



DPC: 21/30439057 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 11 October 2021

Origin: International

Latest date for receipt of comments: 25 November 2021

Project No. 2021/01487

Responsible committee: CPL/59 Performance of household electrical appliances

Interested committees:

Title: Draft BS EN IEC 61591 Cooking fume extractors - Methods for measuring performance.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 25 November 2021

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Responsible Committee Secretary: Ms Nicola Young (BSI)

Direct tel:

E-mail: nicola.young@bsigroup.com

Full document details: 21/30439057 DC

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

PROJECT NUMBER: IEC 61591 ED3	
DATE OF CIRCULATION: 2021-10-01	CLOSING DATE FOR COMMENTS: 2021-12-24
SUPERSEDES DOCUMENTS: 59K/337/RR	

IEC SC 59K : PERFORMANCE OF HOUSEHOLD AND SIMILAR ELECTRICAL COOKING APPLIANCES	
SECRETARIAT: Germany	SECRETARY: Ms Susanne Stolz
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 59	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☒ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE: Cooking fume extractors – Methods for measuring performance
--

NOTE FROM TC/SC OFFICERS:

CONTENTS

FOREWORD	4
1 Scope	5
2 Normative references	6
3 Terms and definitions	6
4 Classification	9
5 List of measurements	10
6 General conditions for measurements	10
6.1 Test room	10
6.2 Installation and positioning	10
6.3 Electricity supply	11
6.4 Filters	11
6.5 Fan control	11
6.6 Instrumentation and measurements	11
7 Dimensions and mass	12
7.1 Overall dimensions	12
7.2 Distance between cooking fume extractor and cooking appliance	12
7.3 Mass	12
8 Power measurement of low power modes	12
8.1 Purpose and combination of appliances	12
8.2 Measurement	12
8.2.1 Principles	12
8.2.2 Determination of power consumption in off mode	13
8.2.3 Determination of power consumption in standby mode	14
8.2.4 Determination of consumption in standby mode in condition of networked standby	14
9 Airborne acoustical noise	14
10 Volumetric airflow	14
10.1 Purpose and test set up	14
10.2 Measurement of the volumetric airflow	16
10.3 Calculation of the volumetric airflow	17
11 Fluid dynamic efficiency	17
11.1 Purpose	17
11.2 Determining the working points	17
11.3 Calculation of the fluid dynamic efficiency (FDE_{CFE})	19
11.3.1 Conversion to reference air density	19
11.3.2 Calculating the corrected working points $WP_{c_{s,j}}$	20
11.3.3 Calculating the fluid dynamic efficiency (FDE_{CFE})	21
12 Effectiveness of the lighting system	22
12.1 Purpose	22
12.2 Measurement	22
12.3 Assessment	23
13 Odour reduction	23
13.1 Purpose	23
13.2 Measuring setup	23
13.3 Measurement	23

13.4	Calculation of the odour reduction factor	25
14	Grease absorption	26
14.1	Purpose	26
14.2	Measuring setup	26
14.3	Preparation	30
14.3.1	Determining the mass	30
14.3.2	Warm-up period	31
14.3.3	Determining the working point <i>WP</i>	31
14.4	Measurement	31
14.5	Assessment	31
Annex A (informative)	Assumption for the parameter <i>b</i> (see Table 3)	33
Annex B (normative)	Low power mode measurements	34
Bibliography		35
Figure 1	– Measurement of airflow	16
Figure 2	– 9e working points of a cooking fume extractor in extraction mode (example)	18
Figure 3	– Measurement points for assessing the effectiveness of the lighting system	23
Figure 4	– Example of a test room	24
Figure 5	– Chamber for the grease absorption of a range hood or a microwave hood combination	28
Figure 6	– Chamber for the grease absorption of a down-draft system	29
Figure 7	– Cookware used for measuring the grease absorption	30
Figure A.1	– typical ducting.....	33
Table 1	– Instruments	11
Table 2	– Measurements.....	12
Table 3	– Parameters for the calculation of resistance curves	16
Table 3	– Relevant measurement points for assessing the effectiveness of the lighting system	22

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**COOKING FUME EXTRACTORS –
METHODS FOR MEASURING PERFORMANCE****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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61591 has been prepared by subcommittee 59K: Performance of household and similar electrical cooking appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 2019. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) new definition of working point, see clause 3.20;
- b) new definition for lowest setting and automatic setting, see clause 3.23 and 3.24;
- c) revised requirements for installation and positioning, see clause 6.2;
- d) adding a normative reference ISO 5801 for the specification of the pressure compensation chamber, see clause 10;
- e) separate clauses for determining the volumetric airflow and fluid dynamic efficiency, see clause 10 and 11;
- f) new approach for determining the fluid dynamic efficiency ("9-point calculation");

- g) new definitions, new clause and new annex B regarding the measurement of low power modes;
- h) new Annex A - Assumption for the parameter b .

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

CDV	Report on voting

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

- terms listed in Clause 3: **Arial bold**.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

COOKING FUME EXTRACTORS – METHODS FOR MEASURING PERFORMANCE

1 Scope

This document applies to **cooking fume extractors** incorporating a fan for the **recirculation** or **extraction mode** situated in a household kitchen.

It can also be used for **cooking fume extractors** where the fan is mounted separately from the appliance, but controlled by the appliance when the fan is defined in the technical documentation (e.g. name plate data) and instructions for installation.

This document deals also with **down-draft systems** arranged beside, behind or under the cooking appliance.

This document defines the main performance characteristics of these appliances, which are of interest to the user, and specifies methods for measuring these characteristics.

This document does not specify a classification or ranking for performance.

NOTE This document does not deal with safety requirements that are in accordance with IEC 60335-1 and IEC 60335-2-31.

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.

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60704-2-13, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-13: Particular requirements for range hoods and other cooking fume extractors*

IEC 62301, *Household electrical appliances – Measurement of standby power*

ISO 5801: 2017, *Fans – Performance testing using standardized airways*

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 5167-2, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full – Part 2: Orifice plates*

ISO 5167-3, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full – Part 3: Nozzles and Venturi nozzles*

ISO 5167-4, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full – Part 4: Venturi tubes*

ISO 80000-1:2009, *Quantities and units – Part 1: General*

EN 50643, *Electrical and electronic household and office equipment - Measurement of networked standby power consumption of edge equipment*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

active mode

mode in which the appliance is connected to a mains power source, has been activated, and is performing any of the intended functions

Example Intended functions are running the fan or operating the lighting system.

Note 1 to entry Associated activities are known like displaying informations, software download, sensor controlled automatic mode and communication with the hob.

3.2**cooking fume extractor*****CFE***

appliance with fan and filter intended to collect and treat cooking fumes, which can be operated in **recirculation mode** or **extraction mode**

3.3**range hood**

cooking fume extractor installed over a cooking appliance

3.3.1**wall range hood**

range hood mounted to the wall

3.3.2**island range hood**

range hood mounted to the ceiling

3.3.3**ceiling range hood**

range hood integrated onto or into the ceiling

3.3.4**built-in range hood**

range hood mounted onto or into a cabinet

3.4**microwave hood combination**

cooking fume extractor integrated in a microwave oven

3.5**multiple combination hood**

cooking fume extractor where the fan is mounted separately of the appliance, but controlled by the appliance

3.6**down-draft system**

cooking fume extractor intended for installation adjacent to a cooking appliance or integrated in a cooking appliance that draws vapour down into a duct

Note 1 to entry: A **down-draft system** can also be a system where the fan is mounted separately from the appliance but controlled by the appliance.

3.7**recirculation mode**

mode of a **cooking fume extractor** that discharges air back into the room, which includes an **odour-reduction filter**

3.8**extraction mode**

mode of a **cooking fume extractor** that discharges the air to the outside of the building by means of ducting

Note 1 to entry: **Extraction mode** is also known as "vented mode" or "ducted mode".

- 97 **3.9**
98 **rated voltage**
99 voltage assigned to the **cooking fume extractor** by the manufacturer
- 100 **3.10**
101 **grease absorption factor**
102 G_{FE}
103 percentage of grease retained within a **grease filter**
- 104 **3.11**
105 **grease filter**
106 components for absorbing grease, which are intended to be replaced or removed for cleaning
107 without tools
- 108 **3.12**
109 **odour-reduction filter**
110 components for reducing odour
- 111 **3.13**
112 **odour reduction factor**
113 capability of the **cooking fume extractor** to reduce odours
- 114 **3.14**
115 **odour dispersion time**
116 time taken to reduce odours to a defined level after the odour generating source has been
117 switched off
- 118 **3.15**
119 **highest continuous setting for normal use**
120 control setting of **cooking fume extractor** at highest speed, excluding the **boost position**
121 **setting**
- 122 Note 1 to entry: Marked setting on the appliance, which is described in the instructions for use.
- 123 **3.16**
124 **boost position setting**
125 marked control setting at maximum fan speed, which is automatically limited in duration
- 126 Note 1 to entry: Marked setting on the appliance, which is described in the instructions for use.
- 127 **3.17**
128 **lowest setting**
129 marked control setting which performs the lowest speed as **cooking fume extractor**
- 130 **3.18**
131 **automatic setting**
132 control setting of cooking fume extractor where the fan speed is altered by sensor or time
- 133 Note 1 to entry: Automatic settings are not used for calculation of the FDE.
- 134 **3.19**
135 **working point**
136 intersection point of pressure/airflow curve and resistance curve – measured WP and
137 compensated to reference air density WP_C

3.20**lighting system**

devices used for the illumination of the cooking surface, excluding ambient illumination, unless there is only one control switch

Note 1 to entry: Power supply units and controllers are included.

3.21**Illumination**

E_{middle}

average illumination of the **lighting system** on the cooking surface measured in lux under standard conditions

3.22**network**

communication infrastructure with a topology of links, an architecture, including the physical components, organizational principles, communication procedures and formats (protocols)

Note 1 to entry: Infrared (IR) remote control is not considered as a network.

3.23**off mode**

condition in which the appliance is connected to the mains and is not providing any active mode or standby function and where the mode may persist for an indefinite time. The following shall also be considered as off mode

- a) Conditions providing only an indication of off mode;
- b) Conditions providing only functionalities intended to ensure electromagnetic compatibility.

3.24**standby mode**

condition where the appliance is connected to the mains and provides only the following functions, which may persist for an indefinite time:

- (a) reactivation function, or reactivation function and a mere indication of enabled reactivation function; and/or
- (b) information or status display; and/or
- (c) detection function for emergency measures.

3.25**standby mode in condition of networked standby**

condition where the appliance is connected to the mains and provides only the reactivation function through a connection to a network, which may persist for an indefinite time.

Note 1 to entry: This mode is only applicable to appliances that provide a connection function to a network.

4 Classification

According to the mode:

- **recirculation mode;**
- **extraction mode.**

A **cooking fume extractor** may be constructed to incorporate both modes.

5 List of measurements

Performance is determined by assessing the following:

- overall dimensions;
- mass;
- power measurement of low-power modes;
- airborne acoustical noise;
- volumetric airflow;
- effectiveness and electric power input of the **lighting system**;
- ability to reduce odours;
- ability to absorb grease.

6 General conditions for measurements

6.1 Test room

The tests are carried out in a draught-free room. The ambient temperature of the room is maintained at (23 ± 2) °C. The absolute air pressure shall be between 913 hPa and 1 063 hPa.

6.2 Installation and positioning

The appliance has to be clean and free of any residues of packaging material and protective foil.

All tests have to be carried out following the order of the clauses of this document with one and the same appliance.

The **cooking fume extractor** (except for the **down-draft system**) is installed above a cooking appliance with the distance of (600 ± 10) mm. The distance is determined between the lowest level of the **cooking fume extractor** and the highest level of the cooking appliance.

Any extendible visor, which is extendable for normal use in accordance with the manufacturer's instructions, shall be opened accordingly. If no instructions are given, the extendible visor is fully opened.

If the **down-draft system** can be elevated, the manufacturer's instructions are followed; otherwise, it shall be measured in its maximum elevated position for use.

If there are different options delivered with the **CFE**, then, for all tests, the air outlet with its properties closest to a theoretical resistance curve for a flue pipe with $b = 0,000125$ shall be used. This set up shall be kept for all measurements described in this document.

NOTE More information for b is given in Table 3.

All tests, except the measurements for low power modes (see clause 8), are carried out:

- with the default factory settings;
- ensure that no network is connected to the appliance for the duration of the measurement.

Before the measurement is made, any conditioning of the **CFE**, unless explicitly required in this document, is not allowed.

Ensure that any **automatic settings** are switched off.