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Irish Standard  
I.S. EN 1822-1:2009

# High efficiency air filters (EPA, HEPA and ULPA) - Part 1: Classification, performance testing, marking

## I.S. EN 1822-1:2009

*Incorporating amendments/corrigenda issued since publication:*

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English Version

## High efficiency air filters (EPA, HEPA and ULPA) - Part 1: Classification, performance testing, marking

Filtres à air à haute efficacité (EPA, HEPA et ULPA) -  
Partie 1: Classification, essais de performance et  
marquage

Schwebstofffilter (EPA, HEPA und ULPA) - Teil 1:  
Klassifikation, Leistungsprüfung, Kennzeichnung

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

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## Foreword

This document (EN 1822-1:2009) 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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.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 1822-1:1998.

It is dealing with the performance testing of efficient particulate air filters (EPA), high efficiency particulate air filters (HEPA) and ultra low penetration air filters (ULPA) at the manufacturers site.

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 elements (scan method)*
- *Part 5: Determining the efficiency of filter elements*

This European Standard is based on particle counting methods which actually cover most needs of different applications. The difference between this European Standard and its previous edition lies in the addition of:

- an alternative test method for using a solid, instead of a liquid, test aerosol;
- a method for testing and classification of filters made out of membrane type filter media;
- a method for testing and classification filters made out of synthetic fibre media; and
- an alternative method for leak testing of group H filters with other than panel shape.

Beside that, various editorial corrections have been implemented.

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  $\mu\text{m}$  to 0,25  $\mu\text{m}$ . For Membrane filter media, separate rules apply, see Annex A of EN 1822-5:2009. This method also allows testing ultra low penetration air filters, which was not possible with the previous test methods because of their inadequate sensitivity.

## 1 Scope

This European Standard applies to high efficiency particulate and ultra low penetration air filters (EPA, HEPA and 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 (or alternatively a solid) test aerosol, and allows a standardized classification of these filters in terms of their efficiency, both local and integral efficiency.

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

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*

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

#### **nominal air volume flow rate**

air volume flow rate specified by the manufacturer, at which the filter element has to be tested

### 3.2

#### **superficial face area**

cross-sectional area of the filter element which is passed by the air flow

### 3.3

#### **nominal filter medium face velocity**

nominal air volume flow rate divided by the effective filter medium area

## 4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply:

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