



FINAL REPORT

SODIUM CHLORIDE (NaCl) AEROSOL TEST

PROCEDURE NO. STP0014 REV 05

LABORATORY NO. 489207

PREPARED FOR:

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LABORATORY NUMBER:	489207
PROCEDURE NUMBER:	STP0014 REV 05
SAMPLE SOURCE:	Global Safety First, LLC
SAMPLE IDENTIFICATION:	Refer to Table 1 P.O. #NL 081709
DEVIATIONS:	None
SAMPLE AREA TESTED:	Entire Respirator
SAMPLE RECEIVED DATE:	19 Aug 2009
LAB PHASE START DATE:	31 Aug 2009
LAB PHASE COMPLETION DATE:	07 Sep 2009
REPORT ISSUE DATE:	08 Sep 2009

INTRODUCTION:

This report details the results of a particulate filter penetration study as specified in 42 CFR Part 84 and RCT-APR-STP-0057, 0058, 0059 for requirements on a N95 respirator. Respirators were conditioned then tested for particle penetration against a polydispersed, sodium chloride (NaCl) particulate aerosol. The challenge aerosol was dried, neutralized, and passed through the test sample at a concentration not exceeding 200 mg/m³. The initial inhalation resistance and maximum filter penetration for each respirator was determined.

The filter tester used in this procedure was a TSI[®] CERTITEST[®] Model 8130 Automated Filter Tester. The tester is capable of efficiency measurements of up to 99.999%. It produces a particle size distribution with a count median diameter of 0.075 ± 0.020 µm and a geometric standard deviation not exceeding 1.86 µm, as determined by the manufacturer with a scanning mobility particle sizer (SMPS). The mass median diameter is 0.26 µm which is generally accepted as the most penetrating aerosol size.

ACCEPTANCE CRITERIA:

The filtration efficiency of the reference material must be within the limits set by the control chart for NaCl testing. The filter tester must pass the "TESTER SET UP" procedure.

CONDITIONING:

Prior to efficiency testing, respirators were taken out of their packaging and placed in an environment of $85 \pm 5\%$ relative humidity (RH) and $38 \pm 2.5^\circ\text{C}$ for 25 ± 1 hours. Following conditioning samples were sealed in gas tight containers and tested within 10 hours of removal from the chamber.

FILTER TESTER SET-UP PROCEDURE:

The filter tester was filled with a 2% NaCl solution. The power was started to the filter tester, heater, and neutralizer and the instrument allowed a minimum warm-up time of 30 minutes. The main regulator pressure was set to 75 ± 5 pounds per square inch (psi). The filter holder regulator pressure, which controls the amount of clamping force that is applied to the test chuck, was set to approximately 35 psi. The NaCl aerosol generator pressure was set to approximately 30 psi and the make-up airflow rate was set to approximately 70 Liters per minute (L/min).

With the filter holder empty, the transducer and photometer zeros, the aerosol concentration level, and the photometer correlation factor (CF) were checked and determined to be acceptable. The CF is used to correlate upstream photometer measurements with those made downstream.

The neutralized NaCl test aerosol was verified to be at $25 \pm 5^\circ\text{C}$ and $30 \pm 10\%$ RH by the acceptance of the manufacturer's reference material. The NaCl concentration of the test aerosol was determined in mg/m^3 by a gravimetric method prior to the load test assessment. A manufacturer's reference standard was tested before and after each test set to verify the test system was within its acceptable operating limits.

FILTER TEST PROCEDURE:

A respirator was mounted on the sponsor provided test plate using hot glue, placed into the sample holder, and the NaCl aerosol passed through the outside surface of the test specimen at a continuous airflow rate of 85 ± 4 L/min. In accordance with NIOSH policy, three respirators were challenged until 200 ± 5 mg of NaCl had contacted the filter. Based upon the load pattern, which was a NIOSH Type 2, the remaining 17 filters had the initial penetration reading recorded or testing was continued until maximum penetration was achieved.

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RESULTS:

Testing met the acceptance criteria previously stated in this report. The results for the particulate filter penetration study are summarized in Table 1.

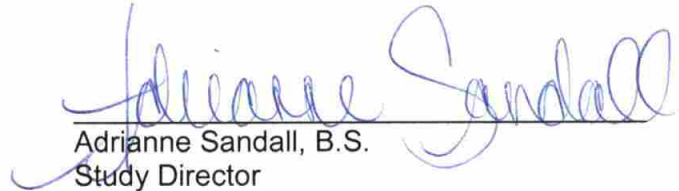
The NIOSH N95 filter efficiency as stated in the 42 CFR Part 84.181 is a minimum efficiency for each filter of $\geq 95\%$ ($\leq 5\%$ penetration). The samples submitted by the sponsor conform to the NIOSH N95 criteria for filter efficiency.

STATEMENT OF UNCERTAINTY:

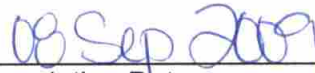
If applicable, the statement of uncertainty is available to sponsors upon request.



Technical Reviewer



Adrienne Sandall, B.S.
Study Director



Study Completion Date

bj

TABLE 1. Results
Airflow Rate: 85 ± 4 L/min.
Sample Identification: GSF-FAY30

SAMPLE NUMBER	INITIAL AIRFLOW RESISTANCE (mm H ₂ O)	MAXIMUM PARTICLE PENETRATION (%)	N95 ACCEPTANCE
1	10.7	1.80	Pass
2	10.7	1.53	Pass
3	10.5	1.75	Pass
4	10.4	1.30	Pass
5	11.0	1.40	Pass
6	10.4	1.41	Pass
7	10.5	1.39	Pass
8	10.6	1.46	Pass
9	11.1	1.91	Pass
10	10.7	1.63	Pass
11	11.2	1.82	Pass
12	10.7	1.92	Pass
13	10.7	1.71	Pass
14	10.6	1.89	Pass
15	10.8	2.27	Pass
16	11.1	1.98	Pass
17	10.8	2.17	Pass
18	11.3	1.39	Pass
19	10.8	1.49	Pass
20	10.4	1.00	Pass



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