

**High efficiency air filters (EPA, HEPA and ULPA) -
Part 4: Determining leakage of filter elements (scan
method)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 1822-4:2010 sisaldab Euroopa standardi EN 1822-4:2009 ingliskeelset teksti.

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English Version

**High efficiency air filters (EPA, HEPA and ULPA) - Part 4:
Determining leakage of filter elements (scan method)**

Filtres à air à haute efficacité (EPA, HEPA et ULPA) -
Partie 4: Essais d'étanchéité de l'élément filtrant (méthode
d'exploration)

Schwebstofffilter (EPA, HEPA und ULPA) - Teil 4:
Leckprüfung des Filterelementes (Scan-Verfahren)

This European Standard was approved by CEN on 17 October 2009.

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Foreword

This document (EN 1822-4:2009) has been prepared by Technical Committee CEN/TC 195 “Air filters for general air cleaning”, the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1822-4:2000.

It contains requirements, fundamental principles of testing and the marking for efficient particulate air filters (EPA), high efficiency particulate air filters (HEPA) and ultra low penetration air filters (ULPA).

The complete European Standard EN 1822, *High efficiency air filters (EPA, HEPA and ULPA)* will consist of the following parts:

- *Part 1: Classification, performance testing, marking*
- *Part 2: Aerosol production, measuring equipment, particle counting statistics*
- *Part 3: Testing flat sheet filter media*
- *Part 4: Determining leakage of filter elements (scan method)*
- *Part 5 : Determining the efficiency of filter elements*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

As decided by CEN/TC 195, this European Standard is based on particle counting methods which actually cover most needs of different applications. The difference between this European Standard and previous national standards lies in the technique used for the determination of the integral efficiency. Instead of mass relationships, this technique is based on particle counting at the most penetrating particle size (MPPS), which is for micro-glass filter mediums usually in the range of 0,12 μm to 0,25 μm . This method also allows to test ultra low penetration air filters, which was not possible with the previous test methods because of their inadequate sensitivity.

For Membrane and synthetic filter media, separate rules apply; see Annexes A and B of EN 1822-5:2009.

1 Scope

This European Standard applies to efficient air filters (EPA), high efficiency air filters (HEPA) and ultra low penetration air filters (ULPA-filters) used in the field of ventilation and air conditioning and for technical processes, e.g. for applications in clean room technology or pharmaceutical industry.

It establishes a procedure for the determination of the efficiency on the basis of a particle counting method using an artificial test aerosol, and allows a standardized classification of these filters in terms of their efficiency.

This part of EN 1822 applies to the leak testing of filter elements. The scan method which is described in detail regarding procedure, apparatus and test conditions in the body of this standard is valid for the complete range of group H and U filters and is considered to be the reference test method for leak determination. The "Oil Thread Leak Test" according to Annex A and the "0,3 μm - 0,5 μm Particle Efficiency Leak Test" according to Annex E may be used alternatively but for defined classes of group H filters only.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1822-1:2009, *High efficiency air filters (EPA, HEPA and ULPA) — Part 1: Classification, performance testing, marking*

EN 1822-2, *High efficiency air filters (EPA, HEPA and ULPA) — Part 2: Aerosol production, measuring equipment, particle counting statistics*

EN 1822-3, *High efficiency air filters (EPA, HEPA and ULPA) — Part 3: Testing flat sheet filter media*

EN 1822-5:2009, *High efficiency air filters (EPA, HEPA and ULPA) — Part 5: Determining the efficiency of filter elements*

EN 14799:2007, *Air filters for general air cleaning — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14799:2007 and the following apply.

3.1

total particle count method

particle counting method in which the total number of particles in a certain sample volume is determined without classification according to size (e.g. by using a condensation nucleus counter)

3.2

particle counting and sizing method

particle counting method which allows both the determination of the number of particles and also the classification of the particles according to size (e.g. by using an optical particle counter)

3.3

particle flow rate

number of particles which are measured or which flow past a specified cross section in unit time