

## Sodium Chloride (NaCl) Aerosol Test Final Report

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Test Article: Filters with valves for LF 2014, LF 020, LF 024, LF 025  
Study Number: 1313586-S01  
Study Received Date: 24 Jun 2020  
Testing Facility: Nelson Laboratories, LLC  
6280 S. Redwood Rd.  
Salt Lake City, UT 84123 U.S.A.  
Test Procedure(s): Standard Test Protocol (STP) Number: STP0014 Rev 09  
Deviation(s): None

**Summary:** This procedure was performed to evaluate the particle penetration and airflow resistance properties of filtration materials. A neutralized, poly-dispersed aerosol of sodium chloride (NaCl) was generated and passed through the test article. The performance of the test article was assessed by measuring the concentration of salt particles penetrating the test article compared to the challenge concentration entering the test article. The filtration performance and airflow resistance of each test article were calculated.

The filter tester used in testing was a TSI® CERTITEST® Model 8130 Automated Filter Tester that is capable of efficiency measurements of up to 99.999%. It produced a particle size distribution with a count median diameter of  $0.075 \pm 0.020$  microns ( $\mu\text{m}$ ) and a geometric standard deviation not exceeding 1.86  $\mu\text{m}$ . The mass median diameter was approximately 0.26  $\mu\text{m}$ , which is generally accepted as the most penetrating aerosol size. All test method acceptance criteria were met. Testing was performed in compliance with US FDA good manufacturing practice (GMP) regulations 21 CFR Parts 210, 211 and 820.

Area Tested: Entire Respirator  
Airflow Rate:  $85 \pm 4$  liters per minute (L/min)  
Test Side: Outside  
Test Type: 1-3: Load Testing (Load Amount: 200 mg/m<sup>3</sup>)  
4-20: Initial Penetration (~1 min. LOAD Test)  
Conditioning Parameters:  $38 \pm 2.5^\circ\text{C}$ ,  $85 \pm 5\%$  relative humidity (RH) for  $25 \pm 1$  hour



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Curtis Gerow electronically approved  
Study Director

Curtis Gerow

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02 Sep 2020 14:59 (+00:00)  
Study Completion Date and Time

**Results:**

Test Article Number	Corrected <sup>a</sup> Airflow Resistance (mm H <sub>2</sub> O)	Maximum Particle Penetration (%)	Filtration Efficiency (%)
1	16.8	0.228	99.772
2	16.4	0.559	99.441
3	17.6	0.443	99.557

<sup>a</sup> The final airflow resistance value for each test article was determined by subtracting out the background resistance from the system.

Test Article Number	Corrected <sup>a</sup> Airflow Resistance (mm H <sub>2</sub> O)	Particle Penetration (%)	Filtration Efficiency (%)
4	18.3	0.197	99.803
5	16.9	0.213	99.787
6	17.3	0.180	99.820
7	18.2	0.237	99.763
8	18.3	0.189	99.811
9	17.8	0.216	99.784
10	17.3	0.205	99.795
11	18.2	0.210	99.790
12	18.1	0.218	99.782
13	19.2	0.232	99.768
14	19.2	0.272	99.728
15	17.6	0.204	99.796
16	18.8	0.184	99.816
17	18.8	0.163	99.837
18	20.1	0.226	99.774
19	18.1	0.204	99.796
20	17.9	0.175	99.825

<sup>a</sup> The final airflow resistance value for each test article was determined by subtracting out the background resistance from the system.