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DOE-STD-3022-98

May 1998

Superseding

DOE NE F 3-42

January 1987

DOE STANDARD

DOE HEPA FILTER TEST PROGRAM



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

FSC 4460

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FOREWORD

1. This Department of Energy (DOE) Standard is approved for use by all DOE components and contractors.
2. Beneficial comments (recommendations, additions, deletions) and any pertinent data that may improve this document should be sent to the Office of the Associate Deputy Assistant Secretary for Technical and Environmental Support (DP-45), U.S. Department of Energy, Washington, DC 20585, by letter or by using the Document Improvement Proposal (DOE F 1300.3) appearing at the end of this document.
3. DOE technical standards such as this technical standard, do not establish requirements. However, all or part of the provisions in a technical standard can become requirements under the following circumstances.
 - (a) they are explicitly stated to be requirements in a DOE requirement's document;
or
 - (b) the organization makes a commitment to meet a standard in a contract or in a plan or program required by a DOE requirement's document.

Throughout this standard, the word "shall" is used to denote actions which must be performed if this standard is to be met. If the provisions in this technical standard are made requirements through one of the two ways discussed above, then the "shall" statements would become requirements.

NOTICE

The Preparing Activity (DP-45) wished to establish continuity between this standard (DOE-STD-3022-98) and its direct predecessor, entitled "Operating Policy of DOE HEPA Filter Test Programs" (NE F 3-42). The original standard was first issued by DOE as a Nuclear Energy (NE) standard on January 29, 1987.

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1.0 SCOPE

This standard establishes essential elements of a Department of Energy (DOE) program for testing HEPA filters to be installed in DOE nuclear facilities or used in DOE-contracted activities. A key element is the testing of HEPA filters for performance at a DOE Filter Test Facility (FTF) prior to installation. Other key elements are (1) providing for a DOE HEPA filter procurement program, and (2) verifying that HEPA filters to be installed in nuclear facilities appear on a "Qualified Products List" (QPL).

2.0 APPLICABLE DOCUMENTS

The following documents are a part of this standard to the extent specified. Unless otherwise stated, the issue date and revision number of a referenced document in effect on the issue date of this standard shall apply. In the event of conflict between provisions of this standard and provisions of the referenced documents, the text of this standard shall take precedence. Appeals in this matter may be addressed to the DOE Preparing Activity (currently DP-45), which is designated as the DOE entity responsible for issuance and interpretation of this standard.

2.1 DOE Standards

DOE NE F 3-43 - Quality Assurance Testing of HEPA Filters

DOE NE F 3-44 - DOE Filter Test Facilities Quality Program Plan

DOE-STD-3020-97 - Specifications for HEPA Filters Used by DOE Contractors

2.2 Institute of Environmental Sciences, Mt. Prospect, Illinois

IES-RP-CC001.3 - HEPA and ULPA Filters

3.0 DEFINITIONS

Acceptance Test—Inspection and testing of a HEPA filter to verify certain characteristics or properties which determine acceptance or rejection of that filter.

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Airflow Resistance—An index of the energy required to maintain airflow through a filter. Airflow resistance is measured in terms of the air pressure difference (pressure drop) across a filter at a specified flow rate (e.g., see Section 5.2.2, Table 1 of DOE Standard DOE-STD-3020-97). Note: The initial airflow resistance of a new filter serves as an index of the filter's potential loading capacity.

Approved Test Aerosol—Particle-generating materials approved by DOE for test activities at a DOE HEPA Filter Test Facility (FTF). Test aerosols currently approved by the DOE for tests conducted in a DOE FTF are di-octyl phthalate (DOP), also known as DEHP, and di-octyl sebacate (DOS), also known as DEHS.

Filter Test Facility (FTF)—A facility accepted by the DOE specifically to conduct quality assurance tests of HEPA filters.

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% when tested at an aerosol diameter of 0.3 micrometers aerodynamic diameter. The maximum airflow resistance shall be as specified in Section 5.2, Table 1 of DOE Standard DOE-STD-3020-97.

Nuclear Facility—Nuclear facility means reactor and nonreactor nuclear facilities. This definition is taken from 10 CFR 830- Nuclear Safety Management, section 830.3, Definitions. "Nonreactor nuclear facility" as well as "reactor" are defined in detail in this section of the Code of Federal Regulations.

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

Preparing Activity—The DOE organization responsible for issuance and interpretation of this standard.

4.0 GENERAL PROVISIONS

This standard is applicable to all HEPA filters defined as performance Type B filters in the Institute of Environmental Sciences publication "HEPA and ULPA Filters," IES-RP-

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CC001.3, that are procured for installation in DOE nuclear facilities under the program described in this standard. Each filter model is to be tested for compliance with HEPA filter specifications that appear in Section 6.1.2 "Qualifications Testing" of DOE-STD-3020-97 prior to acceptance of the filter model for use in DOE installations.

Each individual HEPA filter is to be tested and inspected at a DOE Filter Test Facility in accordance with provisions contained in DOE Standard NE F 3-43 for compliance with purchase specifications and performance criteria prior to installation. HEPA filters that fail to pass the acceptance tests are identified as "rejected" and are not to be installed in a nuclear facility.

DOE may offer its HEPA filter testing services to other federal agencies and commercial organizations on a cost-recovery basis. DOE FTF services are also available to test HEPA filters used for other than nuclear applications, such as Ultra-Low Penetration Air (ULPA) filters or other high quality filters, using current test equipment and test methods, on a cost recovery basis. A schedule of the costs for these services can be obtained by contacting the FTF. If other types of filters, or HEPA filters not intended for installation in DOE nuclear facilities, are inspected and tested for penetration and resistance at the FTF, these tests are to be conducted using the FTF's standard test procedures, as specified in Section 6.0 and 7.0 of DOE Standard F 3-43.

Except as stated in the preceding paragraph, this standard, and related standards, shall not apply to HEPA filters used by DOE contractors for purposes other than installation in DOE nuclear facilities. Examples of filters which are outside the scope of this or related standards are "clean room" filters or those currently defined as performance Type A, C, or D filters in the Institute of Environmental Sciences publication "HEPA and ULPA Filters" IES-RP-CC001.3.

5.0 OPERATIONAL PROVISIONS

This section discusses specific attributes of the DOE program described in this standard.

5.1 FTF Services

The following services will be provided by the DOE FTF to DOE contractors and non-DOE customers.

- Penetration and resistance testing.
- Visual inspection for damage and visible defects.
- Inspection for compliance with visually verifiable filter specifications or special purchase order instructions.

5.2 Charges for FTF Services

Inspection and test services shall be provided without charge to DOE installations and to DOE-site contractors. Services shall be provided to other than DOE prime contractors, other federal agencies, and commercial users in accordance with prices established in advance with the FTF.

5.3 Contacts with Filter Manufacturers

To minimize the potential for conflicts of interest, 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 scheduling; and (3) queries by an FTF concerning manufacturer's instructions for disposition of rejected filters. When it appears that there is a need for special test provisions, e.g., special chucks or adapters, direct discussions between the manufacturers and FTF staff are encouraged, but the special test provisions shall be arranged through the filter purchaser.

5.4 Purchase Order Specifications and Instructions

Purchasers of HEPA filters shall furnish copies of HEPA filter purchase orders and applicable specifications to the FTF. If the purchasing agent fails to supply these documents, the FTF shall not inspect or test filters until appropriate instructions have been received. Filter testing for commercial (charged) customers shall not commence until an authorized purchase order for payment of FTF services has been received and accepted by the FTF business office.

5.5 New or Special Filters

The following steps are to be followed for DOE to consider new filter types or special filters: (1) submit evidence to the DOE DP Headquarters that the filters have met all qualification provisions of DOE-STD-3020-97, ASME code AG-1, section FC and appendix FC-I, and Mil-F-51079, or petition DOE for a waiver when qualification provisions are not met; (2) file an application for consideration to the DOE DP Headquarters; (3) obtain review of evidence, application, and filter design by the Technical Support Group (TSG) and the Technical Review Committee (TRC); (4) obtain recommendations for technical acceptance to the DOE approval authority from both the TSG and the TRC; and (5) receive DOE DP Headquarters determination on application.¹

5.6 Receipt Inspection

Incoming filters shall be inspected for shipping damage as soon as possible after receipt. The FTF shall promptly notify and provide documentation to the shipper and the purchaser of any observed shipping damage. The purchaser is responsible for resolving any claims for shipping damage.

5.7 Acceptance Testing

To conform with the program, HEPA filters shipped from the vendor shall be inspected and tested at an FTF prior to installation in a DOE nuclear facility. Acceptance of filters by the purchaser is contingent upon successful completion of inspections and tests at the FTF to verify compliance with purchase specifications, including any special provisions that appear on individual purchase orders.

5.8 FTF Inspection and Test Schedules

The FTF shall make every effort to complete filter inspections and testing within 15 working days of arrival at the FTF. The FTF shall notify the purchaser if this

¹ The current Preparing Activity and approval authority is DP-45

goal cannot be met. Requests for accelerated testing schedules shall be accommodated when feasible.

5.9 Labeling

Accepted filters shall be identified with a permanent label showing the results of penetration and resistance tests, the date of the tests, and the identification of the FTF which completed the testing. Rejected filters shall be identified and labeled as such. Accepted and rejected filters shall be physically segregated to prevent commingling.

5.10 Waiver

Filter testing shall be performed as specified by Section 7.0 of DOE Standard NE F 3-43 and, for special cases, by the purchaser. When authorized and agreed to in writing by the purchaser and the FTF manager, an individual 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 an 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 these two mandatory provisions.

5.11 Disposition of Accepted and Rejected Filters

Filters accepted by the FTF shall be forwarded to the destination designated by the purchaser at the purchaser's expense. It is the responsibility of the purchaser and the manufacturer to determine proper disposition of rejected filters.

5.12 Test Reports

Upon completion of inspections and tests, the FTF shall provide a written report of test data to the purchaser. Reasons for rejection of any filters shall be included in the report and rejected filters specifically identified.

5.13 Periodic Reports

Semiannual reports of FTF testing activities shall be prepared by the FTF and transmitted in accordance with Section 10 of DOE Standard NE F 3-43.

Semiannual reports may contain proprietary information and distribution shall be limited accordingly.

6.0 QUALITY ASSURANCE

6.1 Quality Assurance Program

Under the program each FTF shall establish, maintain, and operate in accordance with a Quality Assurance Plan that conforms to DOE Standard NE F 3-44.

6.2 Procedures

All inspections and tests within the program shall be conducted in accordance with written procedures described in Section 7.0 of DOE Standard NE F 3-43.

6.3 Verification of FTF Operations

Periodic Round-Robin comparison tests of selected filters shall be conducted in accordance with Section 11.0 of DOE Standard NE F 3-43. FTF activities shall be subject to periodic review and assessment by DOE.

7.0 TECHNICAL SUPPORT

7.1 Technical Support Group

Under this program, DOE maintains a Technical Support Group (TSG) to provide technical assistance, including solution of problems; investigation/development of alternate test aerosols and instruments; and investigation of other facilities or equipment of interest to the DOE filter test program. The TSG shall also perform technical assessments of FTF activities, coordinate and report on Round Robin Tests, review semiannual reports of testing prepared by the FTF, and prepare an Annual Report of Testing, in accordance with program management.

Recommendations resulting from investigations or research by the TSG shall be

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submitted to DOE but shall not be implemented until approved. DOE shall communicate, as appropriate, with the filter industry to promote technology development and/or exchange of information developed by the TSG. The TSG is also to play a role in recommending technical adequacy of new filter types or special filters per section 5.5 of this standard.

7.2 Technical Review Committee

A Technical Review Committee (TRC) is established under this program as an advisory group composed of filter manufacturers, university representatives, and subject matter experts. The TRC shall perform the following functions: provide formal review and comment on the content of these standards; provide formal review and comment on matters relating to selection and development of new test aerosols or test methods; provide recommendations to DOE via a ballot process on issues related to these standards, selection of new test aerosols, or selection of new test methods; and participate in the process of reviewing technical adequacy of new filter types or special filters per section 5.5 of this standard.

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CONCLUDING MATERIAL

Review Activities:

DOE

OR

RF-FTF

Hanford-FTF

Preparing Activity:

DP-45

Project Number:

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