

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

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

Filtres à air à haute efficacité (EPA, HEPA et ULPA) -
Partie 5: Mesure de l'efficacité de l'élément filtrant

Schwebstofffilter (EPA, HEPA und ULPA) - Teil 5:
Abscheidegradprüfung des Filterelements

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

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Foreword

This document (EN 1822-5:2009) 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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.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 1822-5:2000.

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).

EN 1822, *High efficiency air filters (EPA, HEPA and ULPA)*, consists 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 element (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 media usually in the range of 0,12 μm to 0,25 μm . This method also allows the testing 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 this standard.

1 Scope

This European Standard applies to efficient particulate air filters (EPA), high efficiency particulate air filters (HEPA) and ultra low penetration air filters (ULPA) 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 a liquid test aerosol, and allows a standardized classification of these filters in terms of their efficiency.

This part of the EN 1822 series deals with measuring the efficiency of filter elements, specifying the conditions and procedures for carrying out tests, describing a specimen test apparatus and its components, and including the method for evaluating test results.

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 779:2002, *Particulate air filters for general ventilation — Determination of the filtration performance*

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

EN 1822-2:2009, *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 1822-4, *High efficiency air filters (EPA, HEPA and ULPA) — Part 4: Determining leakage of filter element (scan method)*

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

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements (ISO 5167-1:2003)*

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

sampling duration

time during which the particles in the sampling volume flow are counted (upstream or downstream)

3.2

measuring procedure with fixed sampling probes

determination of the integral efficiency using fixed sampling probes upstream and downstream of the test filter