

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

High efficiency air filters (EPA, HEPA and ULPA)

Part 1: Classification, performance testing, marking

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN 1822-1:2019. It supersedes BS EN 1822-1:2009, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/21, Filters for gases and liquids.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2019
Published by BSI Standards Limited 2019

ISBN 978 0 580 98150 0

ICS 23.120; 13.040.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2019.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)

EUROPÄISCHE NORM

April 2019

ICS 13.040.40

Supersedes EN 1822-1:2009

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 14 January 2019.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)

Contents		Page
European foreword		3
1	Scope	4
2	Normative references	4
3	Terms and definitions	4
4	Symbols and abbreviations	5
5	Classification	5
5.1	General	5
5.2	Groups of filters	5
5.3	Groups and Classes of filters	5
6	Requirements	6
6.1	General	6
6.2	Material	6
6.3	Nominal air volume flow rate	6
6.4	Pressure difference	6
6.5	Filtration performance	6
7	Test methods	7
7.1	Test rigs	7
7.2	Test conditions	7
7.3	Test aerosols	7
7.4	Survey of test procedures	8
7.4.1	General	8
7.4.2	Step 1: Testing sheet filter medium	8
7.4.3	Step 2: Leak test of the filter element	8
7.4.4	Step 3: Efficiency test of the filter element	8
7.4.5	Remarks	8
7.5	Test procedures	9
7.5.1	Testing sheet filter media	9
7.5.2	Leak test of the filter element	11
7.5.3	Efficiency test of the filter element	14
8	Assessment of the filter, documentation, test reports	15
9	Marking	15
Annex A (informative) Classification system for high efficiency air filters in ISO 29463-1		17
Bibliography		18

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)

European foreword

This document (EN 1822-1:2019) 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 October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

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

This document supersedes EN 1822-1:2009.

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)*, currently consists of the following parts:

— *Part 1: Classification, performance testing, marking*

EN 1822 *Part 2* to *Part 5* have been replaced by the corresponding parts of EN ISO 29463.

This standard is intended to be used in conjunction with:

— EN ISO 29463-2, *High-efficiency filters and filter media for removing particles in air — Part 2: Aerosol production, measuring equipment and particle-counting statistics*

— EN ISO 29463-3, *High-efficiency filters and filter media for removing particles in air — Part 3: Testing flat sheet filter media*

— EN ISO 29463-4, *High-efficiency filters and filter media for removing particles in air — Part 4: Test method for determining leakage of filter element — Scan method*

— EN ISO 29463-5, *High-efficiency filters and filter media for removing particles in air — Part 5: Test method for filter elements*

When reference is made to ISO 29463-1 in EN ISO 29463-2 to -5, at European level EN 1822-1 applies.

This document is based on particle counting methods which actually cover most needs of different applications. The differences between this European Standard and its previous edition lie in:

— the addition of references to the existing EN ISO 29463-2, EN ISO 29463-3, EN ISO 29463-4 and EN ISO 29463-5;

— the exclusion of the use of an aerosol photometer filter scan leak test;

— various editorial corrections implemented in this document.

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

This is a preview of "BS EN 1822-1:2019". [Click here to purchase the full version from the ANSI store.](#)

1 Scope

This document 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 ISO 29463-2:2018, *High-efficiency filters and filter media for removing particles in air — Part 2: Aerosol production, measuring equipment and particle-counting statistics (ISO 29463-2:2011)*

EN ISO 29463-3, *High-efficiency filters and filter media for removing particles in air — Part 3: Testing flat sheet filter media (ISO 29463-3)*

EN ISO 29463-4:2018, *High-efficiency filters and filter media for removing particles in air — Part 4: Test method for determining leakage of filter elements-Scan method (ISO 29463-4:2011)*

EN ISO 29463-5:2018, *High-efficiency filters and filter media for removing particles in air — Part 5: Test method for filter elements (ISO 29463-5:2011)*

EN 14799, *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)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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