

Viral Filtration Efficiency (VFE) Final Report

Test Article: A, B, C, D, E
Study Number: 1281247-S01
Study Received Date: 25 Mar 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: STP0007 Rev 16
Deviation(s): None


Test Article C is two ply cotton.


Summary: The VFE test is performed to determine the filtration efficiency of test articles by comparing the viral control counts upstream of the test article to the counts downstream. A suspension of bacteriophage Φ X174 was aerosolized using a nebulizer and delivered to the test article at a constant flow rate and fixed air pressure. The challenge delivery was maintained at $1.1 - 3.3 \times 10^3$ plaque forming units (PFU) with a mean particle size (MPS) of $3.0 \mu\text{m} \pm 0.3 \mu\text{m}$. The aerosol droplets were drawn through a six-stage, viable particle, Andersen sampler for collection. The VFE test procedure was adapted from ASTM F2101.

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.

Test Side: Inside (A, B, C, D)
Outside (E)
Test Area: $\sim 40 \text{ cm}^2$ (C, D)
 $\sim 7.1 \text{ cm}^2$ (A, B, E)
VFE Flow Rate: 28.3 Liters per minute (L/min)
Conditioning Parameters: $85 \pm 5\%$ relative humidity (RH) and $21 \pm 5^\circ\text{C}$ for a minimum of 4 hours
Positive Control Average: 2.3×10^3 PFU
Negative Monitor Count: <1 PFU
MPS: $3.0 \mu\text{m}$

Study Director


James W. Luskin


13. Apr 2020
Study Completion Date



1281247-S01

Results:

Test Article	Percent VFE (%)
A	93.6
B	81
C	61
D	99.8
E	99.2

The filtration efficiency percentages were calculated using the following equation:

$$\% VFE = \frac{C - T}{C} \times 100$$

C = Positive control average

T = Plate count total recovered downstream of the test article

Note: The plate count total is available upon request