



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS L 1930 : 2014

**Textiles — Domestic washing and drying
procedures for textile testing**

ICS 59.080.01

Reference number : JIS L 1930 : 2014 (E)

PROTECTED BY COPYRIGHT

L 1930 : 2014

Date of Establishment: 2014-10-20

Date of Public Notice in Official Gazette: 2014-10-20

Investigated by: Japanese Industrial Standards Committee

Standards Board

Technical Committee on Consumer Life Products

JIS L 1930 : 2014, First English edition published in 2015-10

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2015

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

PROTECTED BY COPYRIGHT

Contents

	Page
Introduction	1
1 Scope	1
1.2 Provision of this Standard	1
1.3 Washing procedure	2
1.4 Drying procedure	2
1.5 Provision of test	2
2 Normative references	2
3 Terms and definitions	3
4 Principle	3
5 Apparatus and materials	4
5.1 Automatic washing machines	4
5.2 Tumble dryers	4
5.3 Electrically (dry) heated flat-bed press	4
5.4 Line drying	4
5.5 Drying racks	4
5.6 Ballasts	4
6 Detergents and water	5
6.1 Reference detergents	5
6.2 Water	6
7 Conditioning and testing atmosphere	7
8 Wash load	7
8.1 Total wash load	7
8.2 Number of specimens	7
8.3 Selection of ballast	7
8.4 Ratio of load to ballast	7
9 Washing procedure	7
10 Drying procedure	8
10.1 Open-air dry	8
10.2 Tumble dry	9
11 Test report	10
Annex A (normative) Specification for reference washing machine Type A —Horizontal axis, front-loading type (drum type)	12
Annex B (normative) Specification for wash procedures for reference wash- ing machine Type A (drum type)	13

Annex C (normative)	Specification for reference washing machine Type B —Vertical axis, top-loading type (agitator type)	15
Annex D (normative)	Specification for washing procedures for reference washing machine Type B (agitator type)	16
Annex E (normative)	Specification for reference washing machine Type C — Vertical axis, top-loading type (pulsator type)	17
Annex F (normative)	Specification for washing procedures for reference washing machine Type C (pulsator type)	18
Annex G (normative)	Specification for tumble dryers	19
Annex H (normative)	Specifications for all ballast types used in washing	20
Annex I (normative)	Composition of reference detergent 1	21
Annex J (normative)	Composition of reference detergent 2	23
Annex K (normative)	Composition of reference detergent 3	24
Annex L (normative)	Composition of reference detergent 4	25
Annex M (normative)	Composition of reference detergent 5	26
Annex N (normative)	Composition of reference detergent 6	28
Annex O (normative)	Distribution and mixing of reference detergent 2, 3 or 6	29
Annex P (normative)	Determination of cycle drying time for tumble dryers with a timer device	30
Annex JA (informative)	Measuring method for washing mechanical force by reference washing machine Type C and results of measuring	33
Annex JB (informative)	Comparison table between JIS and corresponding International Standard	43

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry, through deliberations at the Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

Textiles — Domestic washing and drying procedures for textile testing

Introduction

This Japanese Industrial Standard has been prepared based on the third edition of **ISO 6330** published in 2012 with some modifications of the technical contents to correspond to the actual situation of domestic washing in Japan.

The portions given dotted underlines are the matters in which the contents of the corresponding International Standard have been modified. A list of modifications with the explanations is given in Annex JB. The matters contained in Annex JA are unique contents of **JIS** that are not given in the corresponding International Standard.

This Standard is utilized for quality and performance evaluations of a broad range of textile (textile fabrics, garments, etc) including but not exclusive to : appearance change, dimensional change, soil resistance, water repellency, colour fastness to domestic washing and drying (except for bleaching and ironing), and care labelling that are prescribed in other international and Japanese test method standards.

This Standard is also used to evaluate not only the attributes (performance, property) of fabrics themselves but also the performance of apparel, home products and other textile end-products.

The selection of washing and drying machines and their associated ballast types, detergents, and other drying options are to be made according to the country or international region in which the textile will be used by consumers.

NOTE : Suitable washing machines, detergents and ballast specified in this Standard are available commercially.

1 Scope

1.1 This Standard specifies domestic washing and drying procedures for textile testing. The procedures are applicable to textile fabrics, garments or other textile articles which are subjected to appropriate combinations of domestic washing and drying procedures.

1.2 Provision of this Standard

Provision is made for as follows.

- a) 13 different washing procedures based on the use of the reference washing machine Type A.
- b) 11 procedures based on the use of the reference washing machine Type B.
- c) 7 procedures based on the use of the reference washing machine Type C.

1.3 Washing procedure

Each washing procedure represents a single domestic wash.

1.4 Drying procedure

This Standard specifies six drying procedures:

A — Line dry

B — Drip line dry

C — Flat dry

D — Drip flat dry

E — Flat press

F — Tumble dry

1.5 Provision of test

A complete test consists of a washing and drying procedure.

NOTES 1 Use of different parameters (washing machine type, detergent type and type of tumble drier) may affect test results for any test using this Standard. Therefore, parties using this Standard are strongly encouraged to agree on the parameters to be used.

2 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 6330 : 2012 *Textiles — Domestic washing and drying procedures for textile testing* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) listed below shall be applied.

JIS K 0101 *Testing methods for industrial water*

JIS K 3362 *Test method of household synthetic detergent*

JIS K 3371 *Synthetic detergents for home laundering*

JIS L 0105 *General principles of physical testing methods for textiles*

NOTE : Corresponding International Standard : ISO 139 *Textiles — Standard atmospheres for conditioning and testing* (MOD)

JIS L 0208 *Glossary of terms used in textile industry — Testing*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS L 0105**, **JIS**

L 0208 and following apply.

3.1 ambient conditions

temperature and relative humidity in the test environment not differing from the normal indoor condition or the normal outdoor condition in the region where the test is performed

3.2 ballast

textile load (cotton, cotton/polyester or polyester) to be added to the specimen under test in order to achieve the specified weight in the reference washing machines

3.3 controlled humidity device

control unit in a tumble dryer capable of measuring the humidity of the load and ending the drying operation at a predetermined residual moisture level

3.4 over-drying

prolonged drying operation where the load is dried until all remaining moisture in the load has been removed

3.5 reference detergent

detergent with specified formulations to be used for testing purposes

3.6 reference washing machine

washing machine with defined engineering specifications to be used for testing purposes

3.7 washing procedure

cycle of the washing action including water supplying, washing, and repeated rinsing, spinning and water supplying and ended by spinning as predetermined on the washing machine

3.8 spinning process

water-extracting process in the washing machine by which water is removed from the textiles by centrifugal action as a part of the washing procedure

3.9 still air

air not influenced by any natural wind or mechanical device giving it a forced flow

3.10 total air-dry mass

total weight of the specimen under test and the ballast in a conditioned state according to JIS L 0105

4 Principle

A specimen is washed and dried according to the procedures specified in clauses 9 and 10.

5 Apparatus and materials

5.1 Automatic washing machines

5.1.1 Reference washing machine Type A — Horizontal axis, front-loading type (drum type)

The specification for reference washing machine Type A is given in Annex A.

5.1.2 Reference washing machine Type B — Vertical axis, top-loading type (agitator type)

The specification for reference washing machine Type B is given in Annex C.

5.1.3 Reference washing machine Type C — Vertical Axis, top-loading type (pulsator type)

The specification for reference washing machine Type C is given in Annex E.

5.2 Tumble dryers

5.2.1 Type A1 tumble dryer — Vented

The specification for Type A1 tumble dryer is given in Annex G.

5.2.2 Type A2 tumble dryer — Condenser

The specification for Type A2 tumble dryer is given in Annex G.

5.2.3 Type A3 tumble dryer — Large vented

The specification for Type A3 tumble dryer is given in Annex G.

5.3 Electrically (dry) heated flat-bed press

If this method of drying is used, the type of press shall be specified among the interested parties.

5.4 Line drying

For procedure for line drying (procedure A), see 10.1.1; for drip line drying (procedure B), see 10.1.2.

5.5 Drying racks

Use screen drying racks of approximately 16 mesh stainless steel or plastic for flat drying (procedure C) (see 10.1.3) or drip flat drying (procedure D) (see 10.1.4).

NOTE : For the mesh, it should be 16 mesh and 1.0 to 1.2 in aperture sizes as reference value.

5.6 Ballasts

5.6.1 Type I, 100 % Cotton ballast

The nominal composition of 100 % Cotton ballast is given in Annex H.

5.6.2 Type II, 50 % Cotton/50 % Polyester ballast

The nominal composition of 50 % Cotton/50 % Polyester ballast is given in Annex H.

5.6.3 Type III, 100 % Polyester ballast

The nominal composition of 100 % Polyester ballast is given in Annex H.

6 Detergents and water

6.1 Reference detergents

NOTE : Terms used in Annex I to Annex N : “Brightener” for reference detergent 1, “Optical whitener” for reference detergents 2 and 6, “Optical brightener” for reference detergent 4, and “Fluorescent whitening agent” for reference detergent 5, mean fluorescent brightening agent.

6.1.1 Reference detergent 1

Reference detergent 1 shall be as follows.

- a) Reference detergent 1 is a non-phosphate powder detergent without enzymes and is available both with and without optical brightener. [Other designations are 1993 **AATCC** standard reference detergent without optical brightener (WOB) and 1993 **AATCC** standard reference detergent with optical brightener.]
- b) Reference detergent 1 can only be used in machine Type B.
- c) The nominal composition of reference detergent 1 is given in Annex I.

6.1.2 Reference detergent 2

Reference detergent 2 shall be as follows.

- a) Reference detergent 2 is a non-phosphate powder detergent with optical brightener and with enzymes. (Another designation is **IEC** reference detergent A* .)
- b) Reference detergent 2 can be used in both machine Type A and Type B.
- c) The nominal composition of reference detergent 2 is given in Annex J.
- d) For distribution and mixing, see Annex O.

6.1.3 Reference detergent 3

Reference detergent 3 shall be as follows.

- a) Reference detergent 3 is a non-phosphate powder detergent without optical brightener and without enzymes. (Another designation is **ECE** reference detergent 98.)
- b) Reference detergent 3 can be used in both machine Type A and Type B.
- c) The nominal composition of reference detergent 3 is given in Annex K.
- d) For distribution and mixing, see Annex O.

6.1.4 Reference detergent 4

Reference detergent 4 shall be as follows.

- a) Reference detergent 4 is a non-phosphate powder detergent with optical brightener and with enzymes. [Another designation is **JIS K 3371** (Category 1).]
- b) Reference detergent 4 can only be used in washing machine Type C.

- c) The nominal composition of reference detergent 4 is given in Annex L.

6.1.5 Reference detergent 5

Reference detergent 5 shall be as follows.

- a) Reference detergent 5 is a non-phosphate liquid detergent and is available both with and without optical brightener (WOB). (Other designations are 2003 **AATCC** standard reference liquid detergent with optical brightener and 2003 **AATCC** standard reference liquid detergent without optical brightener.)
- b) Reference detergent 5 can only be used in washing machine Type B.
- c) The nominal composition of reference detergent 5 is given in Annex M.

6.1.6 Reference detergent 6

Reference detergent 6 shall be as follows.

- a) Reference detergent 6 is a non-phosphate powder detergent with optical brightener and without enzymes. (Another designation is **SDC** Reference detergent Type 4.)
- b) Reference detergent 6 can be used in machine Type A.
- c) The nominal composition of reference detergent 6 is given in Annex N.
- d) For distribution and mixing, see Annex O.

6.2 Water

6.2.1 Water hardness

Water hardness shall be not more than 300 mg/L¹⁾ expressed as calcium carbonate, when determined in accordance with 15.1.1 of JIS K 0101.

- NOTES
- 1 A water hardness is specified to be lower than 0.7 mmol/L (70 mg/L) expressed as calcium carbonate, when determined in accordance with **ISO 6059**, in the corresponding International Standard (**ISO 6330**).
 - 2 A water hardness of lower than 2.7 mmol/L (270 mg/L) can be applicable with a consent among the interested parties in accordance with **IEC 60456**, in the corresponding International Standard (**ISO 6330**).
 - 3 Hardness means the total amount of calcium ion and magnesium ion in water converted to the amount of calcium carbonate (CaCO₃) (mg/L) contained per litre.

Note¹⁾ It is in accordance with the Ministerial Ordinance of the Drinking Water Quality Standards based on the Water Works Act of the Ministry of Health, Labor and Welfare.

6.2.2 Water pressure

The laboratory water-supply pressure at the inlet to the reference washing machine shall be higher than 150 kPa.

6.2.3 Cold-water inlet temperature

The cold-water inlet temperature is as follows.

- a) The water temperature at the inlet to the reference washing machine type A shall be $(20 \pm 5) ^\circ\text{C}$.
- b) The water at the inlet to the reference washing machine Type C shall be preheated to the specified temperature in Annex F at the beginning of washing.
- c) In tropical countries, the water temperature $(20 \pm 5) ^\circ\text{C}$ should be regarded as a minimum temperature. When the measurement is carried out with a water temperature that differs from these limits, the supply temperature should be stated in the test report.

7 Conditioning and testing atmosphere

The atmospheres used for conditioning textile specimens shall be in accordance with JIS L 0105. When textile specimens are simply conditioned, they are left in a room under the standard condition for 4 h or longer.

8 Wash load

8.1 Total wash load

The total air-dry load mass shall be $(2\,000 \pm 100)$ g for all types of reference washing machines. In the case of testing a whole garment, report the total load if it is more than 2.1 kg.

8.2 Number of specimens

The number of specimens to be subjected to the washing and drying procedures specified in this Standard will be determined by the purpose for which the material is being tested.

8.3 Selection of ballast

For cellulosic products, the Cotton ballast, Type I shall be used (see 5.6.1). For synthetic products and products that are made of blends, either the Polyester/Cotton ballast, Type II or the Polyester ballast, Type III shall be used (see 5.6.2 and 5.6.3).

8.4 Ratio of load to ballast

If dimensional stability is being determined, not more than half of the wash load shall consist of test specimens.

In the case of testing a whole garment, report the ratio of load to ballast if it is more than 1/1.

9 Washing procedure

9.1 Select the washing procedure to be used from those given in Annex B for a reference washing machine Type A, from Annex D for a reference washing machine Type B, or from Annex F for a reference washing machine Type C.

9.2 Weigh the individual specimens or made-up articles or garments before washing if measurement of weight loss is required or if they are to be tumble dried.

9.3 Place the material to be washed in the washing machine (see 5.1.1 to 5.1.3) and add sufficient ballast (see 5.6) to make a total air-dry material load of the mass shown in 8.1 using the washing procedure selected. The specimen and the ballast shall be evenly mixed before it is loaded into the reference machine.

9.4 Dosage of the detergents shall be as follows.

- a) In reference washing machines Type A, add 20 g of the reference detergent 2, 3 or 6 directly into the dispenser.
- b) In reference washing machines Type B fill the machine with water at the selected temperature, then add (66 ± 1) g of reference detergent 1 or add (100 ± 1) g of reference detergent 5, or if reference detergent 2 or 3 is used, add the appropriate amount to provide good running suds having a height of not more than (3 ± 0.5) cm at the end of the washing cycle.
- c) In reference machines Type C, fill the machine with water at the selected temperature, then add 1.33 g/L of reference detergent 4 directly into the dispenser.
- d) See Table 1 for a summary of the reference detergent dosage.

Table 1 Dosage of the reference detergents

Reference detergents	Reference washing machines		
	Type A g	Type B g	Type C g/L
1	—	(66 ± 1) g	—
2	(20 ± 1) g	Appropriate	—
3	(20 ± 1) g	Appropriate	—
4	—	—	1.33 g/L
5	—	(100 ± 1) g	—
6	(20 ± 1) g	—	—

9.5 After the washing procedure has been completed, remove the test specimen(s) carefully, ensuring that they are neither stretched nor distorted, and dry according to one of the drying procedures described in clause 10.

10 Drying procedure

10.1 Open-air dry

At the end of the selected washing procedure, immediately remove the material and follow the selected drying procedures A to D. In the case of drip drying (procedures B and D), the washing procedure shall be finished without spinning; this means taking out the material before final spinning.

10.1.1 Procedure A — Line dry

Remove the specimen from the washing machine and unfold to avoid distortion. Suspend the test specimen from a line. For woven specimen, the warp direction shall be vertical. For knitted specimen, the wale direction shall be vertical. Made-up articles

shall be suspended in the direction of use. Allow the specimen to dry in still air at room temperature.

NOTE : For subsequent testing, the drying should be carried out in a standard atmosphere according to **JIS L 0105**.

10.1.2 Procedure B — Drip line dry

Follow the procedure in 10.1.1 without extracting the water.

NOTE : For subsequent testing, the drying should be carried out in a standard atmosphere according to **JIS L 0105**.

10.1.3 Procedure C — Flat dry

Spread out the specimen on a horizontal screen drying rack (see 5.5) and remove the wrinkles by hand without stretching or distorting. Allow the specimen to dry in still air at room temperature.

NOTE : For subsequent testing, the drying should be carried out in a standard atmosphere according to **JIS L 0105**.

10.1.4 Procedure D — Drip flat dry

Follow the procedure in 10.1.3 without extracting the water.

10.2 Tumble dry

10.2.1 Procedure E — Flat press

Remove the specimen from the washing machine and place the specimen on the flat bed of the press (see 5.3). Smooth out heavy wrinkles by hand and lower the head of the press, which shall be set at a temperature suitable for the specimen to be pressed, for one or more short periods as required to dry the specimen. Record the temperature and pressure used.

10.2.2 Procedure F — Tumble dry

At the end of the selected washing procedure, immediately remove the load and place the specimens and the ballast in the tumble dryer (see 5.2). Tumble dry the load as specified in any of 10.2.2.1, 10.2.2.2 or 10.2.2.3.

10.2.2.1 Timer setting for tumble dryer

To determine the optimum heat setting, tumble dry the load at the normal heat setting for the calculated test cycle time as determined by the method described in Annex P. At the end of the calculated test cycle time, the final moisture shall be equivalent to the moisture content of the conditioned textile relative humidity.

If measuring the fabric temperature during tumble drying is required, plastic ribbons (thermolabels) that indicate the temperature shall be affixed to the fabric. These thermolabels shall be capable of measuring in the temperature range (40 to 90) °C.

For the machines specified in 5.2, ensure that the temperature of the exhaust from the drum is set at a minimum temperature of 40 °C and not exceeding 80 °C for normal fabrics and 60 °C for delicate fabrics.

Operate the dryer until the load is dry, and continue tumbling for 5 min with the heat turned off. Remove the fabrics immediately.

10.2.2.2 Overdrying

Overdrying is characterized by drying to a final moisture level below the conditioned state. In relation to the textile composition, the following values of the final moisture shall be applied:

- -2 % for textile made of synthetic materials compared with the conditioned-textile relative humidity;
- -5 % for textile made of cellulosic materials compared with the conditioned-textile relative humidity.

In order to find out the influence of the overdrying on the dimensional measures, the dimensions of the textile material under testing should be determined before and after the overdrying stage.

Proceed to further dry the load until the determined final moisture is reached. Continue tumbling for 5 min with the heat turned off and then remove the material immediately.

10.2.2.3 Humidity rate for tumble dryer

Tumble dry the load at the normal or low heat setting until the final moisture measured by the humidity device reaches the agreed moisture rate, according to Table 2. Continue tumbling for at least 5 min with the heat turned off and then remove the material immediately.

The tumble dryer cycle should be agreed between the interested parties; otherwise the tumble dryer cycle 1 should be applied.

Table 2 Humidity rate for tumble dryer

Tumble dryer cycle	Materials	Humidity rate setting up of the tumble dryer %
1	Dry cotton	0 ($\pm$ 3)
2	Synthetics and blends	2 ($\pm$ 3)
3	Iron dry cotton	12 ($\pm$ 3)

11 Test report

The test report shall contain the following information :

- a) number and title of this Standard;
- b) name of the testing laboratory and number of the test report;
- c) date of the test;
- d) test method;