



DPC: 25/30511750 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: 08 July 2025

Origin: International

Latest date for receipt of comments: 30 July 2025

Project No. 2025/00915

Responsible committee: CPL/59/1 Dishwashers and washing machines

Interested committees:

Title: Draft BS EN 61121 Tumble dryers for household use - Methods for measuring the performance.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of 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 30 July 2025

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/>.

E-mail: admin.start@bsigroup.com

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	Comment (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.	



59D/531/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 61121 ED5

DATE OF CIRCULATION:

2025-07-04

CLOSING DATE FOR COMMENTS:

2025-08-29

SUPERSEDES DOCUMENTS:

59D/527/RR

IEC SC 59D : PERFORMANCE OF HOUSEHOLD AND SIMILAR ELECTRICAL LAUNDRY APPLIANCES

SECRETARIAT:

Italy

SECRETARY:

Ms Milena Presutto

OF INTEREST TO THE FOLLOWING COMMITTEES:

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

Energy Efficiency, Environment

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.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Tumble dryers for household use - Methods for measuring the performance

NOTE FROM TC/SC OFFICERS:

The CD of IEC 61121 Ed.5 has been prepared by SC59D/MT14 Maintenance Team for IEC 61121 and IEC 62512 under the convenorship of Mrs Luise Christmann

Copyright © 2025 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

Link to Committee Draft (CD) online document:

<https://osd.iec.ch/#/editor/archive/2cb016d8-5fbc-67e4-e063-6d13000ac057/en/CD/1>

How to access

This link leads you to the Online Standards Development (OSD) platform for National Mirror Committee's (NMC) comments. The project draft may be found further down this document.

Resource materials

We recommend NCs to review the available materials to better understand the member commenting on the OSD platform. This includes the:

- [OSD NC roles overview](#)
- [How to add and submit comments to the IEC](#)

Contact

Should you require any assistance, please contact the [IEC IT Helpdesk](#).

CONTENTS

FOREWORD	8
INTRODUCTION	10
1 Scope	11
2 Normative references	11
3 Terms, definitions and symbols	12
3.1 Terms and definitions	12
3.2 List of symbols	16
4 Requirements	18
4.1 General	18
4.2 Rated capacity	19
4.3 Dimensions	19
5 Test conditions, materials	19
5.1 General	19
5.2 Test conditions	20
5.2.1 Electricity supply	20
5.2.2 Water supply	20
5.2.3 Ambient temperature and humidity	21
5.3 Test materials	22
5.3.1 General	22
5.3.2 Test loads	22
5.3.3 Detergents	22
5.4 Equipment	22
5.4.1 Equipment for normalisation	22
5.4.2 Equipment for conditioning the test load	23
5.4.3 Equipment for wetting the test load prior to a test	23
5.4.4 Other equipment	23
6 Preparation for testing	24
6.1 General	24
6.2 Installation of the tumble dryer	24
6.3 Preparation of the tumble dryer for a test series	24
6.4 Preparation of the tumble dryer for a test run	25
6.5 Preparation of test loads	25
6.5.1 General	25
6.5.2 Pre-treatment of new test load items prior to use	25
6.5.3 Requirements regarding the age of test load items	26
6.5.4 Normalization of test load items	26
6.5.5 Conditioning of test load items	27
6.5.6 Test load composition	28
6.5.7 Wetting	29
7 Performance measurements - General requirements	30
8 Tests for performance	31
8.1 General	31
8.2 Test procedure for performance tests	31
8.2.1 Test conditions, materials and preparation for testing	31
8.2.2 Programme	31

8.2.3	Test load	32
8.2.4	Test procedure	32
8.2.5	Validity of a test run	33
8.2.6	Validity of a test series	33
8.3	Measurements to determine water and energy consumption and programme duration	34
8.3.1	General	34
8.3.2	Procedure	34
8.4	Measurements to determine condensation efficiency	35
8.4.1	General	35
8.4.2	Procedure	35
8.5	Measurements to determine evenness of drying	35
8.5.1	General	35
8.5.2	Procedure	35
8.6	Measurements to determine exhaust air volume	35
9	Assessment of performance	36
9.1	General	36
9.2	Final moisture content of the load	36
9.3	Electrical energy consumption	37
9.4	Water consumption	37
9.5	Programme duration	38
9.6	Condensation efficiency	39
9.7	Evenness of drying	39
9.8	Exhaust air volume	41
10	Data to be reported	41
Annex A (normative)	Reference list	42
A.1	Reference detergent	42
A.2	Specification of test load	42
A.3	The bone dry method of conditioning	42
A.4	Calculation of weighted average age of the cotton test load	42
A.5	Measurements of energy consumption in low power modes	43
A.6	Determination of test class, number of test runs in a test series and uncertainty of measurements	43
A.7	Source of materials and supplies	43
A.8	Reference washing machine	43
A.9	Reference programme	43
Annex B (normative)	Nominal and standard exhaust duct for tumble dryer testing	44
B.1	Nominal exhaust duct for tumble dryer testing	44
B.2	Standard IEC exhaust duct for tumble dryer testing	44
Annex C (informative)	Flow diagrams	47
Annex D (normative)	Test report - data to be reported	50
Annex E (normative)	Procedure to determine test load size where rated capacity is not declared	55
E.1	General	55
E.2	Determination of test load mass using table tennis balls	55
Annex F (normative)	Flexible initial moisture content method	56
F.1	General	56
F.2	Procedure	57

F.3	Evaluation.....	57
Annex G (informative) Assessment of evenness of drying		58
Annex H (informative) Measurement of exhaust air volume		59
H.1	Procedure	59
H.2	Exhaust air volume	59
H.3	Examples for measurement setup	59
Annex I (informative) Method for the determination of temperature inside the load		61
I.1	General.....	61
I.2	Test conditions, materials, equipment and instrumentation	61
I.3	Preparation of equipment.....	61
I.3.1	General	61
I.3.2	Attaching the data logger to a towel or pillowcase.....	61
Annex J (normative) Test instrumentation		64
J.1	General.....	64
J.2	Instruments, accuracy and precision of measurements	64
J.3	Electrical energy consumption	64
J.4	Water consumption	65
J.5	Total water hardness	65
J.6	Water pressure	65
J.7	pH-Value	65
J.8	Relative humidity	65
J.9	Mass.....	66
J.10	Temperature	66
J.11	Duration.....	66
J.12	Voltage and frequency	67
Annex K (informative) Laboratory internal testing guide		68
K.1	General.....	68
K.2	Elements of an internal test protocol	68
K.2.1	General	68
K.2.2	Preparation for testing	68
K.2.3	Performing the test	69
K.2.4	Recording and checking results	69
K.2.5	Test report and internal data management for further processing	69
K.3	Examples of elements from a detailed internal testing protocol	69
K.3.1	General	69
K.3.2	Initial preparation for testing	69
K.3.3	Prior to testing	70
K.3.4	During the test	70
K.3.5	Additional points to consider for test runs within a test series	71
K.3.6	Evaluation	71
K.3.7	Post-test activities	71
K.3.8	Airflow measurement	71
Annex L (informative) Environmental aspects of tumble dryer usage determined in IEC 61121		72
L.1	General.....	72
L.2	Environmental aspects of tumble dryer covered by IEC 61121	72
L.2.1	General	72
L.2.2	Energy consumption	72

L.2.3	Water consumption	73
L.2.4	Discharge of water	73
L.2.5	Exhaust air volume	74
L.2.6	Discharge of moist air	74
L.2.7	Environmental aspects of tumble dryer not covered by IEC 61121	74
Annex M (informative) Effects on consumer relevance and measurement accuracy when deviating from standard test conditions		75
M.1	Overview	75
M.2	Standard detergent	76
M.3	IEC load items	76
M.4	Final moisture content	77
M.5	Tests at rated capacity	77
M.6	Other non-standard test conditions	78
M.7	Number of tests and evaluation of drying performance	78
M.8	Other important sources of information on testing	79
Annex N (informative) Determination of test class, number of test runs in a test series and uncertainty of measurements		80
N.1	General	80
N.2	Purpose of test series – test class	80
Bibliography		85
Figure 1 – Overview of the different performance measures		12
Figure B.1 – Pressure/volumetric air flow curve		44
Figure B.2 – Standard exhaust duct		45
Figure B.3 – Standard exhaust simulator		46
Figure C.1 – Decision chart illustrating the requirements for a valid test series (unit class) for automatic tumble dryers		48
Figure C.2 – Decision chart illustrating the requirements for a valid test series (unit class) for non-automatic tumble dryers		49
Figure H.1 – Suction chamber setup		60
Figure I.1 – Placing the data logger in the center of a towel		62
Figure I.2 – Placing the data logger in the center of a pillow case		62
Figure I.3 – Fasten the towel around the data logger		62
Figure I.4 – Fasten the pillow case around the data logger		63
Figure N.1 – Test runs and test series selection flowchart		82
Figure N.2 – Margin of error around $\bar{x}$ with confidence level $(1-\alpha)$		84
Figure N.3 – Figure N.3 - Representation of error bar size as function of sample size		84
Table 1 – List of symbols		17
Table 2 – Number of items in the cotton test load for various test load masses		28
Table 3 – Number of items in the synthetics/blends test load for various test load masses		29
Table 4 – Specifications for initial moisture content in the test load		30
Table 5 – Specification for final moisture content of the test load after drying for automatic and non-automatic tumble dryers		32
Table D.1 – Identification data		50
Table D.2 – Test measurements		51

Table D.3 – Test conditions and materials 53

Table D.4 – Weighted average age - Cotton load 54

Table J.1 – Requirements for electrical energy consumption measurements 64

Table J.2 – Requirements for water measurement 65

Table J.3 – Requirements for the total water hardness.....65

Table J.4 – Requirements for measuring the water pressure 65

Table J.5 – Requirements for measuring the pH-Value 65

Table J.6 – Requirements for relative humidity measurements 66

Table J.7 – Requirements for mass measurement.....66

Table J.8 – Requirements for temperature measurement 66

Table J.9 – Requirements for duration measurement 66

Table N.1 – Critical values t depending on the number of runs and the expected
confidence interval.....83

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Tumble dryers for household use - Methods for measuring the 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) 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/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 61121 has been prepared by subcommittee 59D: Performance of household and similar electrical laundry appliances, of IEC technical committee 59: Performance of household and similar electrical appliances. It is an International Standard.

This 5th edition cancels and replaces the 4th edition published in [publication_date], Amendment 1:[publication_date] and Amendment 2:[publication_date]. This edition constitutes a technical revision.

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

- a) Alignment to IEC 60456:2024
- b) Temperature measurement
- c) New nominal initial moisture content levels
- d) New annexes on the following: test instrument specifications; laboratory testing guidance; environmental aspects determined using this document; the effects on consumer relevance and accuracy of deviating from the test conditions of this document

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/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**.

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.

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.

INTRODUCTION

This fifth edition has been developed in light of experience with use of the fourth edition of IEC 61121. The structure has been revised to ensure that this remains harmonised with the IEC 60456:2024 for clothes washing machines.

Further reading:

IEC 60704-1:2021, *Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 1: General requirements*[IEC 60704-1:2021 \[1\]](#)

IEC 60704-2-6:2006, *Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-6: Particular requirements for tumble dryers*[IEC 60704-2-6:2006 \[2\]](#)

IEC Guide 109:2003, *Environmental aspects - Inclusion in electrotechnical product standards*[IEC Guide 109:2003 \[3\]](#)

IEC 60704-3:2019, *Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 3: Procedure for determining and verifying declared noise emission values*[IEC 60704-3:2019 \[4\]](#)

1 Scope

This International Standard is applicable to household electric **tumble dryers** of the **automatic** and **non-automatic** type, with or without a cold water supply and incorporating a heating device. This excludes **tumble dryers** which use gas or other fuels as a heating source.

The object is to state and define the principal performance characteristics of household electric **tumble dryers** (3.1.1) of interest to users and to describe standard methods for measuring these characteristics. It is also applicable to **tumble dryers** for communal use in blocks of flats or in launderettes.

NOTE 1 Household washing machines performance is assessed to IEC 60456.

NOTE 2 Household washer-dryer combined performance is assessed to IEC 62512.

This international standard does not apply to **tumble dryers** (3.1.1) for commercial use such as in commercial laundries.

NOTE 3 The preparation of methods for measuring the performance of **tumble dryers** (3.1.1) for commercial use is under evaluation.

This international standard does not specify the acoustical noise measurement for household **tumble dryers** (3.1.1).

NOTE 4 Acoustical noise measurements and evaluation for household **tumble dryers** (3.1.1) are specified in IEC 60704-1, IEC 60704-2-6 and IEC 60704-3

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 GUIDE 109:2012, *Environmental aspects - Inclusion in electrotechnical product standards*

IEC 60027-1:1992, *Letters symbols to be used in electrical technology - Part 1: General*

IEC 60027-1:1992/AMD1:1997, *Letters symbols to be used in electrical technology - Part 1: General*

IEC 60027-1:1992/AMD2:2005, *Letters symbols to be used in electrical technology - Part 1: General*

IEC 60335-2-11:2024, *Household and similar electrical appliances - Safety - Part 2-11: Particular requirements for tumble dryers*

IEC 60456:2024, *Washing machines for household use - Methods for measuring the performance*

IEC 60704-2-6:2012, *Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-6: Particular requirements for tumble dryers*

IEC 60734:2012, *Household electrical appliances - Performance - Water for testing*

IEC 62053-21:2020, *Electricity metering equipment - Particular requirements - Part 21: Static meters for AC active energy (classes 0,5, 1 and 2)*

IEC 63474:2023, *Electrical and electronic household and office equipment - Measurement of networked standby power consumption of edge equipment*

ISO 139:2005, *Textiles - Standard atmospheres for conditioning and testing*

ISO 139:2005/AMD1:2011, *Textiles - Standard atmospheres for conditioning and testing*

ISO 5167-1:2022, *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 80000-1:2022, *Quantities and units - Part 1: General*

IEC 62301, *Measurement of standby power for appliances and equipment*

3 Terms, definitions and symbols

For the purposes of this document, the following terms, definitions and symbols apply. [Figure 1](#) shows the usage of and the relationships between definitions for performance and consumption measures.

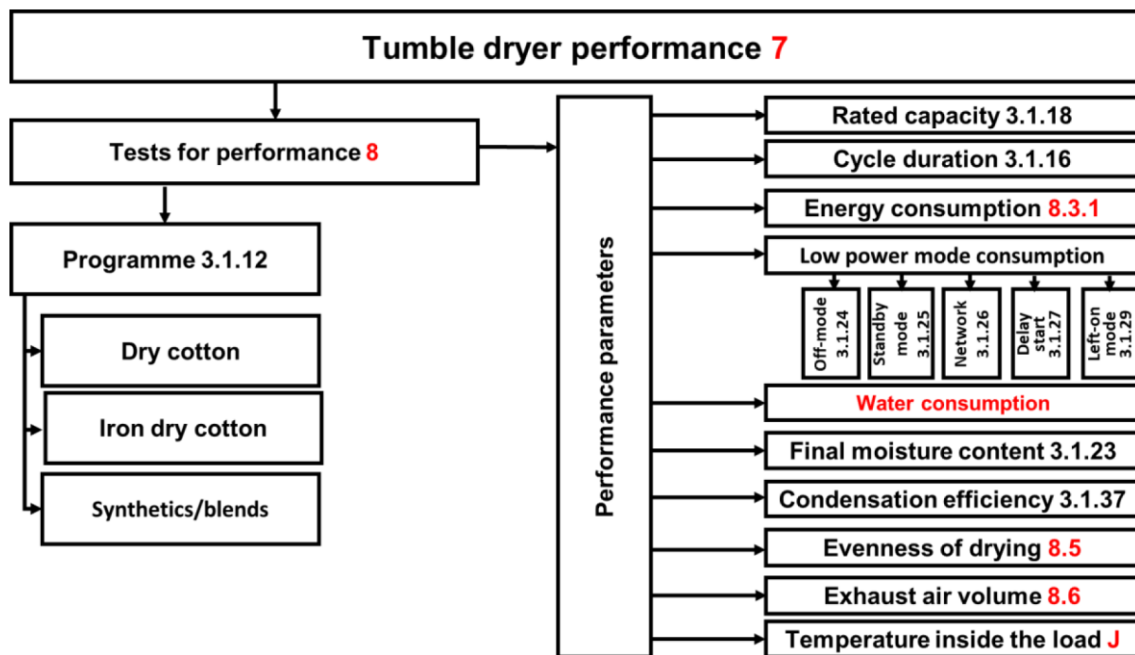


Figure 1 – Overview of the different performance measures

3.1 Terms and definitions

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

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

3.1.1

tumble dryer

appliance in which textiles are dried by tumbling in a rotating drum, through which air is passed

3.1.2

air vented tumble dryer

tumble dryer (3.1.1) that draws in fresh air which is passed over the textiles and where the resulting moist air is exhausted into the room or vented outside

3.1.3

condenser tumble dryer

tumble dryer (3.1.1) which includes a device for removing moisture from the air used for the drying process

3.1.4

automatic tumble dryer

tumble dryer (3.1.1) which switches off the drying process when a certain **moisture content (3.1.22)** of the load is reached without the need for user intervention at any point during the **programme (3.1.13)** prior to the **end of programme (3.1.14)**. (3.1.14)

Note 1 to entry: This may include systems that use conductivity or temperature sensing.

Note 2 to entry: The manufacturer may indicate the use of the direct drain kit.

3.1.5

non-automatic tumble dryer

tumble dryer (3.1.1) which does not switch off the drying process when a certain **moisture content (3.1.22)** of the load is reached, usually controlled by a timer, but may also be controlled manually

3.1.6

test load

textile load used for testing

3.1.7

pre-treatment

processing of a new **test load (3.1.6)** prior to its first use to avoid rapid changes of characteristics during the tests

3.1.8

conditioning

bringing the **test load (3.1.6)** into thermodynamic equilibrium with the defined ambient air conditions of temperature and humidity

Note 1 to entry: The process of **conditioning (3.1.8)** is different from "wetting" which is described in 6.5.7.

3.1.9

test run

single performance assessment of one **programme (3.1.13)** execution in the **tumble dryer (3.1.1)**

3.1.10

test series

group of **test runs (3.1.9)** on a single **tumble dryer (3.1.1)** or multiples of the same model **tumble dryer (3.1.1)** which, collectively, are used to assess the performance of a **tumble dryer (3.1.1)** and the statistical variability of this performance applied to the general population of the model tested

3.1.11

test class

type of the **test series (3.1.10)**, to evaluate individual unit variability over multiple runs (unit class) or to evaluate production variability over multiple units (family class)

Note 1 to entry: Unit class: Multiple **test runs** on a single test machine: provide a statistical basis to assess the performance variability of a single **programme (3.1.13)** on a single test machine when run according to clause xx.

Note 2 to entry: Family class: Single or multiple **test runs (3.1.9)** on multiple test machines provide a statistical basis to assess the performance variability over the manufacturing process using a single **programme (3.1.13)** when run on multiple test machines of the same model according to clause yy.

Note 3 to entry: Statistical independence of **test runs** and **test series (3.1.10)** require **normalisation (3.1.18)** between runs and series to minimise carryover effects. Refer to Annex O? for guidance.

3.1.12 **operation**

each performance of a function that occurs during the **tumble dryer (3.1.1)** drying process such as heating up, drying, cooling, **wrinkle guard (3.1.29)**

3.1.13 **programme**

series of **operations (3.1.12)** which are pre-defined within the **tumble dryer (3.1.1)** and which are declared by the manufacturer as suitable for drying certain types of textiles

3.1.14 **end of programme**

moment in time when the **tumble dryer (3.1.1)** indicates the **programme (3.1.13)** is complete and the load is accessible to the user

Note 1 to entry: Where there is no such indicator and the door is locked during **operation (3.1.12)**, the **programme (3.1.13)** is deemed to be complete when the load is accessible to the user. Where there is no indicator and the door is not locked during **operation (3.1.12)**, the **programme (3.1.13)** is deemed to be complete when the power consumption of the appliance drops to a steady state condition and it is not performing any function. For **non-automatic tumble dryers (3.1.5)**, the **programme (3.1.13)** is deemed to be complete when it is stopped by the operator or the timer.

Note 2 to entry: An indication of the **end of programme (3.1.14)** may be in the form of a light (on or off), a sound, an indicator shown on a display or the release of a door or latch. In some **tumble dryers (3.1.1)** there may be a short delay from an **end of programme (3.1.14)** indicator until the load is accessible by the user.

3.1.15 **programme duration**

period of time from the initiation of the **programme (3.1.13)** (excluding any user programmed delay) until the **end of programme (3.1.14)**

3.1.16 **cycle**

complete drying process, as defined by the selected **programme (3.1.13)**, consisting of a series of **operations (3.1.12)** including any **operations (3.1.12)** that occur after the **end of programme (3.1.14)**

Note 1 to entry: Examples of **operations** that may occur after the completion of the **programme (3.1.13)** are monitoring and **wrinkle guard (3.1.29)** operations (where applicable).

3.1.17 **cycle duration**

period of time from the initiation of the **programme (3.1.13)** (excluding any user programmed delay) until all activity ceases. Activity is considered to have ceased when the power consumption reverts to a steady state condition that persists indefinitely without user intervention. If there is no activity after the **end of programme**, the **cycle duration (3.1.17)** is equal to the **programme duration (3.1.15)**

Note 1 to entry: Cycle duration includes any activity that may occur for a limited period after the end of **programme (3.1.13)**. Any cyclic event that occurs indefinitely is considered to be steady state.

3.1.18 **normalisation**

processing of a **test load (3.1.6)** after a pre-determined number of **cycles** to bring the **test load (3.1.6)** to a normal state prior to testing

3.1.19

rated capacity

maximum mass in kg of dry textiles of a particular type that the manufacturer declares can be treated in the [tumble dryer \(3.1.1\)](#) in the [programme \(3.1.13\)](#) selected

3.1.20

test load mass

actual mass of the [test load \(3.1.6\)](#)

3.1.21

nominal test load mass

mass of dry textiles of a particular type for which the performance of the [tumble dryer \(3.1.1\)](#) will be tested ([rated capacity \(3.1.19\)](#) or part load). Target value toward which the conditioned [test load mass \(3.1.20\)](#) will be adjusted

3.1.22

moisture content

ratio of the difference between the [test load mass \(3.1.20\)](#) and the conditioned [test load mass \(3.1.20\)](#) to the conditioned [test load mass \(3.1.20\)](#) expressed in percent

3.1.23

initial moisture content

[moisture content \(3.1.22\)](#) of a [test load \(3.1.6\)](#) prior to a [test run \(3.1.9\)](#)

3.1.24

final moisture content

[moisture content \(3.1.22\)](#) of a [test load \(3.1.6\)](#) at the end of a [test run \(3.1.9\)](#)

3.1.25

off mode

condition in which the [tumble dryer \(3.1.1\)](#) is connected to the mains and is not providing any function

Note 1 to entry: The following shall also be considered as [off mode \(3.1.25\)](#):

- a) conditions providing only an indication of [off mode \(3.1.25\)](#);
- b) conditions providing only functionalities intended to ensure electromagnetic compatibility.

3.1.26

standby mode

condition where the [tumble dryer \(3.1.1\)](#) is connected to the mains and provides only the following functions, which can persist for an indefinite time:

- a) reactivation function, or a mere indication of enabled reactivation function; and/or
- b) reactivation function through a connection to a [network \(3.1.27\)](#); and/or
- c) information or status display; and/or
- d) detection function for emergency measures

3.1.27

network

communication infrastructure with topology of links, an architecture, including the physical components, organizational principles, communication procedures and format protocols

3.1.28

delay start

condition where the user has selected a specified delay to the beginning of the [cycle \(3.1.16\)](#) of the selected [programme \(3.1.13\)](#)

3.1.29

wrinkle guard

[operation \(3.1.12\)](#) of the [tumble dryer \(3.1.1\)](#) after completion of a [programme \(3.1.13\)](#) to prevent excessive wrinkling of the load

Note 1 to entry: Also known as anti-crease function

3.1.30

left on mode

the lowest power consumption mode that may persist for an indefinite time after the completion of the [programme \(3.1.13\)](#) and unloading of the machine without any further intervention of the user

Note 1 to entry: In some products this mode may be an equivalent power to [off mode \(3.1.25\)](#).

3.1.31

unstable left on mode

condition after opening the door, at the end of the [programme \(3.1.13\)](#) until the [tumble dryer \(3.1.1\)](#) enters [left on mode \(3.1.30\)](#) (without any intervention by the end-user)

Note 1 to entry: Unstable [left on mode \(3.1.30\)](#) is a limited duration mode that may be a short duration (few seconds) up to 30 min, or longer if declared by the manufacturer. The power level during this mode may be constant or varying.

3.1.32

post programme phases

phases after the **end of programme** defined to be used for the measurement of [left on mode \(3.1.30\)](#)

3.1.33

post programme phase LU

phase after the **end of programme** defined to be used for the measurement of the [unstable left on mode \(3.1.31\)](#)

3.1.34

post programme phase LO

phase after the **end of programme** defined to be used for the measurement of the [left on mode \(3.1.30\)](#)

3.1.35

unstable left on mode duration

time to automatically revert the machine to [left on mode \(3.1.30\)](#) after the [end of programme \(3.1.14\)](#)

3.1.36

power management system

system within the [tumble dryer \(3.1.1\)](#) which automatically reverts it to [left on mode \(3.1.30\)](#)

3.1.37

rated voltage

voltage assigned to the appliance by the manufacturer

3.1.38

condensation efficiency

the ratio between the mass of moisture condensed by a [condenser tumble dryer \(3.1.3\)](#) and the mass of moisture removed from the load at the end of the [programme \(3.1.13\)](#)

3.2 List of symbols

The symbols are listed in [Table 1](#).

Table 1 – List of symbols

Symbol	Unit	Definition
a	-	intercept of the regression line
b	-	slope of the regression line
C	%	arithmetical average of the condensation efficiency (3.1.38) of all valid test runs (3.1.9)
C_j	%	condensation efficiency (3.1.38) for test run (3.1.9) j
E	kWh	arithmetical average of the corrected energy consumption of all valid test runs (3.1.9)
E_j	kWh	corrected electric energy consumption for test run (3.1.9) j
E_{mj}	kWh	measured electric energy consumption for test run (3.1.9) j
E_s	kWh/kg	specific energy consumption
F	m ³ /min	volumetric flow rate
j	-	test run (3.1.9) number
k	-	test load (3.1.6) item number
K	-	constant = $1,9 \cdot 10^{-3} \text{ Pa h}^2/\text{m}^6$
L	L	arithmetical average of the corrected water consumption of all valid test runs (3.1.9)
L_j	L	corrected water consumption for test run (3.1.9) j
L_{mj}	L	measured water consumption for test run (3.1.9) j
L_s	L/kg	specific water consumption
n	-	number of valid test runs (3.1.9)
N	-	number of items in the test load (3.1.6)
p	Pa	static pressure
P_{om}	W	off mode (3.1.25) power
P_{sm}	W	left on mode (3.1.30) power
P_{ds}	W	Delay start (3.1.28) mode power
P_{ns}	W	Networked standby mode power
P_{LU}	W	Unstable left on mode (3.1.31) power
P_{LO}	W	Left on mode (3.1.30) power
σ	-	standard deviation of measured results
σ_b	-	standard deviation of the measured final moisture content (3.1.24) for all valid test runs (3.1.9)
σ_w	-	arithmetical average of the evenness of drying of all valid test runs
σ_{wj}	-	evenness of drying for a single test run (3.1.9) j
t	min	arithmetical average of the programme (3.1.15) duration (3.1.15) of all valid test runs (3.1.9)
t_s	min/kg	specific programme (3.1.15) duration (3.1.15)
t_j	min	corrected programme (3.1.15) duration (3.1.15) for test run (3.1.9) j
t_{mj}	min	measured programme (3.1.15) duration (3.1.15) for test run (3.1.9) j
V_D	L	clothes container volume
V_A	m ³	exhaust air volume
W	g	rated capacity (3.1.19) for the type of load tested
W_0	g	mass of the conditioned test load (3.1.6)
W_{0k}	g	mass of conditioned test load (3.1.6) item k

Symbol	Unit	Definition
W_f	g	mass of the test load (3.1.6) after drying
W_{fj}	g	mass of test load (3.1.6) after drying for test run (3.1.9) j
W_{fk}	g	mass of test load (3.1.6) item k after drying
W_i	g	mass of the test load (3.1.6) after wetting
W_{ij}	g	mass of the test load (3.1.6) after wetting during test run (3.1.9) j
W_{wj}	g	mass of water collected in the condenser reservoir during test run (3.1.9) j
x_i	-	i -th term of parameter x
$\bar{x}_i$	-	mean of all terms of parameter x
Y	-	performance parameter (energy consumption or programme duration (3.1.15)) (3.1.15)
y	-	number of table tennis balls
μ_f	%	arithmetical average of the measured final moisture content (3.1.24) of all valid test runs
$\mu_{fj\text{av}}$	%	arithmetical average final moisture content (3.1.24) of all the individual items in the test load (3.1.6) for test run (3.1.9) j
μ_{f0}	%	target final moisture content (3.1.24)
μ_{fj}	%	measured final moisture content (3.1.24) after test run (3.1.9) j
μ_{fjk}	%	measured final moisture content (3.1.24) of the test load (3.1.6) item k for each valid test run (3.1.9) j
μ_{ij}	%	measured initial moisture content (3.1.23) for test run (3.1.9) j
μ_{i0}	%	nominal initial moisture content (3.1.23)

4 Requirements

4.1 General

This International Standard sets methods for the measurement of following performance parameters of **tumble dryers**:

- Electric energy consumption;
- Water consumption;
- **Programme duration**;
- **Condensation efficiency**;
- Evenness of drying;
- Volumetric flow rate of exhaust air;
- Low power modes (including **off mode**, **standby mode**, **delay start**, with or without [network \(3.1.27\)](#) connection and [left on mode \(3.1.30\)](#) power).
- Temperature inside the load

Any claims of performance referring to this International Standard for these parameters shall be measured in accordance with the test methods set out in this standard. Any claims of performance referring to this document at other than [rated capacity \(3.1.19\)](#) shall be qualified with load type and capacity used for the test (refer to [Clause 7](#) for details).

NOTE Measurements/reports should not refer to this International Standard if the test conditions deviate from this International Standard unless the deviations are described in detail. The results are only comparable if they are determined under the same test conditions.

This international standard does not specify minimum performance requirements for **tumble dryers**.

4.2 Rated capacity

The manufacturer or supplier shall declare the [rated capacity \(3.1.19\)](#) at 0,5 kg intervals for each relevant textile type. Textiles relevant to this standard are cotton and synthetic/blends.

The [rated capacity \(3.1.19\)](#) for any textile type shall not exceed the maximum mass of dry laundry, in kilograms, to be used in the appliance in accordance with IEC 60335-2-11:2024.

If the [rated capacity \(3.1.19\)](#) is not declared by the manufacturer, the [rated capacity \(3.1.19\)](#) shall be deduced from the clothes container volume (see [4.3](#)) as described in [Annex E](#).

Where the manufacturer gives a range of values for the [rated capacity \(3.1.19\)](#) for a particular textile type, the maximum value shall be used.

NOTE The [rated capacity \(3.1.19\)](#) of an appliance may be different for different textiles

4.3 Dimensions

Where a manufacturer declares dimensions, these shall be in accordance with the following requirements, as applicable. The dimensions shall be given in cm and shall be rounded to the nearest whole cm.

- Height = vertical dimension measured from the lower edge (on the floor) to the upper edge of the top, with the door/lid closed. If adjustable levelling feet are provided, they shall be moved up and down to determine minimum and maximum possible heights.
- Max height = maximum vertical dimension measured from the lower edge (on the floor) to a horizontal plane at the maximum height of the [tumble dryer \(3.1.1\)](#) with the door/lid open. If adjustable levelling feet are provided, they shall be moved up and down to determine minimum and maximum possible heights.
- Width = horizontal dimension, between the sides, as measured between two parallel vertical planes against the sides of the [tumble dryer \(3.1.1\)](#), including all projections.
- Depth c_1 = horizontal dimension as measured from a vertical rear plane against the back of the [tumble dryer \(3.1.1\)](#) and the most prominent part of the front fascia, with the door/lid closed. For this measurement, the door thickness, knobs and handles are generally not included in the measurement.
- Depth c_2 = horizontal dimension as measured from a vertical rear plane against the [tumble dryer \(3.1.1\)](#) and the most prominent part of the front, knobs and handles also being taken into account, with the door/lid open (generally when at right angles to the machine front).
- Depth c_3 = horizontal dimension as measured from a vertical rear plane against the tumble dryer and the most prominent part of the front, knobs and handles also being taken into account, with the door/lid closed (generally when at right angles to the machine front).
- Clothes container volume = the volume of the container in which textiles are placed, where required, shall be determined in accordance with [Annex E](#).

NOTE 1 Dimension c_1 is intended to provide an indication of the required depth for the [tumble dryer \(3.1.1\)](#) where the fascia is intended to be flush with adjacent furniture or appliances.

NOTE 2 Dimension c_3 is intended to provide an indication of the required depth for the [tumble dryer \(3.1.1\)](#) where it is intended to be installed in a wardrobe or closet.

5 Test conditions, materials

5.1 General

The tolerances specified for parameters within this International Standard, using the symbol '±', indicate the allowable limits of variation from the specified parameter outside which the test or results shall be invalid. The statement of tolerance does not permit the deliberate variation of these specified parameters.

Rounding shall only be applied to reported values in [Annex D](#). If numbers are rounded they shall be rounded to the nearest number according to ISO 80000-1:2009 (B.3, Rule B). If the rounding takes place to the right of the comma, the omitted places shall not be filled with zeros.

Rounding means replacing the magnitude of a given number by another number called the rounded number, selected from the sequence of integral multiples of a chosen rounding range. Rounding shall only be applied to reported values with a rounding range as defined in Annex x, to the nearest number according to ISO 80000-1:2022 Annex B, following B.3 Rule B. If the rounding takes place to the right of the comma, the omitted places shall not be filled with zeros. Rounding in more than one stage by the application of the rules given above may lead to errors. Therefore, calculations requested within this document shall always use the precise value of a measurement (without rounding) and apply rounding according to Annex x only on the final result. An example is given in Annex x.

5.2 Test conditions

5.2.1 Electricity supply

The supply voltage to each [tumble dryer \(3.1.1\)](#) shall be maintained at the [rated voltage \(3.1.37\)](#) $\pm 2\%$ throughout the test. If a voltage range is indicated, then the supply voltage shall be the nominal voltage of the country in which the appliance is intended to be used.

The supply frequency to each [tumble dryer \(3.1.1\)](#) shall be maintained at the rated frequency $\pm 1\%$ throughout the test. If a frequency range is indicated, the test frequency shall be the nominal frequency of the country in which the machine is intended to be used.

The measured voltage and frequency of the power supply used during testing shall be reported.

NOTE Voltage stabilisers shall ensure that the normal [operation \(3.1.12\)](#) of the [tumble dryer \(3.1.1\)](#) does not cause undue distortion of the voltage waveform.

5.2.2 Water supply

5.2.2.1 General

This section describes the specifications for water to be used for preparing **test loads**, wetting **test loads** and for use in water cooled condensers.

In all cases the water supply shall meet the requirements given in [5.2.2.2](#) and [5.2.2.3](#).

Water used for normalising **test loads** and wetting **test loads** shall meet the requirements of [5.2.2.2](#), [5.2.2.3](#) and [5.2.2.4](#).

Water used for wetting **test loads** for testing conductivity controlled **automatic tumble dryers** shall meet the requirements of [5.2.2.2](#), [5.2.2.3](#), [5.2.2.4](#) and [5.2.2.5](#).

NOTE The performance of a dryer may differ according to the quality of the water used to wet the [test load \(3.1.6\)](#).

5.2.2.2 Water temperature

The temperature of the cold water supply shall be $(15 \pm 2)^\circ\text{C}$. The measured water temperature shall be reported.

5.2.2.3 Water pressure

The static (gauge) pressure of the water supply at the inlet to each [tumble dryer \(3.1.1\)](#) during water intake shall be maintained at (240 ± 50) kPa. The measured water pressure shall be reported.

5.2.2.4 Water hardness

Either hard water with a total hardness of $(2,5 \pm 0,2)$ mmol/l or soft water with a total hardness of $(0,5 \pm 0,2)$ mmol/l shall be used. If available, naturally occurring water of the correct total hardness may be used. Alternatively, water of the correct total hardness shall be prepared according to IEC 60734.

The water used for wetting a load shall always be of the same hardness as the water which is used for the previous **normalisation (3.1.18)**.

The total hardness of the water used shall be reported.

5.2.2.5 Water alkalinity, conductivity and pH

When testing conductivity controlled **automatic tumble dryers (3.1.4)**, the characteristics of the water used for wetting the **test load (3.1.6)** can have a large influence on the test results. The water characteristics are defined in terms of total hardness, alkalinity and conductivity.

For the purpose of testing **automatic tumble dryers** the water for wetting the **test load (3.1.6)** shall have the characteristics of water as specified in table 2 of IEC 60734.

If water characteristics need to be adjusted, Method B or Method C3 of IEC 60734 shall be followed, but without adjustment of pH value.

The alkalinity, pH and conductivity of the water used shall be reported.

NOTE Method B of IEC 60734 describes how to prepare water for testing based on demineralised water. Method C3 of IEC 60734 describes how to produce water with the same characteristics as with Method B but based on natural water.

5.2.3 Ambient temperature and humidity

5.2.3.1 General

Air temperature and relative humidity shall be recorded at a frequency of at least once per minute throughout the test and the 24 hours preceding the test, at a location which is representative of the air surrounding the appliance under test. It should be recognised that the appliance under test will be emitting heat by radiation and by convection while it is operating and precautions shall be taken to minimize their influence on the recorded temperature and relative humidity.

5.2.3.2 Ambient temperature and relative humidity for tumble dryer testing

The ambient temperature of the test room shall be maintained at (23 ± 2) °C throughout the **tumble dryer (3.1.1)** test. The ambient temperature shall be measured in the vicinity of the **tumble dryer (3.1.1)** being tested. The maximum and minimum measured temperatures shall be reported and rounded to the nearest 0,5 °C.

The ambient relative humidity of the test room shall be maintained at (55 ± 5) % throughout the **tumble dryer (3.1.1)** test. The ambient relative humidity shall be measured in the vicinity of the **tumble dryer (3.1.1)** being tested. The maximum and minimum measured ambient relative humidity for **tumble dryer (3.1.1)** testing shall be reported rounded to the nearest whole percentage.

The ambient temperature and relative humidity shall not be influenced by the appliance itself or other appliances in the laboratory.

5.2.3.3 Ambient temperature and ambient relative humidity for conditioning of test load items

Test load conditioning (3.1.8) shall be either by the bone-dry method or by ambient-controlled room / chamber. Applicable correction factors to achieve comparable measures of the conditioned load mass are described in A.3

Where an ambient-controlled room / chamber is used for **conditioning** (3.1.8) the **test load** (3.1.6), the following conditions shall be maintained:

- standard ambient conditions: $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \%$ relative humidity (refer to ISO 139:2005 + Amd.1:2011), or
- alternative ambient conditions $(23 \pm 2) ^\circ\text{C}$ and $(55 \pm 5) \%$.

The method of applying correction factors to measured values of ambient temperature and relative humidity and for **conditioning** (3.1.8) **test load** (3.1.6) items shall be reported. The ambient temperature shall be rounded to the nearest 0,5 °C. The reported ambient relative humidity shall be rounded to the nearest whole percentage.

NOTE Specific requirements regarding **conditioning** (3.1.8) of the **test load** (3.1.6) are specified in 6.4. As an alternative to using an ambient-controlled room / chamber for **conditioning** (3.1.8) the **test load** (3.1.6), the bone-dry method may be used as described in 6.5.5.3.

5.3 Test materials

5.3.1 General

This section sets out the specifications for test materials required for **tumble dryer** (3.1.1) testing to this International Standard, including:

- **Test loads** (3.1.6) (load items);
- Detergent.

NOTE Suitable sources of test materials are given in A.7.

5.3.2 Test loads

5.3.2.1 Cotton test load

Where a cotton load is specified for testing, the cotton **test load** (3.1.6) shall consist of bed sheets, pillowcases and towels as specified in A.2.

5.3.2.2 Synthetics/blends test load

Where a synthetics/blends load is specified for testing, the synthetics/blends **test load** (3.1.6) shall consist of men's shirts and pillowcases as defined in A.2.

5.3.3 Detergents

The detergent to be used in this standard is the base powder of IEC 60456 standard powder detergent IEC-P. The specification for this detergent is defined in A.1. Detergent dosage is specified in 6.5.4.2 and 6.5.4.3.

5.4 Equipment

5.4.1 Equipment for normalisation

The specification for the reference washing machine which is used for the **normalisation** (3.1.18) of **test loads** (3.1.6) is defined in A.8.

NOTE Other clothes washing machines can be used provided that they have at least the same washing and rinsing performance of the reference washing machine according to IEC 60456 in the relevant [programme \(3.1.13\)](#). They may be used up to their [rated capacity \(3.1.19\)](#).

5.4.2 Equipment for conditioning the test load

This International Standard requires [test load \(3.1.6\)](#) items to be treated in a controlled manner prior to their use in performance tests in order to determine their mass under standardised ambient conditions. The alternative methods of [conditioning \(3.1.8\)](#) the [test load \(3.1.6\)](#) items are:

- Leaving the [test load \(3.1.6\)](#) items in a room or chamber with a controlled ambient temperature and humidity (refer to [5.2.3.2](#)) until their remaining [moisture content \(3.1.22\)](#) is in equilibrium with the ambient conditions. Refer to [6.5.5.2](#) for details.
- Treating the [test load \(3.1.6\)](#) items in a clothes dryer of specified performance to ensure that the [test load \(3.1.6\)](#) items are in a “bone dry” state. Refer to [6.5.5.3](#) for details. Annex [A.3](#) sets out the method and the specifications for a [tumble dryer \(3.1.1\)](#) which is used for this method.

5.4.3 Equipment for wetting the test load prior to a test

Any washing machine may be used to wet the load prior to a test, provided it has the following features:

- a [rated capacity \(3.1.19\)](#) which is equal to or greater than the load being wetted;
- at least one rinse [operation \(3.1.12\)](#) with a duration of at least five minutes;
- the rinse shall consist of a volume of water in litres at least three times the mass of the [test load \(3.1.6\)](#) in kilograms;
- a spin drying [operation \(3.1.12\)](#) capable of achieving the desired [initial moisture content \(3.1.23\)](#).

5.4.4 Other equipment

This International Standard requires the measurement of a range of parameters during testing of a [tumble dryer \(3.1.1\)](#). These parameters include the following:

- mass;
- dimensions;
- electrical parameters (voltage, energy, power and frequency);
- temperature of water and air;
- relative humidity;
- water pressure;
- total water hardness of the water used for testing;
- conductivity of water used for testing (conductivity sensing dryers only);
- alkalinity of water used for testing (conductivity sensing dryers only);
- pH of the water used for testing;
- duration;
- data loggers for temperature measurement in the load.

For some of the above measurements the specifications of instruments used to take the measurements are explicitly defined in [Annex J](#).

Several different instruments for the measurement of mass are likely to be required for tasks such as mass of load items and the whole [test load \(3.1.6\)](#) and mass of detergent.

6 Preparation for testing

6.1 General

This section sets out the requirements for the preparation of a [tumble dryer \(3.1.1\)](#). It also specifies the requirements for the preparation of [test loads \(3.1.6\)](#).

6.2 Installation of the tumble dryer

The measurements shall be carried out on a [tumble dryer \(3.1.1\)](#) which is installed and used in accordance with the manufacturer's instructions, except as required by this document. Manufacturer's instructions which aim at achieving more favourable results may be disregarded if not explicitly specified in this document. Where there is more than one option for installation, the option chosen for testing shall be documented in the test report.

NOTE 1 Manufacturer's instructions are provided with the product in the form of a user manual, installation guide, instruction sheet, information affixed to the product itself or information that is available on a public website.

NOTE 2 Performance of an aged and/or used machine can differ from a new and/or unused machine.

Where the [tumble dryer \(3.1.1\)](#) is intended for use without a duct (i.e. the [tumble dryer \(3.1.1\)](#) is intended to be vented into the room), the [tumble dryer \(3.1.1\)](#) shall be tested as supplied without a duct.

Where the [tumble dryer \(3.1.1\)](#) is intended for use with a duct and the duct is supplied with the [tumble dryer \(3.1.1\)](#) (i.e. not as a separately supplied accessory), the [tumble dryer \(3.1.1\)](#) shall be tested with this duct, placed in a configuration consisting of three right angle bends as in [Figure B.2](#).

Where the [tumble dryer \(3.1.1\)](#) is intended for use with a duct and the duct is supplied with the [tumble dryer \(3.1.1\)](#) (i.e. not as a separate accessory), but the supplied duct is too short to be placed in a configuration consisting of three right angle bends as in [Figure B.2](#), it shall be tested with a duct as specified in B.3.

Where the [tumble dryer \(3.1.1\)](#) is intended for use with a duct and the duct is not supplied with the [tumble dryer \(3.1.1\)](#), the [tumble dryer \(3.1.1\)](#) shall be tested with a duct as specified in B.3.

Where a manufacturer gives the option to use the [tumble dryer \(3.1.1\)](#) both with and without a duct, the [tumble dryer \(3.1.1\)](#) shall be tested with a duct.

The test report shall clearly state which duct configuration, if any, is used in each test.

Where the [tumble dryer \(3.1.1\)](#) has a water inlet connection, it shall be connected to an appropriate laboratory water supply system for testing (refer to [5.2.2](#)) with a hose provided or as recommended by the manufacturer.

If the manufacturer gives the option to use a [condenser tumble dryer \(3.1.3\)](#) both with and without a condensed water container, or if the manufacturer recommends direct connection to the drainage system, the dryer shall be tested in accordance with the manufacturer's instructions. If no instructions are provided, then the dryer shall be tested with the condensed water container.

6.3 Preparation of the tumble dryer for a test series

Before a [test series \(3.1.10\)](#) is commenced the [tumble dryer \(3.1.1\)](#) shall be checked to confirm that it has no operating defects that may affect the [operation \(3.1.12\)](#) of the unit.

Before each [test run \(3.1.9\)](#) of the [test class \(3.1.11\)](#) 'family class' the filters, heat exchangers and ducts intended to be serviced by the consumer shall be cleaned according to the

manufacturer's instructions. Before each [test series \(3.1.10\)](#) of the [test class \(3.1.11\)](#) 'unit class' the filters, heat exchangers and ducts intended to be serviced by the consumer shall be cleaned according to the manufacturer's instructions.

Before each [test series \(3.1.10\)](#) the **tumble dryers**, filters, heat exchangers, ducts, etc. shall be serviced and cleaned to such an extent that the [tumble dryer \(3.1.1\)](#) is in the same condition or as close as possible to an unused appliance.

The total number of runs before a new [test series \(3.1.10\)](#) and the measures and extent of servicing and cleaning the [tumble dryer \(3.1.1\)](#) shall be reported.

6.4 Preparation of the tumble dryer for a test run

Before each [test run \(3.1.9\)](#) the filters, heat exchangers, condensed water container and ducts intended to be serviced by the consumer shall be maintained according to the manufacturer's instructions.

The manufacturer's specification for the frequency of cleaning of the heat exchanger and related filters shall be followed. If no specification is given regarding frequency, or the specified frequency is greater than six [cycles \(3.1.16\)](#) then the heat exchanger and its related filters shall not be cleaned between [test runs \(3.1.9\)](#). In this context, the manufacturer's specification for cleaning the heat exchanger and its related filters means the specification that is directed towards the user. Specifications that are given specifically for use by test laboratories shall be ignored.

The [tumble dryer \(3.1.1\)](#) shall be at laboratory ambient temperature (refer to [5.2.3.1](#)) at the beginning of each [test run \(3.1.9\)](#). This requirement has been met if the temperature of the hottest internal surface of the [tumble dryer \(3.1.1\)](#) drum remains within 2 °K of the ambient air temperature for a period of 15 minutes whilst the drum door remains closed. Alternatively the [tumble dryer \(3.1.1\)](#) shall be left for 18 hours at ambient temperature between [test runs \(3.1.9\)](#).

NOTE The latter is the preferred method when testing [tumble dryer \(3.1.1\)](#)s with a high thermal mass (such as heat pump dryers).

6.5 Preparation of test loads

6.5.1 General

This section sets out requirements for the preparation of the [test loads \(3.1.6\)](#) used in the [tumble dryer \(3.1.1\)](#) which is to be tested in accordance with this International Standard. Refer to [Clause 7](#) regarding the selection of the required [test load mass \(3.1.20\)](#) and requirements for tests at [rated capacity \(3.1.19\)](#). This section sets out:

- [Pre-treatment \(3.1.7\)](#) of new [test load \(3.1.6\)](#) items prior to use in testing;
- Average age requirements for [test load \(3.1.6\)](#) items used in a [test series \(3.1.10\)](#);
- [Normalisation \(3.1.18\)](#) of the [test load \(3.1.6\)](#) items;
- [Conditioning \(3.1.8\)](#) of [test load \(3.1.6\)](#) items to determine the [test load mass \(3.1.20\)](#) at a known remaining [moisture content \(3.1.22\)](#);
- [Test load \(3.1.6\)](#) composition;
- Wetting of the [test load \(3.1.6\)](#).

6.5.2 Pre-treatment of new test load items prior to use

New cotton and synthetics/blend [test load \(3.1.6\)](#) items shall be treated before their first use by undergoing a [normalisation \(3.1.18\)](#) wash process five times, as defined in [6.5.4](#) but without intermediate drying. 15 g of the base powder of IEC 60456 standard powder detergent IEC-Pper kg of [test load \(3.1.6\)](#) is added to each of the first five washes. After the final [pre-treatment \(3.1.7\)](#) wash, the [test load \(3.1.6\)](#) shall be dried.