
Gospodinjski in podobni električni aparati za čiščenje zraka - Metode za merjenje učinkovitost delovanja - 2-1. del: Posebne zahteve za določitev zmanjšanja delcev (IEC 63086-2-1:2024)

Household and similar electrical air cleaning appliances - Methods for measuring the performance - Part 2-1: Particular requirements for determination of reduction of particles (IEC 63086-2-1:2024)

Elektrische Luftreinigungsgeräte für den Hausgebrauch und ähnliche Zwecke – Messung der Gebrauchseigenschaften – Teil 2-1: Besondere Anforderungen für die Bestimmung der Reduktion von Partikeln (IEC 63086-2-1:2024)

Appareils d'épuration d'air électriques domestiques et appareils similaires - Méthodes de mesure de l'aptitude à la fonction - Partie 2-1: Exigences particulières pour la détermination de la réduction des particules (IEC 63086-2-1:2024)

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77140485/sist-en-iec-63086-2-1-2024>

Ta slovenski standard je istoveten z: EN IEC 63086-2-1:2024

ICS:

23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners
97.030	Električni aparati za dom na splošno	Domestic electrical appliances in general

SIST EN IEC 63086-2-1:2024

en

EUROPEAN STANDARD

EN IEC 63086-2-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2024

ICS 23.120

English Version

Household and similar electrical air cleaning appliances -
Methods for measuring the performance - Part 2-1: Particular
requirements for determination of reduction of particles
(IEC 63086-2-1:2024)

Appareils d'épuration d'air électriques domestiques et
appareils similaires - Méthodes de mesure de l'aptitude à la
fonction - Partie 2-1: Exigences particulières pour la
détermination de la réduction des particules
(IEC 63086-2-1:2024)

Elektrische Luftreinigungsgeräte für den Hausgebrauch und
ähnliche Zwecke - Messung der Gebrauchseigenschaften -
Teil 2-1: Besondere Anforderungen für die Bestimmung der
Reduktion von Partikeln
(IEC 63086-2-1:2024)

This European Standard was approved by CENELEC on 2024-02-23. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024>



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 63086-2-1:2024 (E)

European foreword

The text of document 59N/44/FDIS, future edition 1 of IEC 63086-2-1, prepared by SC 59N "Electrical air cleaners for household and similar purposes" of IEC/TC 59 "Performance of household and similar electrical appliances" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63086-2-1:2024.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2024-11-23 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2027-02-23 document have to be withdrawn

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 63086-2-1:2024 was approved by CENELEC as a European Standard without any modification.

[SIST EN IEC 63086-2-1:2024](https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024)

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024>

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 63086-1	2020	Household and similar electrical air cleaning appliances - Methods for measuring the performance - Part 1: General requirements	EN IEC 63086-1	2020
+ AMD1	2023		+ A1	2023
ISO 12103-1	-	Road vehicles - Test contaminants for filter evaluation - Part 1: Arizona test dust	-	-
ISO 29463-1	-	High efficiency filters and filter media for removing particles from air - Part 1: Classification, performance, testing and marking	-	-
ISO 5011	2020	Inlet air cleaning equipment for internal combustion engines and compressors - Performance testing	-	-

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024>



IEC 63086-2-1

Edition 1.0 2024-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Household and similar electrical air cleaning appliances – Methods for measuring the performance –
Part 2-1: Particular requirements for determination of particle reduction**

**Appareils d'épuration d'air électriques domestiques et appareils similaires –
Méthodes de mesure de l'aptitude à la fonction –
Partie 2-1: Exigences particulières pour la détermination de la réduction des
particules**

[SIST EN IEC 63086-2-1:2024](https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024)

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 23.120

ISBN 978-2-8322-8122-2

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions.....	7
3.2 Abbreviated terms.....	8
4 Aerosol measurement instruments.....	8
4.1 General.....	8
4.2 Aerosol transport	9
4.3 Condensation particle counter.....	9
4.4 Optical particle counter	9
4.5 Aerodynamic particle sizer	9
5 Aerosol generation	9
5.1 Salt aerosol	9
5.2 Smoke aerosol.....	10
5.2.1 Type of cigarettes	10
5.2.2 Smoke aerosol generation	10
5.3 Dust aerosol	11
5.3.1 Type of dust	11
5.3.2 Dust aerosol generation.....	11
5.4 Pollen aerosol.....	12
5.4.1 Type of pollen.....	12
5.4.2 Pollen aerosol generation	12
6 Measurement of the CADR in maximum performance operation mode	13
6.1 Test methods	13
6.2 General.....	13
6.3 Natural decay	13
6.3.1 Test preparation	13
6.3.2 Background particle number concentration	13
6.3.3 Test chamber conditions.....	14
6.3.4 Aerosol generation	14
6.3.5 Mixing and homogenization of the test aerosol	14
6.3.6 Measurement of the natural decay	15
6.3.7 Calculation of the natural decay rate.....	15
6.3.8 Acceptability of the run	15
6.4 Total decay	16
6.4.1 Test preparation	16
6.4.2 Placement of the DUT	16
6.4.3 Background particle number concentration	16
6.4.4 Test chamber conditions.....	16
6.4.5 Aerosol generation	16
6.4.6 Mixing and homogenization of the test aerosol	16
6.4.7 Operation of the DUT.....	16
6.4.8 Measurement of the total decay	16
6.4.9 Calculation of the total decay rate.....	16
6.4.10 Acceptability of the run	17

6.5	Calculation of the clean air delivery rate	17
7	Calculation procedures	17
7.1	Criteria for the acceptance of data points	17
7.1.1	Outliers from the regression line	17
7.1.2	Particle number concentration below 1 % of the value at $t = 0$	17
7.2	Calculation of decay constants	17
7.3	Sample standard deviation of the slope of the regression line	18
7.4	Calculation of the clean air delivery rate	19
7.5	Sample standard deviation of the clean air delivery rate	19
Annex A	(normative) Limits of measurability	20
A.1	General	20
A.2	Maximum clean air delivery rate	20
A.3	Minimum clean air delivery rate	20
Annex B	(informative) Long-term storage of the target pollutants	21
B.1	Salt	21
B.2	Cigarettes	21
B.3	Dust	21
B.4	Pollen	21
Annex C	(informative) Test report information	22
C.1	General	22
C.2	General data	22
C.3	Description of the DUT	22
C.4	Test chamber	22
C.5	Aerosol generation	22
C.6	Particle measurement instrumentation	22
C.7	Test conditions	22
C.8	Test execution	23
C.9	Results	23
Annex D	(normative) Derivation of the effective room size	24
D.1	Effective room size	24
D.2	Basic indoor air model for particle number concentrations	24
Annex E	(informative) Schematic representation of a CADR measurement	27
Annex F	(informative) Cleaning procedures for the test chamber	28
F.1	Daily start-up cleaning procedure	28
F.2	Comprehensive test chamber cleaning procedure	28
F.2.1	General	28
F.2.2	Equipment	28
F.2.3	Procedure	28
Annex G	(normative) Measurement of the average power in maximum performance operation mode	29
G.1	General	29
G.2	Setup of the DUT	29
G.3	Measurement procedure	29
G.4	Calculation of the average operating power	29
Annex H	(informative) Calculation of the 99 % prediction interval of the regression line	31
Annex I	(normative) Alternative fine particle size range	33
I.1	General	33
I.2	Optical particle counter	33

I.3	Measurement of the CADR in maximum performance operation mode	33
I.4	Derivation of the effective room size	34
	Bibliography.....	35
	Figure 1 – Schematic of a Laskin atomizer (a) and a Collison atomizer (b).....	10
	Figure 2 – Schematic of two possible methods to generate the smoke aerosol.....	11
	Figure 3 – Schematic of two possible methods to generate the dust aerosol	12
	Figure 4 – Schematic of two possible methods to generate the pollen aerosol.....	12
	Figure E.1 – Schematic representation of the CADR measurement in accordance with Clause 6	27
	Table 1 – Measurement instruments, test aerosols and maximum background particle number concentrations for the different particle size ranges.....	14
	Table 2 – Test aerosols and initial particle number concentrations for different particle size ranges	14
	Table 3 – Test aerosols, mixing and homogenization time for different particle size ranges	15
	Table 4 – Test aerosols, test duration and minimum number of data points for different particle size ranges.....	15
	Table 5 – Limits for the sample standard deviation of the slope of the regression line for the natural decay	15
	Table 6 – Limits for the sample standard deviation of the slope of the regression line for the total decay	17
	Table H.1 – Values of the Student t-distribution with $n - 2$ degrees of freedom for different numbers of data points n	32
	Table I.1 – Measurement instrument, test aerosols and maximum background particle number concentration for the alternative fine particle size range	33
	Table I.2 – Test aerosols and initial particle number concentrations for the alternative fine particle size range.....	34

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HOUSEHOLD AND SIMILAR ELECTRICAL AIR CLEANING APPLIANCES –
METHODS FOR MEASURING THE PERFORMANCE –****Part 2-1: Particular requirements for determination of particle reduction**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63086-2-1 has been prepared by subcommittee 59N: Electrical air cleaners for household and similar purposes, of IEC technical committee 59: Performance of household and similar electrical appliances, in co-operation with ISO technical committee 142: Cleaning equipment for air and other gases. It is an International Standard.

It is published as a double logo International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
59N/44/FDIS	59N/46/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

In this standard, the following print types are used:

- **terms defined in Clause 3 of IEC 63086-1: bold type**
- **terms defined in Clause 3 of IEC 63086-2-1: bold type.**

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63086 series, published under the general title *Household and similar electrical air cleaning appliances – Methods for measuring the performance*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

(<https://standards.iteh.ai>)
Document Preview

[SIST EN IEC 63086-2-1:2024](https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024)

<https://standards.iteh.ai/catalog/standards/sist/db0e2136-06a5-482e-894f-2f5f77f40485/sist-en-iec-63086-2-1-2024>