



**NOT MEASUREMENT
SENSITIVE**

DOE-STD-3025-2007

February 2007

Supersedes

DOE-STD-3025-99

DOE TECHNICAL STANDARD

Quality Assurance Inspection and Testing of HEPA Filters



**U.S. Department of Energy
Washington, D.C. 20585**

AREA SAFT

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

FOREWORD

This U.S. Department of Energy (DOE) standard supersedes DOE-STD-3025-99 and is approved for use by DOE and its contractors. In 2005, DOE privatized its quality assurance inspection and performance testing of High Efficiency Particulate Air (HEPA) filters and now contracts for these services. As a result, DOE-STD-3022-98, *DOE HEPA Filter Test Program* and DOE-STD-3026-99, *Filter Test Facility Quality Program Plan*, are no longer required and will be cancelled.

This standard was developed primarily for application in DOE programs. This standard establishes essential elements of a DOE program for quality assurance inspection and performance testing of HEPA filters to be installed in DOE nuclear facilities that fall within the scope of DOE-STD-3020-2005, *Specification for HEPA Filters Used by DOE Contractors*. This standard was designed to achieve technical coordination among individuals of recognized authority from affected DOE programs, including manufacturers, purchasers, users, and technical experts. A standard working group comprised of subject matter experts drawn from DOE, Defense Nuclear Facilities Safety Board, contractors, and industry was used to prepare the standard.

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may improve this document should be sent to Dr. Subir K. Sen, U.S. Department of Energy, Office of Corporate Safety Programs HS-31/270 CC, 1000 Independence Avenue, SW, Washington, D.C. 20585.

DOE technical standards, such as this standard, do not establish requirements. However, all or part of the provisions in a DOE standard can become requirements under the following circumstances:

- (1) they are explicitly stated to be requirements in a DOE requirements document; or
- (2) the organization makes a commitment to meet a standard in a contract or in an implementation plan or program plan required by a DOE requirements document.

Throughout this standard, the word “shall” is used to denote actions that must be performed if the objectives of this standard are to be met. If the provisions in this standard are made requirements through one of the two ways discussed above, then the “shall” statements would become requirements. It is not appropriate to consider that “should” statements would automatically be converted to “shall” statements as this action would violate the consensus process used to approve this standard. This standard in part incorporates the HEPA testing requirements described in the Secretary of Energy’s June 4, 2001 letter *100 Percent Quality Assurance Testing of HEPA Filters At The DOE Filter Test Facility* to the Defense Nuclear Facilities Safety Board.

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1. SCOPE

This standard establishes essential elements of a Department of Energy (DOE) program for quality assurance inspection and performance testing of High Efficiency Particulate Air (HEPA) filters to be installed in DOE nuclear facilities that fall within the scope of DOE-STD-3020, *Specification for HEPA Filters Used by DOE Contractors*. Quality assurance inspection and performance testing shall be performed at a DOE approved filter test facility (FTF) prior to HEPA filter installation. This standard describes the operational requirements and procedures in performing HEPA filter quality assurance inspection and performance testing.

2. APPLICABLE DOCUMENTS

The following documents either form a part of this standard to the extent specified herein or specify requirements for HEPA filter qualification, quality assurance inspection, or testing. Unless otherwise stated, the current issue date and revision number of a referenced document shall apply, including addenda and/or amendments. In the event of a conflict between provisions of this standard and provisions of the "Other Standards" in Section 2.2, the text of this standard shall take precedence. The Application Guide in subpart 4.5 of ASME NQA-1-2004 describes how ASME NQA-1-2000 addresses the DOE quality assurance requirements.

2.1 Federal Regulations, Department of Energy Standards and Publications

10 CFR Part 830, Nuclear Safety Management
 DOE O 414.1C, Quality Assurance
 DOE-STD-3020, Specifications for HEPA Filters used by DOE Contractors

2.2 Other Standards

ASME AG-1, Code on Nuclear Air and Gas Treatment
 ASME NQA -1, Quality Assurance Program Requirements for Nuclear Facilities
 IEST-RP-CC007.1, Testing of ULPA Filters
 IEST-RP-CC001.4, HEPA and ULPA Filters
 MIL-STD-282, Filter Units, Protective Clothing, Gas-Mask Components, and Related Products Performance - Test Methods

3. DEFINITIONS

Airflow: Airflow expressed in terms of actual cubic feet of air per minute (acfm). Actual cubic feet per minute is a cubic foot of air at actual existing conditions.

Airflow Resistance: The resistance to airflow at the manufacturer rated airflow of the clean filter when tested in accordance with ASME AG-1, FC-5000.

Approved Test Aerosols: Particle-generating materials approved by DOE for penetration testing. Test aerosols approved by the DOE for tests conducted in the FTF are di-octyl phthalate (DOP), also known as DEHP, and di-octyl sebacate (DOS), also known as DEHS. Others may be approved after DOE evaluation. Polystyrene latex (PSL) with 0.3 micrometer diameter may also be used only when testing HEPA filters made with glass fiber media in accordance with IEST-RP-CC007.1. The DOP and DOS aerosols can be thermally generated to produce 0.3 micrometer aerosols using a penetrometer. Alternatively, a Laskin nozzle can be used to generate heterodisperse DOP and DOS aerosols and a laser particle counter used to measure the 0.3 micrometer aerosols.

Effective Filter Media Area: The effective surface area of the filter media in the assembled filter element (without adhesive areas) through which the air stream is passed.

Filter Media Face Velocity: The rated airflow divided by the effective filter media area.

Filter Test Facility (FTF): A facility contracted by DOE specifically to conduct quality assurance inspections and tests of HEPA filters.

Filter Tester: A test apparatus for determining filter penetration and pressure drop as described in MIL-STD-282 and IEST-RP-CC007.1.

High Efficiency Particulate Air (HEPA) Filter: A throwaway, extended-media, dry type filter with a rigid casing enclosing the full depth of the pleats. The filter shall exhibit a minimum efficiency of 99.97% at a test aerosol diameter of 0.3 micrometer.

Nuclear Facility: A reactor or nonreactor nuclear facility where an activity is conducted for or on behalf of DOE and includes any related area, structure, facility, or activity to the extent necessary to ensure proper implementation of the requirements established by 10 CFR Part 830.

Penetration: The downstream test aerosol concentration, expressed as a percentage of the upstream test aerosol concentration.

Penetrometer: A self-contained instrument for the determination of filter penetration and pressure drop using a thermally generated liquid test aerosol with diameter of 0.3 micrometer and a light scattering photometer in accordance with MIL-STD-282.

Preparing Activity: The activity performed by the DOE organization responsible for issuance and interpretation of this standard.

Qualified Filter: HEPA filter designs that have successfully passed qualification or requalification testing performed and certified by an independent test laboratory in accordance with ASME AG-1.

Rated Airflow: The designated airflow capacity of a HEPA filter in acfm.

Standard Orifice Plate: An air flow measurement device having multiple holes that is used for calibrating the air flow in the filter tester.

4. GENERAL REQUIREMENTS

4.1 DOE HEPA Filter Procurement Program

HEPA filters for installation in a DOE nuclear facility that fall within the scope of this standard shall be fabricated, inspected, and tested by the manufacturer to the requirements in DOE-STD-3020.

4.2 Qualification of HEPA Filters to be Installed in Nuclear Facilities

HEPA filters that fall within the scope of this standard shall be "Qualified" in accordance with DOE-STD-3020 and ASME AG-1.

4.3 Quality Assurance Inspection and Performance Testing of HEPA Filters at DOE Approved FTF

Prior to installation in a DOE nuclear facility, HEPA filters that fall within the scope of DOE-STD-3020 and require quality assurance inspection and testing as directed by the Secretary's June 4, 2001 memorandum, *100 Percent Quality Assurance Testing of HEPA Filters At The DOE Filter Test Facility*, shall be inspected and tested by an independent DOE approved FTF.

4.4 Minimum Operating Procedure Requirements for Primary FTF Functions

HEPA filters that require inspection and testing at a DOE approved FTF shall be inspected and tested at an independent facility in accordance with Section 5 of this standard, the purchaser's written specifications or procurement documents, and any special written instructions from the purchaser. Unless otherwise instructed, FTF inspections and tests shall include:

- Visual inspection for compliance with purchase order (e.g., type, size, quantity received, and shipping damage).
- Visual inspection for manufacturing defects and compliance with construction and materials requirements.
- Penetration test at 100% rated airflow for all filters and penetration test at 20% for filters with rated airflow of 125 acfm (0.059 m³/second) and higher.
- Airflow resistance at 100% of rated airflow.

Maximum penetration allowed is 0.03% at an aerosol particle diameter of 0.3 micrometers. If a higher penetration is measured, the filter shall be rejected and purchaser notified in writing with the test results that the filter does not meet the penetration requirements.

Maximum airflow resistance, at rated airflow, is listed in Tables 5.1, 5.3, 5.4, and 5.5 of DOE-STD-3020. The resistance shall be reported to the nearest 0.1 inch (in) water gauge (wg) (25 Pa).

4.5 Site Receipt Inspection

Purchaser shall conduct site receipt inspection of HEPA filters using qualified inspectors with specific training for HEPA filters. HEPA filter containers shall be inspected for shipping damage prior to or immediately after unloading. Each purchaser shall develop detailed inspection criteria. The inspection criteria should include the following:

- Filter orientation and packaging.
- Filter size, model, type and capacity.
- Filter labels, markings, and identification.
- Filter faceguards and separators, when applicable.
- Filter frame, including frame edges, for damage and roughness.
- Filter media damage, including punctures, tears, cracks, holes in the filters, sagging pleats, etc.
- Filter seals and gasket damage, including tears, splits, gaps, poor adhesion, etc.
- Filter dimensions and squareness of the frame.
- Documentation from filter manufacturer as specified in the purchase order including certificate of qualification per Section 4.2.
- Documentation from the FTF per Section 5.3.

5. FILTER TEST FACILITY PROCEDURES

All FTF operations shall be conducted in accordance with written procedures that address the subjects and conform to this standard. All procedures shall contain specific acceptance criteria. The FTF shall prepare, maintain, and operate in accordance with detailed procedures that comply with DOE-STD-3020 and cover, as a minimum, the following functions:

- Receiving inspection.
- Un-boxing, handling, re-boxing, and storage of filters.
- Inspection for defects, damage, and compliance with purchase order specifications.
- Documentation and records keeping as specified in the FTF contract.
- Operating and calibration procedures for each penetration and resistance test device.
- Test and inspection reports, including disposition and retention.
- Labeling of accepted and rejected filters.
- Segregation and disposition of rejected filters.
- Shipping of accepted filters.
- Preparation of monthly and semiannual reports to DOE.
- Training and qualification of personnel.

5.1 Receipt of Filters

5.1.1 Receiving Inspection

All filter packages, crates, and pallets shall be inspected upon receipt at the FTF. Any damage must be noted on the Bill of Lading before signing. Damaged cartons or cartons improperly oriented shall be opened immediately and the filters inspected, and a description of observed damage shall be recorded in the filter inspection and test report.

5.1.2 Initial Handling and Storage

Filter handlers shall be properly trained to handle filter cartons carefully. Cartons shall be oriented with arrows on the filter cartons pointed "up". Filter cartons shall be stacked not more than three (3) high, and pallets shall not be stacked on top of one another or other material stacked on top of HEPA filter pallets. HEPA filters shall be stored in a clean, dry location. Storage facilities for HEPA filters shall be equipped with temperature controls to meet storage requirements specified in DOE-STD-3020.

5.1.3 Pre-Test Filter Inspection

Prior to testing, each filter shall be visually examined for possible damage, compliance with applicable sections of DOE-STD-3020 and purchaser's specifications, and workmanship. Damage to filters noted during the pre-test inspection shall be recorded on the filter inspection and test report. Filters obviously damaged shall not be further tested, but shall be immediately reported to the purchaser for disposition.

The inspection shall, at a minimum, include: verification of general workmanship, filter type, size, gasket installation and material, separators, frame dimension and material, squareness, parallelism of media face, face guards, and required labels or markings. Filters shall be inspected for looseness of filter packs, excessive slump or distortion, loose gaskets, breaks or tears, or patching of the filter media. Manufacturer's labels shall contain test data, test date, and effective filter media area.

5.2 Penetration and Resistance Testing

5.2.1 Testing Requirements and Test Methods

Following visual inspection, each filter, completely encased in the test apparatus, shall be tested for penetration at 100% of the rated airflow, and filters rated at 125 acfm (0.059 m³/second) or greater shall also be tested at 20% of rated airflow. For encapsulated (nipple ended) filters, a special housing may be required to ensure the filter is encased within the test apparatus. Each filter shall be tested for resistance to airflow at 100% of the rated airflow. Test air flow rates shall be measured in actual cubic feet per minute (acfm), and conversion to

standard cubic feet per minute (scfm) is not required. The filter test apparatus shall be equipped with "chucks" which encase the HEPA filter in the test position. Encapsulated (nipple ended) filters shall not be routinely tested for resistance to airflow. Operating, calibration, and test procedures shall be prepared for each test device and shall include, as a minimum, the following elements:

- Filling the generator reservoir and verification of fluid level.
- Daily verification of airflow rates using National Institute of Standards and Technology (NIST) traceable orifice plates. Flow rates shall be adjusted such that the inclined manometer reading is within +/- .02 in. wg of the orifice plate calibration value.
- Adjustment and verification of critical airflows (and temperatures for thermal test method only).
- Calibration of filter test equipment which determines particle size, penetration, and resistance.
- Calibration of instruments which are used to calibrate the filter test equipment.
- Calibration schedules.
- Design and use of adapters to permit tests of non-standard filters or special test procedures.
- Operation, service, and maintenance of test equipment, including the system exhaust air cleaning device.

For penetration and resistance testing, two (2) Penetrometer Systems have long been authorized. Both Penetrometer Systems operate using approved test aerosols. They are:

- The Q-107 for testing filters with rated airflows greater than or equal to 250 acfm (0.12 m³/second).
- The Q-76 for testing filters with rated airflows less than 250 acfm (0.12 m³/second).

5.2.2 Approved Test Aerosols

Test aerosol materials currently approved by DOE for HEPA filter penetration testing are di-octyl phthalate (DOP) and di-octyl sebacate (DOS). Polystyrene latex (PSL) spheres with 0.3 micrometer diameter may also be used only when testing HEPA filters made with glass fiber media in accordance with IEST-RP-CC007.1.

5.3. Inspection and Test Reports and Labeling

5.3.1 FTF Inspection and Test Reports for HEPA Filters

Upon completion of quality assurance inspections and performance tests, the FTF shall provide a written report of test data to the purchaser (see Appendix 1). Reasons for rejection of any filters shall be included in the report and rejected filters specifically identified. The report shall include, as a minimum:

- Identification of the FTF.
- Name of purchaser.
- Purchaser order number.
- Date of shipment receipt at FTF.
- Date of inspection and test.
- Purchaser's specification or standard (if applicable).
- Filter manufacturer.
- Filter description (model or designation number).
- Rated airflow.
- Test air temperature.
- Test relative humidity.
- Barometric pressure at time of test.
- Name of operating technician and supervisor responsible for test.
- Serial number of each filter tested.
- Resistance (in. wg or Pa) across filter pack at rated airflow.
- Penetration test at 100% rated airflow for all filters.
- Penetration test at 20% for filters with rated airflow of 125 acfm (0.059 m³/second) and higher.
- Remarks: Reason for rejection.
 - P = Penetration
 - R = Resistance
 - D = Damage: specify
 - O = Other: as described in Part 2 of Appendix 1

5.3.2 Labeling

Accepted Filters: Each accepted HEPA filter shall be identified with a properly secured "Accepted" label (yellow). A suggested "Accepted" label design is shown in Appendix 2, and includes the following:

- Identification of FTF.
- Filter serial number.
- Resistance at rated airflow.
- Penetration test at 100% rated airflow for all filters.
- Penetration test at 20% for filters with rated airflow of 125 acfm (0.059 m³/second) and higher.
- Date tested.

Rejected Filters: Each rejected HEPA filter shall be identified with a properly secured "Rejected" label (red). A suggested "Rejected" label design is shown in Appendix 2. This label can be a single or double sided label and shall be attached to the filter.

5.4 FTF Personnel

All personnel who inspect, test, supervise, or interpret the results of inspections and tests of HEPA filters at the FTF shall be qualified in accordance with Section 5.4.1 of this standard. Non- FTF personnel who handle HEPA filters, including shipping, receiving, and materials-handling personnel, shall, as a minimum, be instructed in the requirements for proper handling, stacking, and storage of HEPA filters.

5.4.1 Qualification

The FTF shall ensure that personnel selected to conduct, supervise, or interpret the results of FTF inspections and tests are qualified by experience, formal training or instruction, and are physically capable of carrying out the functions for which they are responsible.

Personnel assigned to handle the HEPA filters shall be instructed in the proper procedures for:

- Handling, stacking, storing, un-boxing, re-boxing, crating, and placing filters on pallets.
- Operation of appropriate materials handling equipment, such as fork-lift industrial trucks, hoists, or conveyers.
- Verifying compliance with qualification requirements by supervisor review of records.
- Inspection for shipping damage, correct orientation, and proper stacking at time of receipt.
- Preparing of filters for shipping, including the proper orientation, packaging, and proper loading in transport vehicles.

Personnel responsible for the inspection and testing of HEPA filters, the supervision of inspection and testing activities, or the interpretation of inspection and test results, shall have formal training and demonstrated performance or comprehension in the following:

- All applicable provisions of this standard.
- Applicable specifications for HEPA Filters used at DOE nuclear facilities.
- Materials, construction, and performance specifications of HEPA filters.
- Use and interpretation of filter specifications and purchase criteria, with particular attention to ASME AG-1 Code, Section FC and FK, and Institute of Environmental Sciences publication IEST-RP-CC007.1.
- Performance specifications for and calibration of test devices and other instruments used at the FTF.
- Procedures for handling, inspection, testing, data recording, labeling, and disposition of accepted and rejected filters.

- Proficiency in the operation, adjustment, and maintenance of the FTF instruments and equipment.
- All applicable Quality Assurance requirements (i.e., DOE O 414.1C and NQA-1).

Personnel responsible for interpretation or certification of inspection and test results shall, in addition, have demonstrated proficiency in the following:

- Data evaluation and analysis, including validation of test results.
- Interpretation of applicable standards, specifications, and purchase-order requirements relative to the acceptability of filters.
- Determination of the appropriate rejection status when compliance with all specified requirements cannot be demonstrated.
- Preparation and issuance of appropriate documentation of inspection and test results.
- Materials of construction and certifications, and compliance of filters to such certifications.
- Personnel in this category have the authority to sign data forms and reports attesting to the accuracy and completeness of the reported data or results.

5.4.2 **Physical Qualifications**

Personnel responsible for supervision of inspection and testing activities or for interpretation of inspection and test results shall meet appropriate physical qualifications. They shall include the following:

- Visual acuity, including near vision, depth perception, and color discrimination.
- Physical capability for performing job related tasks.
- Hearing acuity.

5.4.3 **Training**

Personnel responsible for HEPA filter inspection and testing, supervision of inspection and testing activities, or the interpretation of inspection and test results, shall satisfactorily complete a formal training course. This course shall address the principles of HEPA filter testing. The course shall be equivalent to the Harvard University School of Public Health In-Place Filter Testing Workshop. New hires shall receive on-the-job training and instruction by qualified personnel to become completely familiar with the equipment, instrumentation, and procedures. FTF management is responsible for establishing ongoing personnel maintenance and re-certification programs that assure personnel remain qualified to carry-out required FTF activities.

5.4.4 **Documentation**

Physical and technical qualifications of personnel responsible for inspection and testing, supervision of inspection and testing activities, and interpretation of inspection and test results, shall be documented. Documentation shall include

written evidence of the dates and extent of instruction and formal training, and shall be signed by a responsible supervisor. The supervisor's signature will certify satisfactory demonstration of the individual's ability to perform all job functions.

Personnel records shall be retained for the duration of the FTF contract and as specified in Section 5.10, and shall be subject to audit and recertification by demonstration as specified by facility procedures. Recertification will be required at intervals to be defined in facility operating procedures.

5.5. Reports

The FTF shall prepare a monthly and semi-annual report describing test activities for that period, including a tabulation of test data as described below. Copies shall be sent only to the DOE as specified by the FTF contract. Further distribution of HEPA filter test data shall be at the discretion of DOE.

5.5.1 Test Data Summary

A summary of HEPA filter test data during the report period shall be presented in table form separated by filter model type and so recorded. As a minimum, the tabulation shall provide the following data for each HEPA filter tested:

- Name of purchaser.
- Name of filter manufacturer.
- Purchase order number.
- Rated airflow acfm.
- Number of filters received.
- Number of filters tested.
- Number of filters accepted.
- Number of filters rejected.
- Reason for rejection [as specified in Appendix 3].

5.5.2 Report Format

The format of the monthly and semiannual reports shall be as specified in Appendix 3. Narrative information, including explanations of trends or problems observed during the report period, shall also be provided.

5.6 Contacts with Filter Manufacturers

FTF contact with HEPA filter manufacturers shall preclude the potential for conflicts of interest. When questions arise regarding HEPA filters being tested by the FTF, contacts between the FTF and filter manufacturers will normally be limited to the following: (1) notices of shipping damage; (2) responses to manufacturer's requests for information about filter receipt and test schedules; and (3) queries by the FTF concerning manufacturer's instructions for disposition of rejected filters.

5.7 Waiver & Filter Media Repair

Filter testing shall be performed as specified in DOE-STD-3020. When authorized and agreed to in writing by the purchaser and the FTF manager, the FTF may accept minor deviations from certain specification provisions, provided that the minor deviations do not affect the basic performance of the filter. However, HEPA filters that fail penetration or resistance tests shall not be accepted with waiver, nor shall the FTF attempt to repair damage to the HEPA filter media. It shall be the responsibility of the purchaser and manufacturer to determine disposition of those filters that do not pass either penetration or resistance test.

5.8 Equipment Maintenance and Calibration

FTF equipment (e.g., pressure and temperature measurement instruments, orifice plates, mass-flow meters, and other instruments critical to the performance of tests) shall be properly maintained and calibrated using qualified personnel and NIST traceable standards. Calibration reports and certifications shall be maintained by the FTF and shall be available to DOE upon request.

5.9 Quality Assurance Program

The FTF shall establish, maintain, operate, inspect, and test HEPA filters in accordance with a Quality Assurance Plan that conforms to DOE O 414.1C and ASME NQA-1.

5.10 Document Control and Records Management

The FTF shall maintain controlled access to all stored records of data and other technical information generated in the performance of quality assurance inspection and performance testing of HEPA filters. Documents shall be maintained in a safe and secure manner to prevent tampering and water or fire damage. The FTF shall transfer to DOE all data and records at the conclusion of the contract period in accordance with the contract provisions. These shall include, but are not limited to, personnel qualification records, logs of HEPA filter tests, and instrument calibration records.

APPENDIX 1 - HEPA FILTER TEST REPORT

PENETRATION AND RESISTANCE TEST RESULTS (Part 1)

PAGE OF

PURCHASER		TEST CRITERIA		NUMBER ORDERED	DATE RECEIVED
		DOP PENETRATION			
		% @ RATED FLOW	% @ 20% RATED		
PURCHASE ORDER NO.		RESISTANCE		NUMBER RECEIVED	DATE TESTED
		in. wg @ 100% RATED FLOW			
FILTER MODEL NUMBER		SPECIFICATION		NUMBER ACCEPTED	DATE SHIPPED
MANUFACTURER		TEST CONDITIONS		REJECTS	
FILTER DESCRIPTION		TEMPERATURE ° F	TEST FLOW (acfm)	PENETRATION	RESISTANCE
PO REVIEWED BY	RATED FLOW (acfm)	BAROMETRIC PRESS mm Hg	TEST AIR HUMIDITY IN % RH	DAMAGE	OTHER
ITEM No.	FILTER SERIAL NUMBER	INSPECTION RESULTS	RESISTANCE (in. wg)	TEST RESULTS	
				% PENETRATION	
				@ 100% FLOW	@ 20% FLOW
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
DISTRIBUTION			TESTED BY:		
			APPROVED BY:		

APPENDIX 1 - HEPA FILTER TEST REPORT

VISUAL INSPECTION CHECK LIST (Part 2)

Purchaser: _____

P.O.#: _____

Date: _____

Specific Reference for Acceptance Criteria: _____

RECEIVING INSPECTION

	Satisfactory	Unsatisfactory	N/A
Number of Filters Per Shipping Papers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filters Received Upright (pleats vertical)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cartons/Filters Undamaged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crates/Pallets Undamaged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Characteristics As Specified In Purchase Order or Specifications:

	Satisfactory	Unsatisfactory	N/A
Number of Filters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frame Material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frame Construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gaskets:			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Capacity -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UL-586 Label	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faceguards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separators -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Required Labels/Marking/Identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exposed Edges of Frame Sealed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frame Edges/Faces Free of Splinters/Rough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gaskets Secure and Undamaged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fluid Seal Gasket Undamaged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No Damage to Filter Media -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filter Dimensions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Squareness of Frame	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hidden Shipping Damage -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filter Pack Tightness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Filter Workmanship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Inspected by: Name _____

Approved by: Name _____

APPENDIX 2 – LABEL EXAMPLES

Accepted Label (Yellow)

FILTER TEST FACILITY			
Address			
DOE Contract: _____			
Filter Serial Number: _____			
FILTER TEST RESULTS			
Resistance (in. wg)	% Penetration at 100% Flow	% Penetration at 20% Flow	Date of test

**Rejected Label (Red)
Front**

<h1 style="margin: 0;">REJECTED</h1>	
FILTER TEST FACILITY	
Address	
Inspector: _____	Date: _____

**Rejected Label (Red)
Back**

Date: _____				
PO Number: _____				
Purchaser: _____				
			% Penetration	
Filter Ser No.	Findings *	Resistance (in. wg)	100% Flow	20% Flow

* Rejection Codes
 CD - Carrier Damage FP - Filter Pack P - Penetration
 F - Frame G - Gasket R - Resistance
 FG - Face Guards M - Media

Note: Rejected label can be a single or double sided label.

APPENDIX 3 – MONTHLY AND SEMIANNUAL REPORT FORMAT

This Appendix shows the report format and includes the required tabular data that will simplify extracting data for analysis. Other aspects of the monthly and semiannual reports, including any narrative, shall also be provided.

Purchaser	Manufacturer	P O Number	Rated Flow (acfm)	Number Received	Number Tested	Number Accepted	Number Rejected	Reason for Rejection							
								Resistance (in. wg)	Penetration (%)	Manufacturing Defects	Does not meet PO and/or Spec	Shipping Damage			
Subtotal															
Subtotal															
Total															

CONCLUDING MATERIAL

Review Activity:

<u>HQ Offices</u>	<u>Field Offices</u>
NA	Albuquerque Service Center
EE	Chicago Operations Office
HS	Idaho Operations Office
EM	Nevada Operations Office
ME	Oakland Operations Office
NE	Oak Ridge Operations Office
SC	Office of River Protection
	Richland Operations Office

Preparing Activity:

DOE-HS-30

Project Number:

4460-0009

National Laboratories

Brookhaven National Laboratory
Los Alamos National Laboratory
Lawrence Livermore National Laboratory
Oak Ridge National Laboratory
Sandia National Laboratory
Savannah River National Laboratory