PPE CASE

Personal Protective Equipment Conformity Assessment Studies and Evaluations

Performance Testing of Fraudulent Respirator P100® Filters, Organic Vapor Chemical Cartridges, and Combination Cartridges

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This report details the results of inhalation and exhalation resistance, filtration performance, and organic vapor (OV) service life testing on NIOSH Approved® and fraudulent respirator P100 filters, chemical cartridges, and combination cartridges.

NIOSH's pilot project showed

- ***220/240** fraudulent P100 filters*
- ***124/124** fraudulent combination cartridges*
- ***8/8** fraudulent chemical cartridges*

failed to meet all required NIOSH performance tests.

During public health emergencies and subsequent respirator supply shortages, respirators that misrepresent the NIOSH approval flood the market. These fraudulent respirators often copy the look of genuine NIOSH Approved® respirators (e.g., use the same part numbers, colors) or are falsely marketed and sold as NIOSH Approved respirators when they are not.

To counteract this, NIOSH registered 12 certification marks—i.e., NIOSH stylized logos with and without text, N95®, N99®, N100®, P95®, R95®, P100®, HE®, PAPR100-P®, PAPR100-N®and NIOSH Approved®—with the U.S. Patent and Trademark Office and recorded them with U.S. Customs and Border Protection. "NIOSH Approved" and "N95" are also registered in 14 other countries. The U.S. Department of Health and Human Services (HHS) owns these certification marks and NIOSH, as the approving federal entity for the Respirator Approval Program, serves as the custodian of the marks. This means that NIOSH administers and controls who can use them. Accordingly, the certification marks may only be used by NIOSH approval holders (manufacturers) that have respirators approved under Title 42, Part 84, of the Code of Federal Regulations (42 CFR Part 84) [NIOSH 2023]. By registering the certification marks, NIOSH can pursue actions as necessary to enforce their use.

NIOSH's Brand Protection Team has been monitoring and investigating the use of these certification marks on several online marketplaces since 2020. When the team finds a product listing that misuses the certification marks, NIOSH pursues actions to remove it. Despite NIOSH's efforts, numerous fraudulent respirator listings continue to appear on online marketplaces. These products potentially provide consumers with a false sense of confidence that they are receiving the same level of protection NIOSH Approved respirators provide.

Recently, NIOSH has seen a trend towards fraudulent respirator components (e.g., filters and cartridges) being offered in online marketplaces. Entities who are not affiliated with a NIOSH approval holder are selling respirator filters and cartridges, misrepresenting them as being part of a NIOSH Approved respirator configuration. NIOSH does not approve individual components, only complete respirator assemblies (configurations). NIOSH approval labels specify the components that make up a respirator configuration, including replacement parts. If components not listed on the approval label are used, the respirator will not be considered approved by NIOSH.

Due to limited performance data for fraudulent respirator filters and cartridges, NIOSH initiated a pilot effort to evaluate the performance characteristics of fraudulent respirator components that typically appear in online marketplaces and compare them to respirator components that are part of a genuine NIOSH Approved configuration. This report details the performance data for fraudulent P100 filters, chemical cartridges, and combination cartridges (chemical/particulate) when evaluated for inhalation and exhalation resistance, particle filtration, and chemical penetration.

How NIOSH Evaluated Fraudulent Respirator Components

Selection of Fraudulent Respirator Components (P100 Filters, Chemical Cartridges, and Combination Cartridges)

NIOSH uses keywords to help monitor fraudulent respirators and respirator components on the market. Recent brand monitoring trends have shown that higher protection filtering elements—i.e., P100 filters and combination cartridges—have emerged in online marketplaces as shown by **Figure 1**.

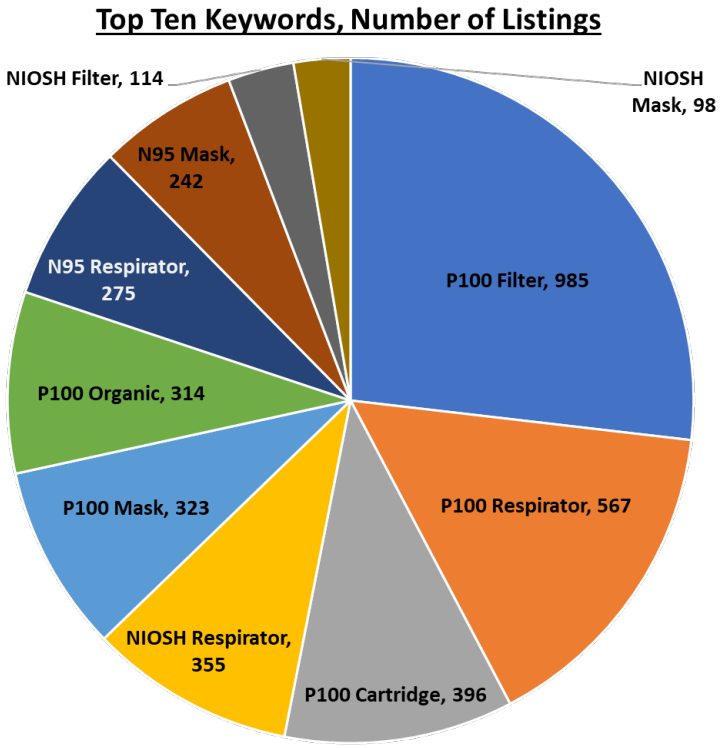

Figure 1: Top ten keywords with number of listings associated with each across 345 marketplaces in one given month, showing P100 filters and cartridges appear at a higher proportion than N95 respirators.

For this pilot project, NIOSH purchased a small number of fraudulent P100 filters, OV cartridges, and multi-gas/vapor combination cartridges with OV protection from two online marketplaces due to the prevalence of these components (**Table 1**). Further informed by brand monitoring activities, frequent models/part numbers associated with genuine NIOSH Approved respirators—such as 3M: 2091, 2097, 6001, 6001CN, 60923, and 60926—were targeted within each category due to numerous fraudulent listings found in online marketplaces.

NIOSH considered the following criteria when selecting products to purchase within each category of respirator component:

- Filters/cartridges displaying "NIOSH" or "P100" markings that were not manufactured by NIOSH approval holders.
- Filters/cartridges where the online product photos had evidence of alterations, such as concealing, blurring, or deleting part of the certification mark (e.g., using "100" instead of "P100").

For each fraudulent product's part number, NIOSH purchased genuine NIOSH Approved respirator components to serve as controls for testing and evaluation. Additionally, two genuine 3M elastomeric half mask respirators of each part number 6100(S), 6200(M), and 6300(L) were purchased as these are the facepieces for the respirator configuration and are referenced in the online marketplace platform listings. NIOSH used these facepieces to perform resistance testing and generate test fixtures for all P100 and gas/vapor testing.

Table 1: Respirator Filters and Cartridges Test Samples

Category	Part Number	Product Reference Number	Product Type
P100 Filter	2097	G-1	Genuine
		F-1-1	Fraudulent
		F-1-2	Fraudulent
		F-1-3	Fraudulent
		F-1-4	Fraudulent
		F-1-5	Fraudulent
		F-1-6	Fraudulent
	2091	G-2	Genuine
		F-2-1	Fraudulent
		F-2-2	Fraudulent
		F-2-3	Fraudulent
		F-2-4	Fraudulent
		F-2-5	Fraudulent
		F-2-6	Fraudulent
Combination Cartridge	60923	G-3	Genuine
		F-3-1	Fraudulent
		F-3-3	Fraudulent
		F-3-4	Fraudulent
	60926	G-4	Genuine
		F-4-1	Fraudulent
		F-4-2	Fraudulent
Chemical Cartridge	6001	G-5	Genuine
		F-5-1	Fraudulent
	6001CN	G-6	Genuine
		F-6-1	Fraudulent

Evaluation of Inhalation and Exhalation Resistance, Filtration Performance, and Chemical Penetration

NIOSH evaluated the inhalation and exhalation resistance, filtration performance, and chemical penetration (breakthrough time) of the fraudulent and genuine (control) P100 filters, chemical cartridges, and combination cartridges using the same standard testing procedures (STPs) used to approve respirators under 42 CFR Part 84.

Each STP specifies requirements for the number of respirator components tested.

- STPs 0003 and 0007 require a minimum of three complete respirators to evaluate inhalation and exhalation resistance. For all genuine and fraudulent products tested to these STPs in this pilot project, a complete respirator consisted of an elastomeric half mask respirator equipped with two filters or cartridges.
- STP 0051 requires a minimum of 20 filters or combination cartridges to evaluate particulate filtration efficiency.
- STP 0046A requires seven complete respirators to evaluate OV service life. Seven complete respirators are required to test three pairs of filters or cartridges as received, two pairs conditioned at 25% humidity, and two pairs conditioned at 85% humidity. Due to resource constraints, a modified procedure was used for testing.[a]

Table 2. NIOSH Tests Conducted to Evaluate Inhalation and Exhalation Resistance, Filtration Performance, and Chemical Penetration

NIOSH Standard Testing[b] Procedures	Pass/Fail Criteria	Fraudulent Filters or Complete Respirators Tested	Genuine Filters or Complete Respirators Tested
STP 0003: Exhalation Resistance	Filter Only - ≤20 mm H_2O column OV and Combination - ≤25 mm H_2O column	3[c]	3[c]
STP 0007: Inhalation Resistance	Filter Only - ≤35 mm H_2O column OV Only - ≤40 mm H_2O column Combination Only - <50 mm H_2O column	3[c]	3[c]
STP 0046A: OV Service Life Test (Carbon Tetrachloride)	OV Only - 50 min Combination - 25min	2[a]	2[a]
STP 0051: Particulate Filter Efficiency for P100 (Dioctyl phthalate)	<0.03% particulate penetration (>99.97% filter efficiency)	20	20

[a] Only two complete respirators equipped with fraudulent cartridges and two complete respirators equipped with genuine cartridges were used to conduct service life testing. The complete respirators were only conditioned at 85% humidity as this condition is typically harder to pass.

[b] Testing was only performed at the location where the STPs are under the laboratory's ISO/IEC 17025:2017 scope of accreditations. STPs 0003, 0007, and 0051 are accredited in both the Pittsburgh and Morgantown laboratories; therefore, this testing was conducted at both facilities. STP 0046A is only accredited at the Pittsburgh laboratory.

[c] NIOSH testing requirements state that a minimum of three complete respirators must be tested for inhalation and exhalation resistance. The same three complete respirators can be used for both inhalation and exhalation resistance testing.

What NIOSH Found Through Inspection, Testing, and Evaluation

Inspection of Received Items

Prior to conducting testing, NIOSH inspected the labeling of all the fraudulent filters and cartridges purchased and compared them to the genuine products purchased. NIOSH inspected a total of:

- 352 fraudulent and 58 genuine P100 filters;
- 141 fraudulent and 52 genuine combination cartridges; and
- 8 fraudulent and 8 genuine chemical cartridges.

<u>P100 Filters</u>

On the online marketplaces, the fraudulent filters showed signs of concealing, blurring, or deleting part of or the entire P100 certification mark (**Figures 2A, 2B**). When received, the fraudulent P100 filters included the mark as well as "NIOSH", a misrepresentation of the NIOSH approval (**2C, 2D**). **Figure 2** shows the visual differences between the advertised and received fraudulent filters and the close resemblance to genuine NIOSH Approved 3M 2097 and 2091 P100 filters (**2E, 2F**).

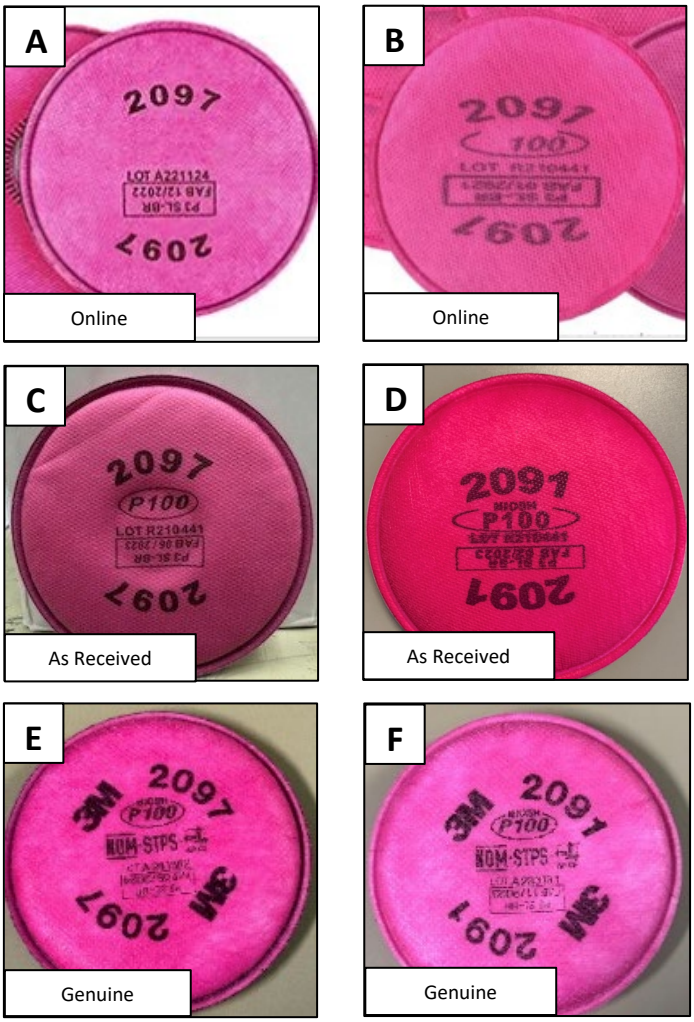

Figure 2: Examples of the appearance of fraudulent filters on the online marketplace (A and B), the appearance of these fraudulent filters when NIOSH received them (C and D), and the appearance of genuine 3M 2097 and 2091 P100 filters (E and F).

Combination Cartridges

The physical appearance and out of box labeling of the fraudulent cartridges (**Figures 3A, 3B, 3C**) were, in most cases, nearly identical to the genuine cartridges (**3D, 3E**). This similarity was seen between the genuine combination cartridge products and fraudulent products with part numbers 60923 and 60926. Some small differences in the shade of coloring could be seen on some cartridges, but overall, they appeared the same. NIOSH also noted the presence of the P100 certification mark and the word "NIOSH" on the labeling sticker affixed to the fraudulent cartridges which misrepresent the product as approved by NIOSH (**3B, 3C**).

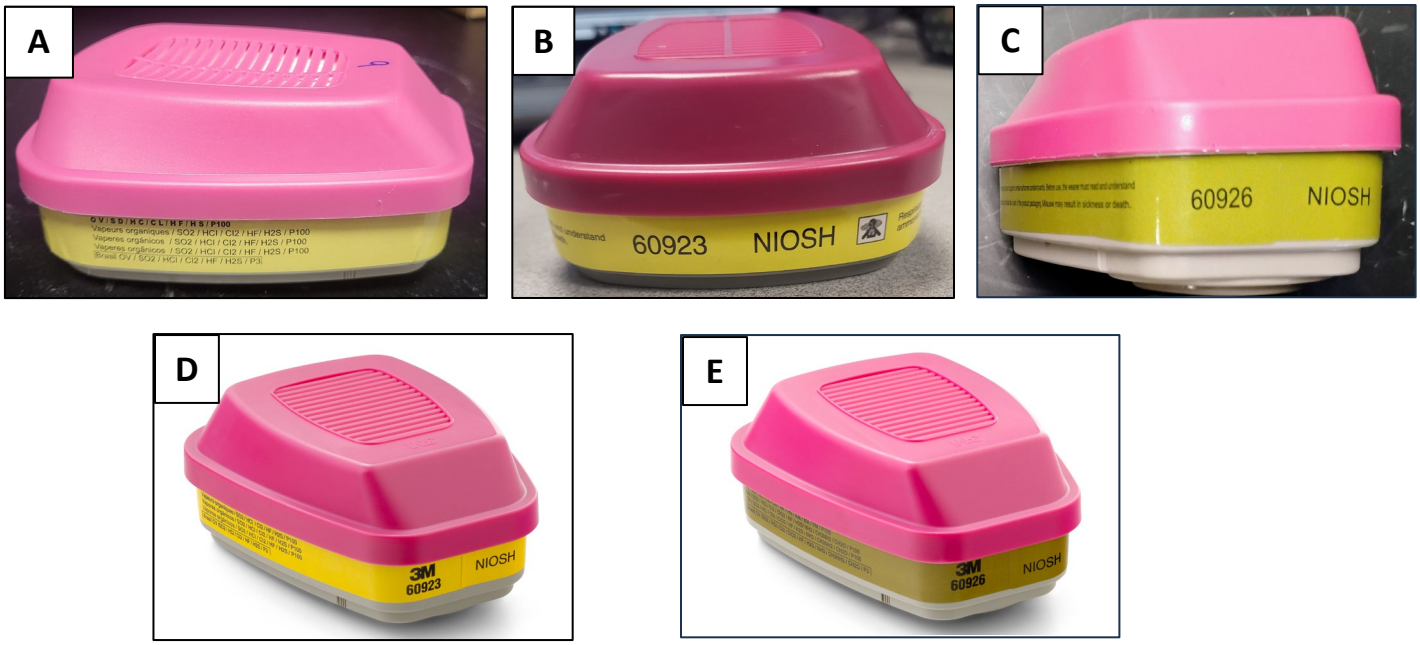

Figure 3: Examples of fraudulent cartridges misrepresenting genuine 3M 60923 and 3M 60926 combination cartridges. Image A depicts a fraudulent 60923 cartridge using the P100 certification mark. Images B and C show fraudulent cartridges using the word "NIOSH." Images D and E show a genuine 60923 and 60926 cartridge.

Chemical Cartridges

The physical appearance and out of box labeling of the fraudulent chemical cartridges (**Figure 4A**) were nearly identical to the genuine cartridges (**4B**) except for the removal of the approval holder's name. NIOSH observed the presence of the word "NIOSH" on the labeling sticker affixed to the fraudulent cartridges, a misrepresentation of the NIOSH approval (**4A**). **Figure 4** showcases the visual similarities between fraudulent chemical cartridge products and genuine products with part number 6001.

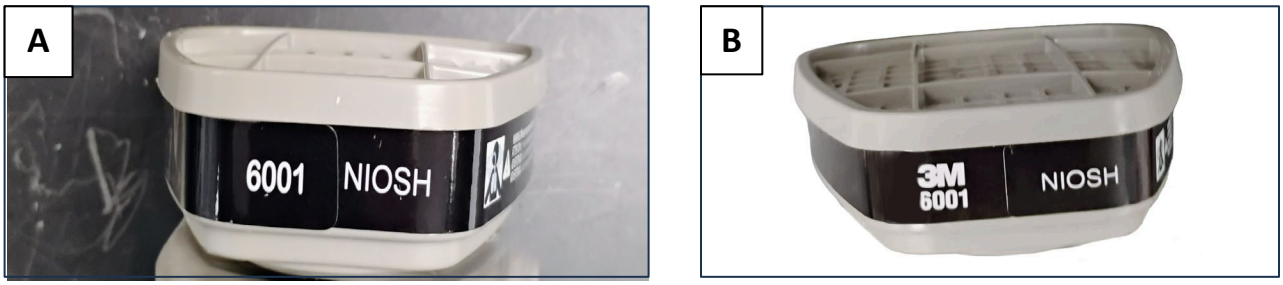

Figure 4: Example of fraudulent 6001 chemical cartridge (A) with similar cartridge label as genuine 3M 6001 (B), except for 3M missing on fraudulent chemical cartridges.

Particulate Filtration Performance

Test Methods

When conducting particulate filtration efficiency testing, NIOSH:

- Evaluated the products according to the requirements in STP-0051.
    - For the purposes of this report, NIOSH considered any maximum penetration value above the NIOSH maximum limit (0.03%) a failure. Any maximum value below the maximum limit was considered a pass.
- Evaluated 20 individual filters for each genuine and fraudulent product.
    - 40 genuine and 240 fraudulent P100 filters
    - 40 genuine and 100 fraudulent combination cartridges
- Conditioned genuine and fraudulent P100 filters in the same chamber and tested on the same test-plate fixtures to minimize any procedural differences.
- Performed initial filter checks on a reference filter to verify the test fixture and system operated normally.
- Performed genuine filter checks after every suspected fraudulent filter test failure to verify proper system function.

Filtration Efficiency Testing Results: P100 Filters

- All 40 genuine P100 filters tested exhibited maximum penetration values below the NIOSH maximum limit (0.03%).
- **220 fraudulent P100 filters tested exhibited maximum penetration values above the NIOSH maximum limit, resulting in failures for 11 out of 12 products** (**Figure 5**). For four fraudulent products, some filters tested exhibited values above 1.00% maximum penetration with values reaching as high as 3.00-4.00%. In five fraudulent products (F-1-1, F-1-3, F-1-5, F-1-6, F-2-3), all filters immediately failed (i.e., the initial penetration exceeded the NIOSH maximum limit).
- **All 20 P100 filters tested for fraudulent product F-2-4 exhibited values below the NIOSH maximum limit.**

NIOSH observed greater variability in maximum penetration values among fraudulent P100 filters compared to corresponding genuine filters. Additionally, all fraudulent products had tests that resulted in immediate failures except for one product (F-2-4).

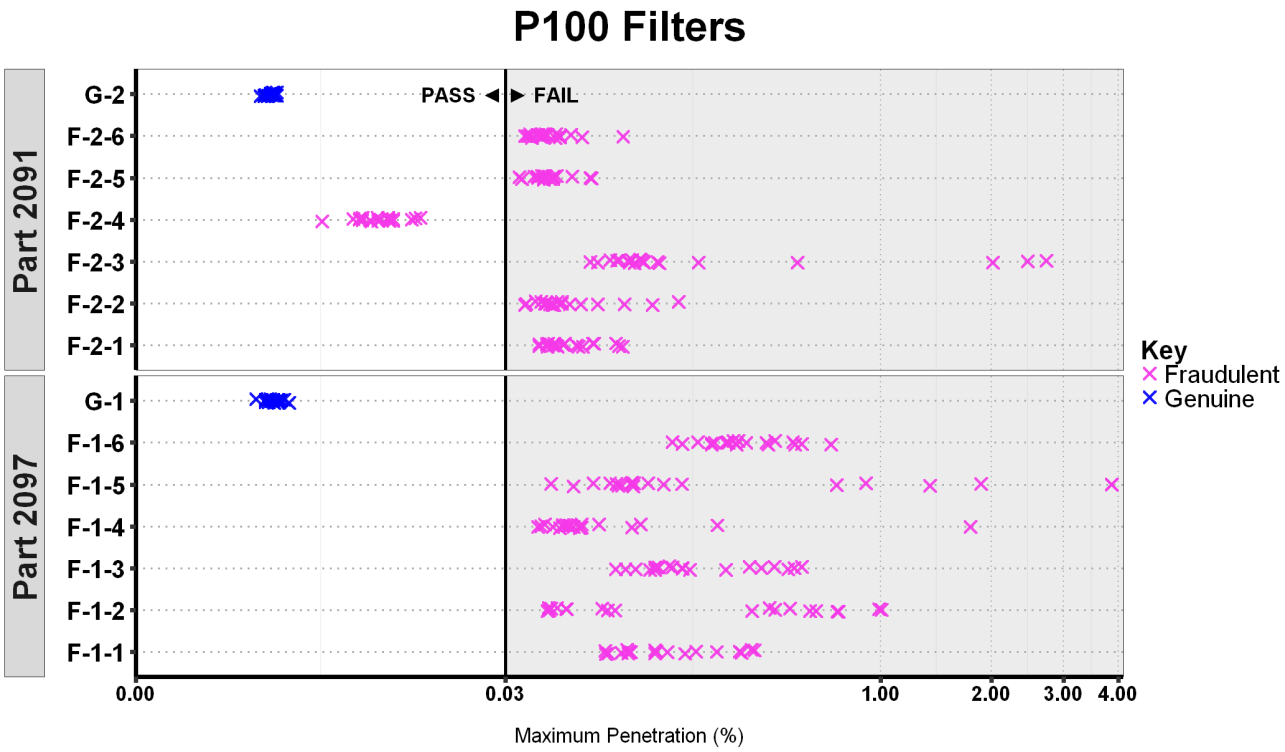

Figure 5. Particulate filter efficiency test results for genuine and fraudulent P100 filters tested. Maximum penetration is depicted on a root scale for visual clarity.

Filtration Efficiency Testing Results: Combination Cartridges

- All 40 genuine combination cartridges tested exhibited maximum penetration values below the NIOSH maximum limit (0.03%).
- **All 100 fraudulent combination cartridges tested exhibited values above the NIOSH maximum limit, resulting in failures**. All fraudulent cartridges **failed immediately**, showing initial penetrations greater than 0.03% (**Figure 6**). Maximum penetration values exceeding 50.0% were observed in cartridges tested from fraudulent products F-3-1 and F-3-3.

NIOSH observed greater variability in maximum penetration values among fraudulent combination cartridges compared to corresponding genuine combination cartridges.

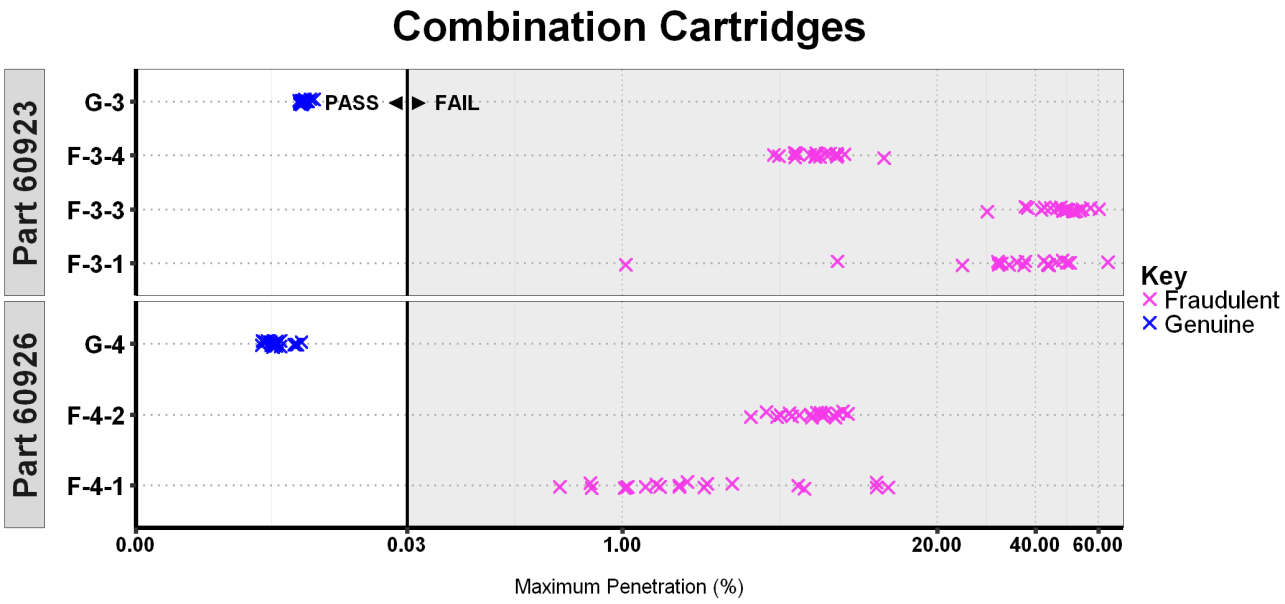

Figure 6. Particulate filter efficiency test results for genuine and fraudulent combination cartridges tested. Maximum penetration is depicted on a root scale for visual clarity.

Chemical Breakthrough

Test Methods

When conducting service life testing, NIOSH:

- Evaluated the products according to the requirements in STP-0046A.
    - For the purposes of this report, NIOSH considered any value below the NIOSH minimum service life requirement a failure. Any value above the minimum service life was considered a pass.
    - The chemical cartridges (6001 and 6001CN) tested were OV only. The service life requirement for these types of cartridges is 50 minutes.
    - The combination cartridges (60923 and 60926) tested provide protection against multiple types of gases. The service life requirement for these types of cartridges is 25 minutes.
- Evaluated two pairs of cartridges for each genuine and fraudulent product.
    - 4 pairs of genuine and 4 pairs of fraudulent chemical cartridges
    - 5 pairs of genuine and 12 pairs of fraudulent combination cartridges
        - To verify the accuracy of the test, NIOSH tested one additional pair of genuine cartridges for product G-3 and two additional pairs of fraudulent cartridges for product F-3-1.
- Verified the breakthrough detectors calibration responded appropriately when exposed to a failing breakthrough concentration of OV prior to any testing.
- Preconditioned the cartridges according to the STP.

Service Life Testing Results: Chemical Cartridges (OV only)

- All four pairs of genuine chemical cartridges tested exhibited values above the NIOSH minimum service life requirement with minimal to no breakthrough.

- **All four pairs of fraudulent chemical cartridges tested exhibited values below the NIOSH minimum service life requirement, resulting in failures**. All fraudulent cartridges experienced **chemical breakthroughs in less than five minutes** (**Figure 7**).

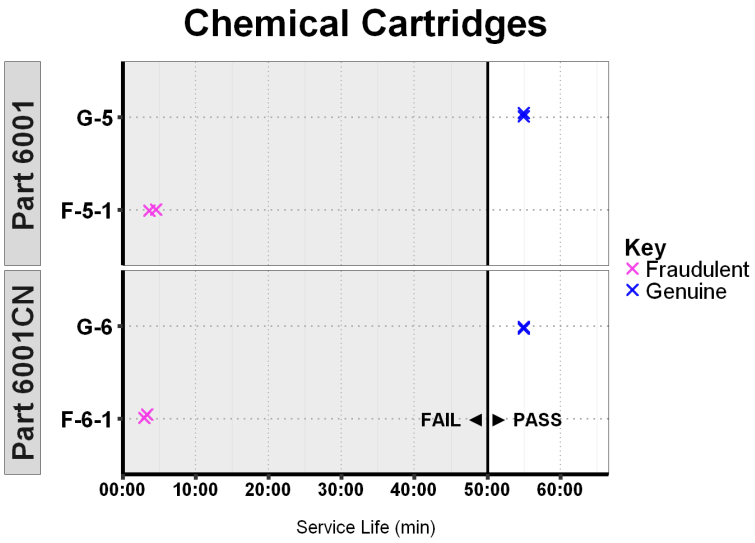

Figure 7. Service life test results for genuine and fraudulent chemical cartridges tested.

Service Life Testing Results: Combination Cartridges

- All five pairs of genuine combination cartridges tested exhibited values above the NIOSH minimum service life requirement.
- **All 12 pairs of fraudulent combination cartridges tested exhibited values below the NIOSH minimum requirement, resulting in failures.**
    - When conducting testing for fraudulent product F-3-3, the pink P100 filter section of one cartridge separated from the bottom half after preconditioning (**Figure 8**). Although NIOSH would consider this an automatic failure during the approval process, to complete the study, NIOSH placed the cover back on and resumed testing.
    - All cartridges tested for fraudulent product F-4-2 experienced breakthrough in less than one minute (**Figure 9**). Given the rapid failure results of the first cartridge pair, before starting the next test, NIOSH checked the test system for leaks and checked the breakthrough detector again to ensure the accuracy of its response/calibration. No leaks or changes to the detector were found and the second test produced the same results.

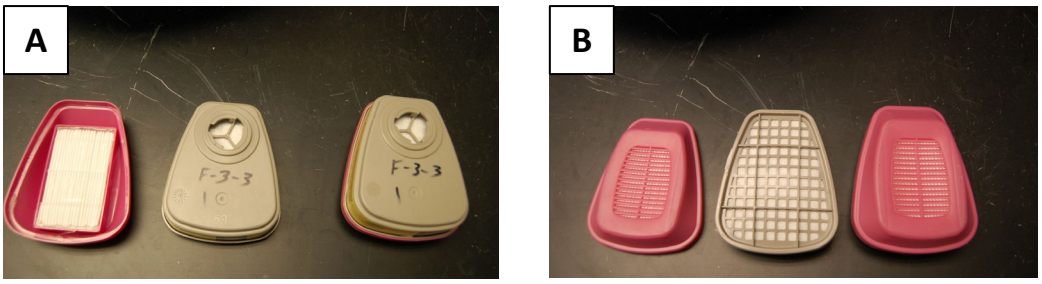

Figure 8: Photos of the bottom (A) and top (B) of F-3-3 Sample 1 showing the detached pink P100 filter cover.

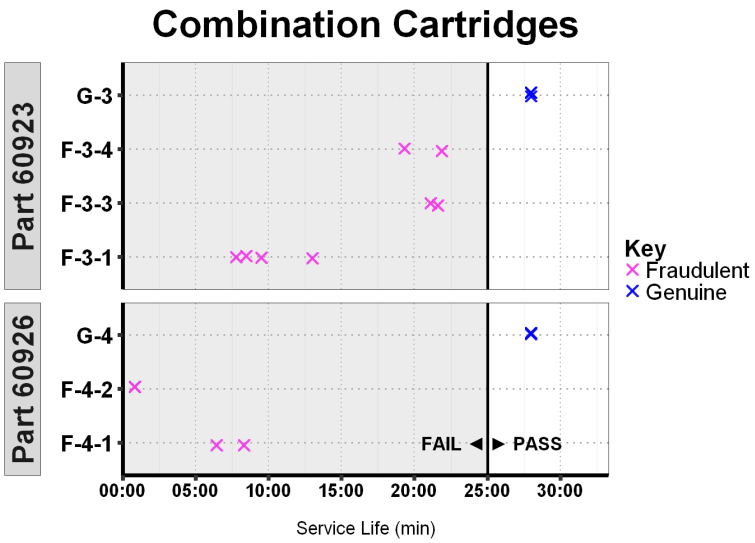

Figure 9. Service life test results for genuine and fraudulent combination cartridges tested.

Inhalation and Exhalation Resistance

Test Methods

When conducting inhalation and exhalation resistance testing, NIOSH:

- Evaluated the products according to the requirements in STP-0003 and STP-0007.
    - For the purposes of this report, NIOSH considered any value above the NIOSH maximum limit a failure. Any value below the maximum limit was considered a pass.
        - The maximum limit for inhalation resistance is 35, 40, and 50 mmH_2O for P100 filters, chemical cartridges, and combination cartridges respectively.
        - The maximum limit for exhalation resistance is 25 mmH_2O for P100 filters and 20 mmH_2O for chemical and combination cartridges.
- Evaluated three pairs of P100 filters and combination cartridges for each genuine and fraudulent product.
- Evaluated two pairs of chemical cartridges for each genuine and fraudulent product (refer to **Table 2**).
- Used a headform to test all genuine and fraudulent products.
- Took inhalation and exhalation resistance once before starting the test and once after completing the test to verify the resistance system.
- Tested each genuine product followed by its corresponding fraudulent products.
- Performed control filter checks periodically to ensure there were no environmental or technical differences.

Inhalation and Exhalation Resistance Testing Results: P100 Filters

- Inhalation Resistance
    - All six pairs of genuine P100 filters tested exhibited inhalation resistance values below the NIOSH maximum limit (35 mmH2O).
    - **All six pairs of P100 filters tested for fraudulent products F-1-1 and F-1-2 exhibited values above the NIOSH maximum limit, resulting in failures.**

- **One pair of P100 filters tested for fraudulent product F-2-1 exhibited a value above the NIOSH maximum limit, resulting in an overall failure.**

- Exhalation Resistance
  - **All pairs of genuine (6) and fraudulent (36) filters tested exhibited exhalation resistance values below the NIOSH maximum limit (25 mmH_2O).**

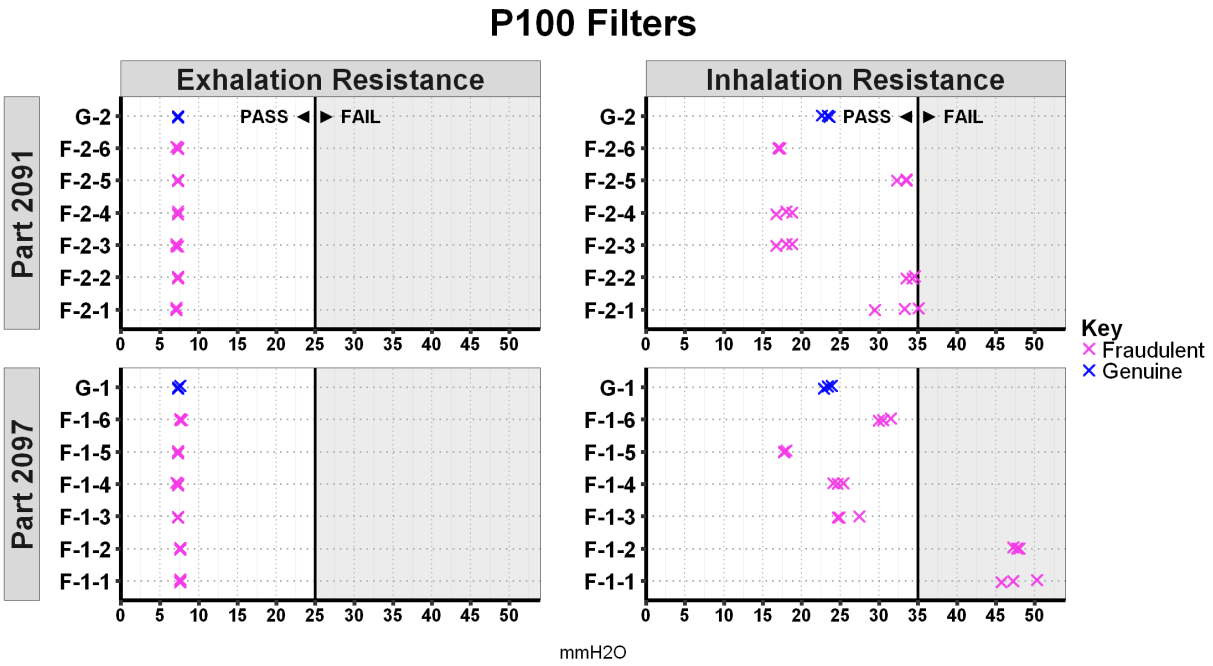

Figure 10. Inhalation and exhalation test results for genuine and fraudulent P100 filters tested.

Inhalation and Exhalation Resistance Testing Results: Chemical Cartridges

- Inhalation Resistance
  - **All pairs of genuine (4) and fraudulent (4) chemical cartridges tested exhibited inhalation resistance values below the NIOSH maximum limit (40 mmH_2O).**
- Exhalation Resistance
  - **All pairs of genuine (4) and fraudulent (4) chemical cartridges tested exhibited exhalation resistance values below the NIOSH maximum limit (20 mmH_2O).**

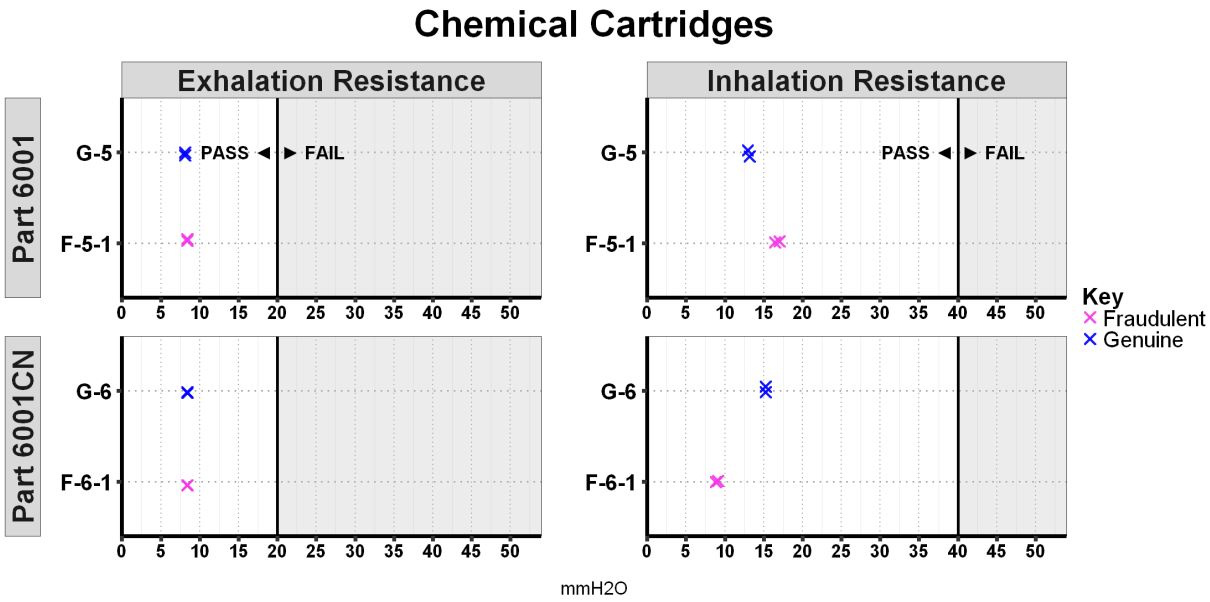

Figure 11. Inhalation and exhalation test results for genuine and fraudulent chemical cartridge tested.

Inhalation and Exhalation Resistance Testing Results: Combination Cartridges

- Inhalation Resistance
  - **All pairs of genuine (6) and fraudulent (15) combination cartridges tested exhibited inhalation resistance values below the NIOSH maximum limit (50 mmH_2O).**
- Exhalation Resistance
  - **All pairs of genuine (6) and fraudulent (15) combination cartridges tested exhibited exhalation resistance values below the NIOSH maximum limit (20 mmH_2O).**

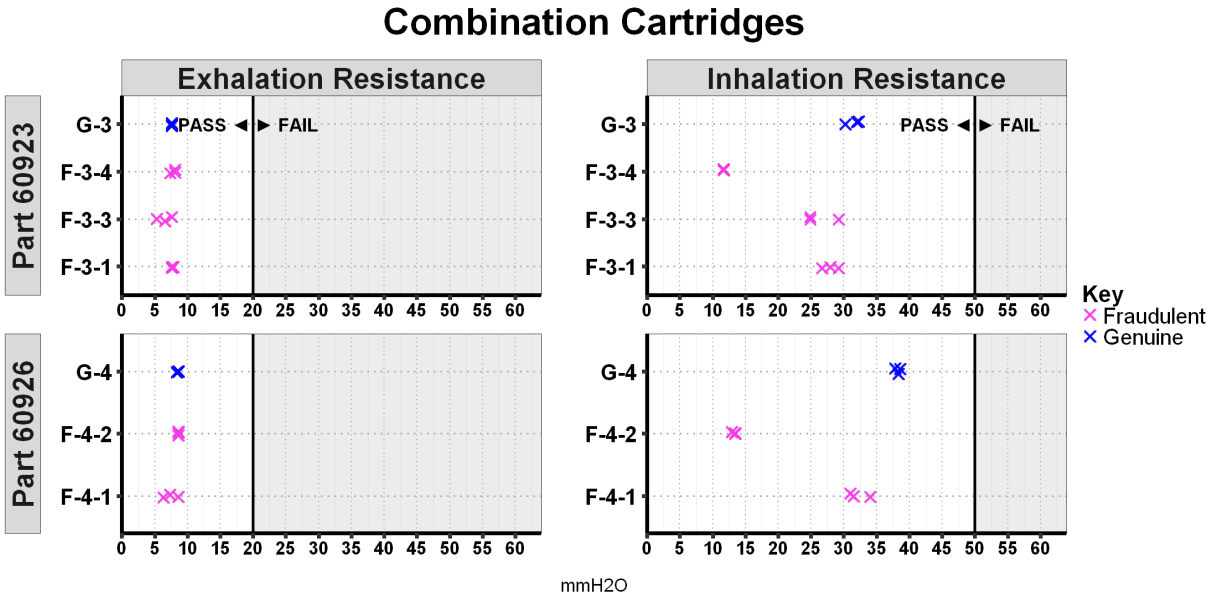

Figure 12. Inhalation and exhalation test results for genuine and fraudulent combination cartridges tested.

CASE Findings

Findings for Visual Inspection, Filtration Performance, OV Service Life (Breakthrough Time), Inhalation Resistance, and Exhalation Resistance

Overall, NIOSH found that nearly all fraudulent respirator components tested failed to meet all three required performance tests.

- **220/240** P100 filters failed
- **124/124** combination cartridges failed
- **8/8** chemical cartridges failed

This finding highlights the possibility that fraudulent products may provide consumers with a false sense of confidence that they are receiving the same level of protection as filters and cartridges that are part of a NIOSH Approved respirator configuration provide.

Findings of P100 Filters:

Upon visual inspection, the fraudulent P100 filters received closely resembled genuine 3M 2097 and 3M 2091 P100 filters and used a NIOSH certification mark (i.e., P100), as well as the word "NIOSH," misrepresenting a NIOSH Approved product (see **Figure 2**). Some online marketplace photos had the P100 mark removed/blurred out, but the product received had the mark printed on the filter.

When NIOSH evaluated the filtration performance of the P100 filters, all 40 genuine filters had maximum penetration values below the NIOSH maximum limit (0.03%), resulting in passes. All tests for 11 of the 12 fraudulent P100 products (220 out of 240 fraudulent filters tested, or 91.67%) had maximum penetration values above the NIOSH maximum limit, **resulting in failures**. All 20 filters tested for fraudulent product 2091 showed maximum penetration values below the NIOSH maximum limit (0.03%). NIOSH observed greater variability in maximum penetration values among fraudulent P100 filters compared to corresponding genuine filters.

When NIOSH evaluated the inhalation and exhalation resistance of the filters, all six pairs of genuine filters had inhalation and exhalation resistance values **below** the NIOSH maximum limits, resulting in passes. Three of the twelve fraudulent P100 products had at least one pair of filters fail testing, **resulting in an overall failure determination**. The three product failures included two fraudulent 2097 products and one fraudulent 2091 product.

Findings of Chemical Cartridges:

Upon visual inspection, the physical appearance and out-of-box labeling of the fraudulent chemical cartridges were nearly identical to the genuine 3M 6001 cartridges except for the removal of the approval holder's name (see **Figure 4**). NIOSH observed the presence of the word "NIOSH" on the labeling sticker affixed to the fraudulent cartridges, a misrepresentation of the NIOSH approval.

When NIOSH evaluated the OV service life of the chemical cartridges, the two pairs of genuine cartridges had values **above** the NIOSH minimum service life requirement (50 minutes) with minimal to no breakthrough. The two pairs of fraudulent cartridges had values **below** the NIOSH minimum service life requirement (50 minutes), **resulting in failures**. All fraudulent cartridges **experienced chemical breakthrough in less than five minutes**.

When NIOSH evaluated the inhalation and exhalation resistance of the cartridges, the two pairs of genuine and two pairs of fraudulent cartridges had inhalation and exhalation resistance values **below** the NIOSH maximum limits, resulting in passes.

Findings of Combination Cartridges:

Upon visual inspection, the physical appearance and labeling of the fraudulent combination cartridges were, in most cases, nearly identical to the genuine cartridges (see **Figure 3**). This similarity was seen between the genuine combination cartridges and the fraudulent cartridges with part numbers 60923 (three products) and 60926 (two products). These cartridges included NIOSH's P100 certification mark and used the word "NIOSH" on the labeling sticker affixed to the fraudulent cartridges.

When NIOSH evaluated the filtration performance of the combination cartridges, all 40 genuine cartridges had maximum penetration values **below** the NIOSH maximum limit (0.03%), resulting in passes. All tests for the fraudulent products—i.e., three fraudulent 60923 products (60 cartridges tested) and two fraudulent 60926 products (40 cartridges tested)—had values **above** the NIOSH maximum limit, **resulting in failures**. Nine cartridges tested from fraudulent products **F-3-1 and F-3-3 showed maximum penetration values above 50.0%**.

When NIOSH evaluated the OV service life of the cartridges, all five pairs of genuine cartridges had values **above** the NIOSH minimum service life requirement (25 minutes), resulting in passes. All 12 pairs of fraudulent cartridges had values **below** the NIOSH minimum service life requirement (25 minutes), **resulting in failures**. Both pairs of cartridges tested for fraudulent product **F-4-2 showed chemical breakthrough in less than one minute**.

When NIOSH evaluated the inhalation and exhalation resistance of the cartridges, all pairs of genuine (6) and fraudulent (15) cartridges had inhalation and exhalation resistance values **below** the NIOSH maximum limits, resulting in passes.

Table 3. Summary of all testing performed. Cells indicate the fraction (and percentage) of tests performed that yielded a passing result. Green shading indicates when 100% of tests for a given product and STP passed.

	Part Number	Product Reference Number	STP 3 Passing Tests (Inhalation Resistance)	STP 7 Passing Tests (Exhalation Resistance)	STP 51 Passing Tests (Filtration Efficiency)	STP 46 Passing Tests (Service Life)
P100 Filter	2097	G-1	3/3 (100%)	3/3 (100%)	20/20 (100%)	N/A
		F-1-1	0/3 (0%)	3/3 (100%)	0/20 (0%)	N/A
		F-1-2	0/3 (0%)	3/3 (100%)	0/20 (0%)	N/A
		F-1-3	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-1-4	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-1-5	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-1-6	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
	2091	G-2	3/3 (100%)	3/3 (100%)	20/20 (100%)	N/A
		F-2-1	2/3 (67%)	3/3 (100%)	0/20 (0%)	N/A
		F-2-2	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-2-3	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-2-4	3/3 (100%)	3/3 (100%)	20/20 (100%)	N/A
		F-2-5	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
		F-2-6	3/3 (100%)	3/3 (100%)	0/20 (0%)	N/A
Combination Cartridge	60923	G-3	3/3 (100%)	3/3 (100%)	20/20 (100%)	3/3 (100%)
		F-3-1	3/3 (100%)	3/3 (100%)	0/20 (0%)	0/4 (0%)
		F-3-3	3/3 (100%)	3/3 (100%)	0/20 (0%)	0/2 (0%)
		F-3-4	3/3 (100%)	3/3 (100%)	0/20 (0%)	0/2 (0%)
	60926	G-4	3/3 (100%)	3/3 (100%)	20/20 (100%)	2/2 (100%)
		F-4-1	3/3 (100%)	3/3 (100%)	0/20 (0%)	0/2 (0%)
		F-4-2	3/3 (100%)	3/3 (100%)	0/20 (0%)	0/2 (0%)
Chemical Cartridge	6001	G-5	2/2 (100%)	2/2 (100%)	N/A	2/2 (100%)
		F-5-1	2/2 (100%)	2/2 (100%)	N/A	0/2 (0%)
	6001CN	G-6	2/2 (100%)	2/2 (100%)	N/A	2/2 (100%)
		F-6-1	2/2 (100%)	2/2 (100%)	N/A	0/2 (0%)

What Can End Users Do to Learn More about the Fraudulent Respirator Components Sold in Online Marketplaces?

- End users should check NIOSH's Certified Equipment List to verify NIOSH approval of respirator components.
- To determine if a respirator is fraudulent, please review NIOSH's Counterfeit/Misrepresented Respirators webpage and NIOSH's Informing Workers of Counterfeit and Misrepresented Respirators fact sheet [DHHS 2025].
- To report suspected fraudulent respirators, email NIOSH at ppeconcerns@cdc.gov with the following information:
    - The company name on the respirator
    - Respirator model or part number
    - Photos of the respirator and packaging
    - NIOSH approval number (e.g., TC-84A-XXXX, TC-21C-XXXX), if present
    - Web URL where respirator was purchased or found
- A Technical Bulletin reported by 3M titled "3M Alert: Fraudulent/Counterfeit Product Offered Online" describes their concerns for end users and provides tips for purchasing genuine 3M respiratory protection products [3M 2024].
- Sign up for NPPTL's Listserv by subscribing to email updates and stay up to date on personal protective equipment research.

For more information related to personal protective equipment, visit NIOSH's Personal Protective Equipment page.

Get More Information

Find NIOSH products and get answers to workplace safety and health questions:
1-800-CDC-INFO (1-800-232-4636) | TTY: 1-888-232-6348
CDC/NIOSH INFO: cdc.gov/info | cdc.gov/niosh
Monthly NIOSH eNews: cdc.gov/niosh/eNews

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