97	1.9
10	85.11	0.213	99.787	11.84	19.3
20	85.13	0.243	99.757	14.59	38.5
30	85.17	0.274	99.726	18.86	57.7
40	85.20	0.257	99.743	25.82	76.9
50	85.15	0.301	99.699	37.10	96.1
60	85.09	0.375	99.625	52.28	115.3
70	85.00	0.399	99.601	68.99	134.5
80	84.89	0.338	99.662	86.77	153.7
90	84.76	0.293	99.707	105.5	172.9
100	84.62	0.317	99.683	124.94	192
105	84.53	0.270	99.730	134.96	201.5

Table 3. Loading Test Data for Flow rate, Inhalation Resistance, Penetration, and Filtration Efficiency according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-1.***

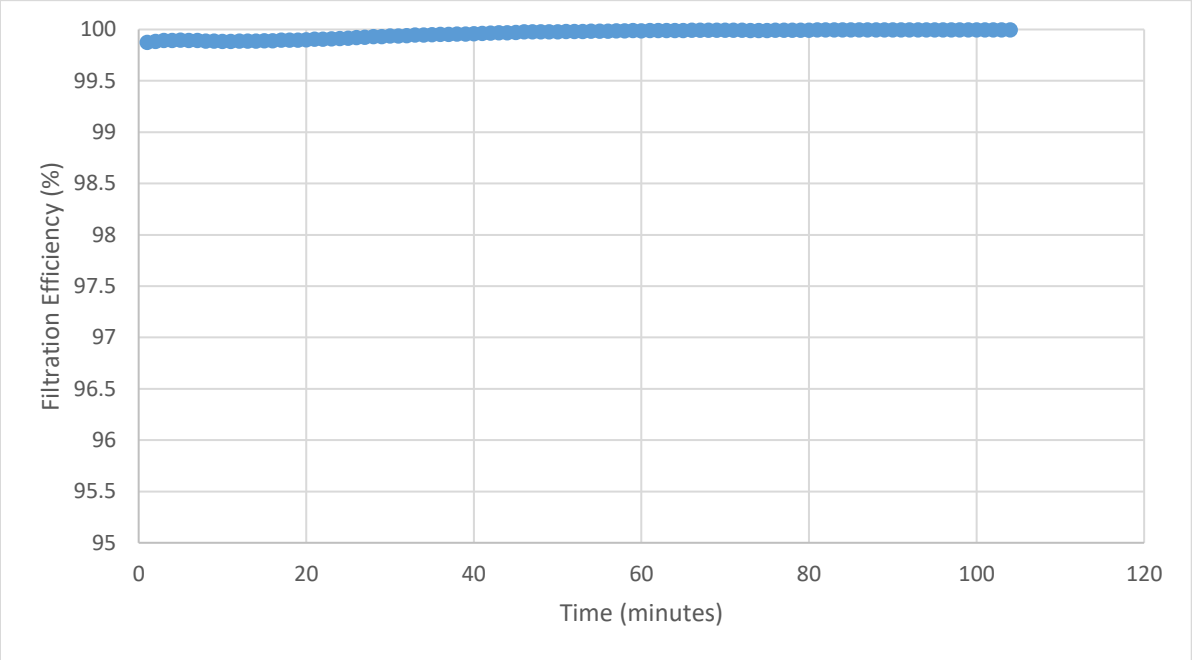

Figure 2. Filtration efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-2.***

Run Time (minutes)	Flow Rate (litres per minute)	Penetration (%)	Filtration Efficiency (%)	Inhalation Resistance (mm H_2O)	NaCl Mass Loading (mg)
1	85.55	0.126	99.874	10.07	1.9
10	85.51	0.116	99.884	12.28	19.3
20	85.48	0.101	99.899	15.48	38.6
30	85.46	0.064	99.936	20.63	57.9
40	85.41	0.041	99.959	29.22	77.2
50	85.36	0.024	99.976	41.24	96.4
60	85.25	0.011	99.989	56.45	115.7
70	85.14	0.005	99.995	74.17	134.9
80	84.98	0.006	99.994	93.42	154.1
90	84.83	0.004	99.996	113.02	173.3
100	84.67	0.003	99.997	132.83	192.4
104	84.89	0.004	99.996	141.24	200.1

Table 4. Loading Test Data for Flow rate, Inhalation Resistance, Penetration, and Filtration Efficiency according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-2.***

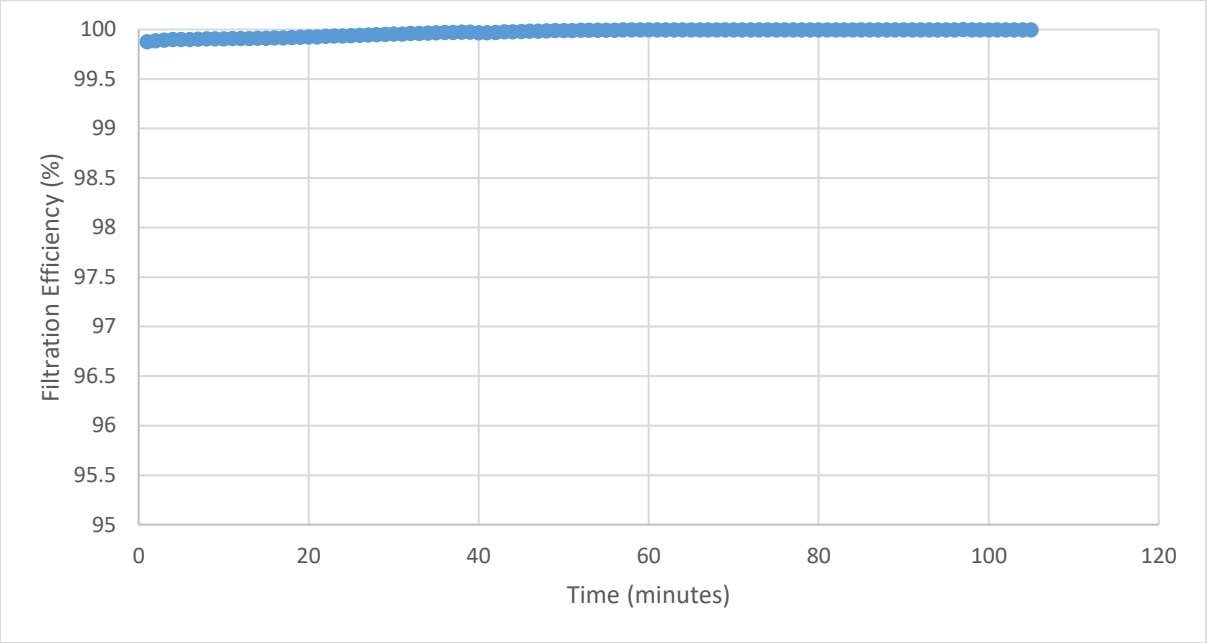

Figure 3. Filtration efficiency over time for a 200 mg NaCl loading test according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-3.***

Run Time (minutes)	Flow Rate (litres per minute)	Penetration (%)	Filtration Efficiency (%)	Inhalation Resistance (mm H_2O)	NaCl Mass Loading (mg)
1	85.97	0.124	99.876	10.2	1.9
10	85.04	0.094	99.906	12.12	19.2
20	85.03	0.076	99.924	15.17	38.4
30	84.96	0.046	99.954	19.92	57.6
40	84.8	0.034	99.966	28.34	76.7
50	84.66	0.010	99.990	40.64	95.9
60	84.52	0.003	99.997	55.77	115
70	84.38	0.003	99.997	72.5	134
80	84.24	0.003	99.997	89.71	153
90	84.13	0.003	99.997	106.46	172
100	84.02	0.003	99.997	122.42	191
105	83.97	0.002	99.998	130.19	200.5

Table 5. Loading Test Data for Flow rate, Inhalation Resistance, Penetration, and Filtration Efficiency according to NIOSH Method TEB-APR-STP-0059 for ***Sample ID 210217-VIT-B-1-3.***

Figure 4. Vitacore Industries CAN99 respirator.

Figure 5. CAN99 respirator under test.

Reviewed by: *Dr. Titus Wong*, Medical Director

Prepared by: *Jesse Cooper MSc,* VCH PPE Testing Lab Manager

These data are representative of only the samples tested. This report may be copied only in its entirety.

REFERENCES

1. National Institute for Occupational Safety and Health. Determination of Particulate Filter Efficiency Level for N95 Series Filters against Solid Particulates for Non-Powered, Air Purifying Respirators Standard Test Procedure TEB-APR-STP-0059 Revision 3.2. 2019.

End of Report