



NSAI
Standards

Irish Standard
I.S. EN 1822-5:2009

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

I.S. EN 1822-5:2009

Incorporating amendments/corrigenda issued since publication:

<i>This document replaces:</i> EN 1822-5:2000	<i>This document is based on:</i> EN 1822-5:2009 EN 1822-5:2000	<i>Published:</i> 18 November, 2009 25 November, 2000
--	---	---

This document was published under the authority of the NSAI and comes into effect on: 17 December, 2009	ICS number: 13.040.40
--	--------------------------

NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
---	--	---

Údarás um Chaighdeáin Náisiúnta na hÉireann

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.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Description of the method	7
4.1 General	7
4.2 Measurement method using fixed sampling probe	8
4.3 Scan method	8
4.4 Statistical efficiency test method for EPA filters (Group E).....	8
5 Test filter.....	9
6 Test apparatus	9
6.1 General	9
6.2 Test duct.....	9
6.2.1 Test air conditioning	9
6.2.2 Adjustment of the volume flow rate.....	9
6.2.3 Measurement of the volume flow rate	9
6.2.4 Aerosol mixing section	9
6.2.5 Test filter mounting assembly.....	9
6.2.6 Measuring points for the pressure drop	10
6.2.7 Sampling.....	10
6.3 Aerosol generation and measuring instruments	11
6.3.1 General	11
6.3.2 Apparatus for testing with a monodisperse test aerosol.....	11
6.3.3 Apparatus for testing with a polydisperse test aerosol	12
7 Conditions of the test air	17
8 Test procedure.....	17
8.1 Preparatory checks	17
8.2 Starting up the aerosol generator.....	17
8.3 Preparation of the test filter.....	17
8.3.1 Installation of the test filter.....	17
8.3.2 Flushing the test filter	17
8.4 Testing	18
8.4.1 Measuring the pressure drop	18
8.4.2 Testing with a monodisperse test aerosol.....	18
8.4.3 Testing with a polydisperse test aerosol	18
9 Evaluation.....	18
10 Test report	20
11 Maintenance and inspection of the test apparatus.....	22
Annex A (informative) Testing and classification method for filters with MPPS $\leq 0,1 \mu\text{m}$ (e.g. membrane medium filters).....	23
A.1 Background.....	23
A.2 MPPS of filters with Membrane filter medium	23
A.3 Penetration consistency and uniformity of Membrane filter medium.....	23

A.4	Procedure for testing and classification of filters with Membrane filter media	23
A.4.1	Integral Penetration	23
A.4.2	Classification	24
A.4.3	Local Penetration	24
A.5	Publication of data and labelling of products with membrane filter media	24
Annex B (normative)	Testing and classification of filters using media with (charged) synthetic fibers	26
B.1	Background	26
B.2	Scope	26
B.3	Procedure for testing and classification of HEPA and ULPA filters using media with (charged) synthetic fibres	26
B.4	Publication of data and labelling of products for HEPA and ULPA filters using media with (charged) synthetic fibres	27
	Bibliography	28

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

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-