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**Testing methods for efficacy against
house dust mite of textiles**

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Carpet Manufacturers Association (JCMA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS L 1920 : 2007**), which has been technically revised.

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Testing methods for efficacy against house dust mite of textiles

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 21326** : 2019, Edition 1, with some modifications of the technical contents, mainly addition of test methods uniquely used in Japan.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies test methods for determining efficacy of textile products against house dust mites. The methods covered in this Standard applies to textile products treated chemically for suppressing house dust mites and textile products treated physically for preventing house dust mites from passing through.

This Standard covers the repelling method and proliferation method intended for textile products treated chemically for suppressing house dust mites, and the penetration method intended for textile products treated physically for preventing house dust mites from passing through. Each test method is further classified as follows.

- **Repelling method**, using either Petri-dish or glass tube. The glass tube method is further classified into method A and method B according to the applicable textile products.
- **Proliferation method**, classified into method A and method B according to the type and shape of applicable textile products. The two methods use different test containers.
- **Penetration method**, a material test as with the repelling method and proliferation method. It is generally applied to fabric materials, but can also be applied to fabrics containing sewing lines or fasteners depending on their shape or size. This method is not applicable to textile products that stop the mites at the fibre layer without allowing them to penetrate through the fabric.

Application of these methods according to the type, shape, size, etc. of textile products is as follows.

- **Petri-dish method**, applied to carpet, bedding surface fabric, bed sheeting, bed covering, blanket, etc.
- **Glass tube method A**, applied to wadding, etc. with a fibre content of cotton, wool, synthetic fibre, etc.
- **Glass tube method B**, applied to feathers/down, etc.

- **Proliferation method A**, applied to carpet, bedding surface fabric, bed sheeting, bed covering, blanket, etc.
- **Proliferation method B**, applied to wadding, etc.
- **Penetration method**, applied to bedding surface fabric, bed sheeting, bed covering, surface fabric of mattress, etc.

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

ISO 21326 : 2019 *Textiles — Test methods for determining the efficiency of products against house dust mite* (MOD)

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

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7139-1 *Stereomicroscopes — Part 1 : Minimum requirements for stereomicroscopes*

JIS K 6862 *Testing methods for melt viscosity of hot-melt adhesives*

JIS K 8102 *Ethanol (95) (Reagent)*

JIS K 8150 *Sodium chloride (Reagent)*

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

JIS L 0803 *Standard adjacent fabrics for staining of colour fastness test*

NOTE Normative reference in the corresponding International Standard : ISO 105-F02 *Textiles — Tests for colour fastness — Part F02 : Specification for cotton and viscose adjacent fabrics*

JIS L 1096 *Testing methods for woven and knitted fabrics*

NOTE Normative reference in the corresponding International Standard : ISO 9237 *Textiles — Determination of the permeability of fabrics to air*

JIS L 1903 *Testing methods for feathers*

JIS L 1930 *Textiles — Domestic washing and drying procedures for textile testing*

JIS L 4406 *Tile carpet*

JIS P 3801 *Filter paper (for chemical analysis)*

JIS R 3503 *Glass apparatus for chemical analysis*

JIS R 3644 *Glass tubes*

JIS Z 1539 *Pressure sensitive adhesive polypropylene tapes for packaging*

JIS Z 1701 *Rubber band*

JIS Z 1707 *General rules of plastic films for food packaging*

JIS Z 8703 *Standard atmospheric conditions for testing*

JIS Z 8704 *Temperature measurement — Electrical methods*

JIS Z 8801-1 *Test sieves — Part 1 : Test sieves of metal wire cloth*

NOTE Normative reference in the corresponding International Standard : ISO 3310-1 *Test sieves — Technical requirements and testing — Part 1 : Test sieves of metal wire cloth*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

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

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

3.1

house dust mite

generic term for mites observed in or on floor surfaces, carpets, bedding, etc. with house dust

Note 1 to entry Dominant species of mites found in house dust normally belong to Pyroglyphidae, among which *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae* are the most prevalent.

3.2

efficiency of repellency

efficiency of the treatment in repelling house dust mites

3.3

rate of repellency

ratio of the number of live mites in treated material against the number of live mites in untreated material, used as a numerical expression of repellency of treated material

Note 1 to entry The rate of repellency is expressed in percentage (%).

3.4

rate of suppression of house dust mite reproduction

ratio of the number of live mites in treated material against the number of live mites in untreated material, used as a numerical expression of reproduction suppression efficiency of treated material

Note 1 to entry The rate of suppression of house dust mite reproduction is ex-

pressed in percentage (%).

3.5

culture medium

diet for breeding house dust mites

3.6

mite medium

mix of culture medium and house dust mites

Note 1 to entry A mite medium contains mite carcasses, eggs and shed exoskeletons as well as live mites.

3.7

live mite

mites which react when stimulated from the outside

Note 1 to entry It includes all of larva, nymph (protonymph and tritonymph) and adult mites but excludes eggs.

3.8

population density

degree of live mites in a mite medium

Note 1 to entry The term is also used to refer to the number of live mites in 1 g of mite medium.

3.9

quiescent period

period in the stage in which activity of mites almost stops and is observed in the latter half of each development period of a larva, protonymph and tritonymph

Note 1 to entry The synonym “dormancy period” may be used instead.

3.10

efficiency of suppression of house dust mite reproduction

efficiency of the treatment in suppressing the reproduction of house dust mites

3.11

efficiency for prevention of penetration against house dust mite

efficiency of the treatment in preventing entrance and penetration of house dust mites

Note 1 to entry For the purpose of this Standard, this term only applies to textiles physically treated against penetration of live mites.

4 Principle

4.1 Repelling method

- a) **Petri-dish method** Two Petri dishes, one small and one large, are used to prepare a test apparatus assembly. The sample is placed in the small Petri dish with the culture medium spread at its centre. The mite medium with 10 000 live mites is spread in the large Petri dish. The small Petri dish is placed in the centre position of the large Petri dish. This unit is used as a test apparatus assembly. After 24 h has elapsed since the start of the test, the number of live mites that have migrated to the small Petri dish is counted and used to determine the efficiency of repellency of the sample.

This Standard provides the Petri-dish method in Annex C and the mite counting method in Annex B.

- b) **Glass tube method** The culture medium, stuffing for counting mites and sample, in this order, are placed in one end of a glass tube, and the mite medium with 10 000 live mites is spread at the opposite end of the glass tube, and sealed with adhesive tape. This glass tube is used as a test apparatus assembly. After 48 h has elapsed since the start of the test, the number of live mites in the culture medium and the stuffing for counting mites is counted and used to determine the efficiency of repellency of the sample.

The glass tube method is classified into two methods according to whether a holder is used for keeping the thickness of the sample, between which the one suitable for the material of the wadding shall be selected.

- 1) **Glass tube method A**, not using holders.
- 2) **Glass tube method B**, using holders.

This Standard provides the glass tube test method in Annex D and the mite counting method in Annex B.

4.2 Proliferation method

Culture medium with 50 to 80 live mites per 0.1 g is spread on the sample placed either in a small Petri dish or a vial depending on the type of sample. This is used as a test apparatus assembly. The counting of mites is performed 4 weeks and 6 weeks after the start of the test. If the test period is extended, the maximum period is 8 weeks, with a third mite counting conducted between 7 and 8 weeks after the start of the test. In this test, the proliferation of the mites in each count is observed to determine the efficiency of the sample to suppress the house dust mite reproduction.

The proliferation method is classified into two methods according to the test container used.

- a) **Proliferation method A**, using small Petri dishes.
- b) **Proliferation method B**, using vials.

This Standard provides the proliferation test method in Annex E and the mite counting method in Annex B.

4.3 Penetration method

The sample is placed at the upper end of the glass tube and wrapped by plastic wrap tightly. The mite medium with 10 000 live mites is placed at the bottom of the glass tube on the filter paper which is tightly sealed. This is used as a test apparatus assembly. After 24 h has elapsed since the start of the test, the number of mites on the sample which have passed through is counted through the plastic wrap and is used to determine the efficiency of the sample to prevent penetration of house dust mites.

This Standard provides the penetration test method and its mite counting method in Annex F.

5 Preparation of test

5.1 Reagents

The following reagents shall be used.

5.1.1 Water, conforming to the criteria of ordinary water as specified in Japanese Pharmacopeia 17th edition. For preparation of reagents, however, purified water conforming to the criteria of Japanese Pharmacopeia 17th edition shall be used.

5.1.2 Dried yeast, conforming to the criteria of Japanese Pharmacopeia 17th edition, used as a material for culture medium.

5.1.3 Saturated sodium chloride solution Add 392 g of sodium chloride (guaranteed grade) specified in **JIS K 8150** to 1 000 ml of water, dissolve by heating and take only the supernatant liquid. Use this solution for the control of humidity in an airtight container (**5.2.17**) and for the floatation method (**B.2.1**).

5.1.4 Non-ionic surfactant solution Dissolve 0.1 g of non-ionic surfactant [Polyoxyethylene sorbitan monooleate (Polysorbate 80)] in 100 ml of water. Use this solution as a wetting agent when collecting mites.

5.1.5 Colouring liquid Dissolve 6.0 g of crystal violet ($C_{25}H_{30}ClN_3 \cdot 9H_2O$) or 0.6 g of methylene blue ($C_{16}H_{18}N_3S \cdot Cl \cdot 3H_2O$) in 100 ml of ethanol (guaranteed grade or 1st grade) specified in **JIS K 8102** and add water to make 1 000 ml. Use this liquid to colour the filter paper and foreign matter on the filter paper to facilitate differentiation from the mites.

When used to directly colour the filter paper, this liquid needs to be diluted by several factors. The amount of colouring reagent may be adjusted if necessary to optimize the colouring for the tester's personal sense of vision. The colouring liquid shall not kill or colour the mites.

5.2 Materials and instruments

The following materials and instruments shall be used.

5.2.1 Hot-air circulation oven, capable of maintaining a temperature of $70\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, used for pretreatment of a sample or culture medium.

5.2.2 Incubator (or incubation room), capable of maintaining a temperature of $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ in dark conditions, used for breeding mites and testing.

5.2.3 Erlenmeyer flask, as specified in **JIS R 3503**, with a nominal volume of 50 ml, used for the floatation method (**B.2.1**).

5.2.4 Beaker, as specified in **JIS R 3503**, with a nominal volume of 50 ml or 100 ml. A 50 ml beaker is used for the floatation method (**B.2.1**), and a 100 ml beaker, for the whole counting method (**B.2.2**).

5.2.5 Large Petri dish, as specified in **JIS R 3503**, with an internal diameter of approximately 90 mm and an internal height of approximately 20 mm, used for the test apparatus assembly (**C.2**) of the Petri-dish method, as well as for the breeding container of mites and the receiver of the filter paper used in suction filtration.

5.2.6 Small Petri dish, with an external diameter of 45 mm and an internal height of approximately 15 mm, used for the test apparatus assembly (**C.2**) of the Petri-dish method and the test apparatus assembly (**E.2**) of proliferation method A (**E.2.1**).

5.2.7 Glass tube A, hard-coated glass type specified in **JIS R 3644** with an external diameter of $22 \text{ mm} \pm 0.6 \text{ mm}$ (wall thickness $1.2 \text{ mm} \pm 0.2 \text{ mm}$) and a length of approximately 100 mm, used for the test apparatus assembly (**D.2**) of the glass tube method.

5.2.8 Glass tube B, hard-coated glass type specified in **JIS R 3644** with an external diameter of $40 \text{ mm} \pm 1.0 \text{ mm}$ (wall thickness $2.0 \text{ mm} \pm 0.3 \text{ mm}$) and a length of approximately 55 mm, used for the test apparatus assembly (**F.2**) of the penetration method.

5.2.9 Rubber band, equivalent to nominal size 18 ($70 \text{ mm} \pm 3 \text{ mm}$ in lay-flat length and $15 \text{ mm} \pm 1.5 \text{ mm}$ in width) specified in **JIS Z 1701**, used for the test apparatus assembly (**D.2**) of the glass tube method and the test apparatus assembly (**F.2**) of the penetration method.

5.2.10 Vial, made of glass, with an external diameter of approximately 30 mm, a total length of approximately 63 mm and a volume of approximately 30 ml, used for the test apparatus assembly (**E.2**) of proliferation method B (**E.2.2**).

5.2.11 Hot-melt adhesive, as specified in **JIS K 6862**, with appropriate adhesive strength and no effect to mites, used for the test apparatus assembly (**F.2**) of the penetration method.

5.2.12 Filter paper, as specified in **JIS P 3801**, intended for qualitative analysis, with a diameter of 70 mm or 90 mm, used for counting live mites (Annex B) and for the test apparatus assembly (**F.2**) of the penetration method.

Filter papers used for counting mites shall be inscribed with lines at 5 mm to 10 mm intervals or a grid pattern of 5 mm to 10 mm in square in order to prevent repeated counting of the same mites.

5.2.13 Pressure sensitive adhesive tape, as specified in **JIS Z 1539**, with appropriate adhesive strength and no effect to mites, used for the test apparatus assembly (**D.2**) of the glass tube method and the test apparatus assembly (**F.2**) of the penetration method.

5.2.14 Sticky sheet, with an adhesive strength with the ability to anchor mites that may escape, used for preparation of mite medium (Annex A), used as a mite trap for preventing the mite contamination of the laboratory by being laid over the drainboard of the airtight container (5.2.17) in the Petri-dish method (Annex C) and the proliferation method (Annex E), or used for collection of mites in the heat escape method (B.2.4). If the sticky sheet may interfere with removal of the test apparatus assembly, a release paper shall be applied at the bottom of the test container. The sticky sheet to be used in the heat escape method shall have a sufficient adhesive strength to anchor mites and shall be re-strippable from the sample without leaving any adhesive on the sample.

5.2.15 High-density fabric, with air permeability of $1 \text{ cm}^3/\text{cm}^2 \cdot \text{s}$ to $10 \text{ cm}^3/\text{cm}^2 \cdot \text{s}$ as specified in method A (JIS method) of 8.1.1 of JIS L 1096 with a fibre content of 100 % cotton, used for the test apparatus assembly (D.2) of the glass tube method.

5.2.16 Standard woven fabric, “single-fibre cloth” of “cotton” of nominal number 3-1 (sheeting No. 3) specified in Table 1 of JIS L 0803, used as a substitute for untreated sample of bedding surface fabric, bed sheeting, bed covering, blanket, etc. or as a reference fabric for the penetration method (Annex F).

5.2.17 Airtight container, made of plastic, airtight, and large enough so that the culture medium or mite medium is not affected by the static electricity from the plastic. It shall have a drainboard placed at the bottom and be filled up to about 10 % of its inner capacity with saturated sodium chloride solution (5.1.3). This container shall be used for breeding mites and for testing. Furthermore, when used for testing, an airtight container shall be prepared for each test section.

- The airtight container and drainboard shall be made of polypropylene or other material not affecting the test and shall not be treated with antimicrobial agent or given other special treatment.
- The drainboard shall be capable of maintaining its horizontal attitude.

5.2.18 Powder diet, for small laboratory animals (mouse, rat, hamster, etc.) and used as a material of culture medium [A.2.2 a)].

5.2.19 Balance, capable of reading to 0.000 1 g.

5.2.20 Stereoscopic microscope, as specified in JIS B 7139-1, with an epi-illumination device with $20 \times$ magnification.

5.2.21 Test sieve, as specified in JIS Z 8801-1, of the following two types selected according to the intended purpose.

- a) Test sieve with a mesh opening size in the range of $500 \mu\text{m}$ to $700 \mu\text{m}$, used for the wet sieving method (B.2.3).
- b) Test sieve with a mesh opening size of $300 \mu\text{m}$, used for sieving of powder diet (5.2.18).

5.2.22 Holder Stainless steel meshes (mesh opening size about 1 mm), one cut to a circular shape of approximately 20 mm diameter and the other with the edge turned

down to have the same diameter, used in glass tube method B (D.2.2) to maintain the sample thickness at $20\text{ mm} \pm 2\text{ mm}$.

5.2.23 Suction unit, capable of performing suction filtration with an aspirator (or a suction pump) with a Buechner funnel attached to a vacuum flask. The bypass can be included for adjusting suction force if necessary.

5.2.24 Counter, capable of counting from 0 to 9 999, used for counting mites.

5.2.25 Plastic wrap, as specified in JIS Z 1707, intended for food preservation made of polyethylene or polypropylene, used for the test apparatus assembly (F.2) of the penetration method (Annex F).

5.2.26 Stuffing, fibre of 100 % polyester with a fineness of 5 dtex to 8 dtex and fibre length 51 mm to 75 mm, without any special treatment. It shall be pretreated [6.2.1 b)], and then used as a stuffing for counting mites in the test apparatus assembly (D.2) of the glass tube method (Annex D) and as a substitute for the untreated sample of wadding.

5.2.27 Tile carpet, of original size falling under Class 1 “tile carpet” as specified in JIS L 4406. It shall be without backing or pre-coating, and its primary backing cloth shall be a non-binder type. The pile yarn shall be nylon filament yarn which has been subjected to the piece-dyeing process or piece-dyeing process that does not use dye-stuffs. It shall be pretreated [6.2.1 a)], and then used as a substitute for the untreated sample of carpet.

5.2.28 Heating plate, capable of heating at $40\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$, used for the heat escape method (B.2.4).

5.2.29 Temperature measuring device, as specified in JIS Z 8704, capable of measuring and recording temperatures at two or more points between $20\text{ }^{\circ}\text{C}$ to $100\text{ }^{\circ}\text{C}$, of which the temperature sensing element can be attached and fixed at the measuring positions, used for the heat escape method (B.2.4).

6 Sample

6.1 Sampling procedure

The following amount of sample shall be obtained in accordance with the procedure given in JIS L 0105 for textile products other than feather wadding, and in accordance with the procedure given in JIS L 1903 for feather wadding.

Each of the collected samples shall be placed in separate polyethylene or similar bags and sealed so that they will not be affected by each other, and then stored in the laboratory away from moisture and direct sunlight.

- a) $30\text{ cm} \times 30\text{ cm}$ or more for carpet, bedding surface fabric, etc.
- b) 50 g or more for stuffing
- c) 10 g or more for feather wadding

6.2 Untreated sample

6.2.1 Petri-dish method, glass tube method and proliferation method

For the Petri-dish method (Annex C), the glass tube method (Annex D) and the proliferation method (Annex E), the untreated samples shall be tested along with the treated samples. If an untreated sample of the same quality as the treated sample can be prepared, it shall be used for the test. If not, and if the sample is a carpet, stuffing, bedding surface fabric, bed sheeting or bed covering, the sample prepared by the following procedure may be used as a substitute for untreated sample.

- a) **Carpet** Wash and dehydrate by centrifuge the tile carpet (5.2.27) according to method C4M in Annex F of **JIS L 1930** and dry at $120\text{ °C} \pm 2\text{ °C}$ for 30 min. Repeat the washing and centrifugal dehydration according to the same method and dry at room temperature. The washing process shall use only hot water and not detergent.
- b) **Stuffing** Wash and dehydrate by centrifuge the stuffing (5.2.26) placed in a laundry net according to method C4M in Annex F of **JIS L 1930**, and dry at room temperature. This shall be used as a stuffing for counting mites for the glass tube method (Annex D) as well as for a substitute for untreated sample. The washing process shall use only hot water and not detergent.
- c) **Bedding surface fabric, bed sheeting and bed covering** Use standard woven fabric (5.2.16)

6.2.2 Penetration method

In the penetration method, a reference fabric shall be tested along with the sample to check the effectiveness of the test. The standard woven fabric (5.2.16) shall be used as a reference fabric.

7 Preparation

7.1 Sample

7.1.1 Pretreatment

A sample shall be heated at $70\text{ °C} \pm 2\text{ °C}$ in a hot-air circulation oven (5.2.1) for 10 min before being supplied for the test.

This heat treatment shall be performed with the sample placed in a covered stainless steel tray of a suitable size. When it is necessary to heat-treat two or more types of sample, the samples shall be heat-treated individually.

The sample having undergone pretreatment shall be immediately tested. If this is not possible, the sample shall be stored according to 7.1.2.

7.1.2 Storage

Each of the pretreated samples shall be placed in separate polyethylene or similar bags and sealed so that they will not be affected by each other, and then stored in the laboratory away from the influence of temperature, moisture, direct sunlight, etc.

7.2 Mite medium

7.2.1 General

The mite medium used for the test shall be prepared by the colonization procedure in accordance with Annex A. The prepared medium shall have a high population density, and shall be such that the mites crawling out of the medium can be observed with sufficient visibility.

7.2.2 Population density

The population density and coefficient of variation of the mite medium used for the test shall be determined by the following procedure.

Measurement of population density for the purpose of the test shall be performed on the start day of the test.

- Take 0.025 g or 0.050 g of the mite medium which has been stirred well.
- If the mass of mite medium used is 0.025 g, count the number of live mites 8 times according to the floatation method (B.2.1) or the whole counting method (B.2.2). If the mass of mite medium used is 0.050 g, count the number of live mites 4 times according to the floatation method (B.2.1).
- Determine the population density and the coefficient of variation from the obtained count of live mites according to Formulae (1) and (2).

NOTE The coefficient of variation is used to assess the validity of the test.

$$N_m = \frac{\sum_{i=1}^n x_i}{0.2} \dots\dots\dots (1)$$

where, N_m : population density (mites/g)
 x_i : number of live mites in 0.025 g (or 0.050 g) of mite medium
 n : number of measurements of mite medium, $n = 8$ (or $n = 4$)

$$C_v = \frac{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 / (n-1)}}{\bar{x}} \times 100 \dots\dots\dots (2)$$

where, C_v : coefficient of variation (%)
 x_i : number of live mites in 0.025 g (or 0.050 g) of mite medium
 $\bar{x}$: average number of live mites in 0.025 g (or 0.050 g) of mite medium
 n : number of times of counting of mite medium, $n = 8$ (or $n = 4$)

7.2.3 Mass of mite medium

The mass of mite medium shall be calculated according to Formula (3). This mass is equal to the amount of mite medium with 10 000 live mites, and used for the Petri-dish method (Annex C), the glass tube method (Annex D) and the penetration method (Annex F).

$$q = \frac{10\,000}{N_m} \dots\dots\dots (3)$$

where, q : mass of mite medium (g)
 N_m : population density (mites/g)

7.2.4 Fractional mass of mite medium

The fractional mass of mite medium and culture medium for adjusting the number of live mites in 0.1 g of mite medium to 50 to 80 shall be calculated according to Formulae (4) to (6). Each medium weighed out according to the determined fractional mass and mixed together shall be used as the mite medium for inoculation in the proliferation method (Annex E).

$$S = \frac{N_m}{650} \dots\dots\dots (4)$$

$$W_m = \frac{W_t}{S} \dots\dots\dots (5)$$

$$W_f = W_t - W_m \dots\dots\dots (6)$$

where, S : dilution factor
 N_m : population density (mites/g)
 W_t : mass of mite medium for inoculation prepared (g)
 W_f : fractional mass of culture medium (g)
 W_m : fractional mass of mite medium (g)

NOTE 1 Formula (4) uses 650, which is the median between 500 and 800, as the denominator as it is necessary to satisfy the population of 50 to 80 mites in 0.1 g of mite medium for inoculation.

NOTE 2 In practice, a greater mass of medium than W_t should be prepared because the calculated value of W_t determined from the number of samples may be insufficient. W_t expressed by the number of samples, n , is as follows.

$$W_t > 0.1 \times 9 \times (n + 1) + 0.3$$

where, “ $n + 1$ ” is the number of samples including the untreated sample, and “ $+ 0.3$ ” is the mass in grams (g) of the mite medium for inoculation required for determining the initial population density.

8 Test conditions

8.1 Laboratory

The laboratory shall be maintained at the standard atmospheric condition of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ in temperature and $(65 \pm 20)\%$ in relative humidity specified in JIS Z 8703.

The laboratory is a work area where sampling, preparation of test, etc. are performed.

8.2 Test atmosphere

Temperature $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, relative humidity $(75 \pm 5)\%$, and dark condition.

The above test atmosphere applies to the breeding of mites and testing. The relative humidity of the test atmosphere is controlled to the specified level by filling the air-tight container with saturated sodium chloride solution up to 10 % of its inner capacity.

9 Test methods

9.1 Petri-dish method

The test shall be carried out according to Annex C.

9.2 Glass tube methods A and B

The test shall be carried out according to Annex D.

9.3 Proliferation methods A and B

The test shall be carried out according to Annex E.

9.4 Penetration method

The test shall be carried out according to Annex F.

10 Test report

The test report shall contain the following information.

a) General (common items)

- 1) A reference to this Standard : JIS L 1920
- 2) Test method used, among the following:
 - repelling method using Petri-dish;
 - repelling method using glass tube, method A;
 - repelling method using glass tube, method B;
 - proliferation method A;
 - proliferation method B;
 - penetration method.
- 3) Name of species of mites used for test, including system, source, origin, etc.
- 4) Type of sample: carpet, bedding surface fabric, blanket, bed sheeting, bed covering, surface fabric of mattress, etc.
- 5) Identification of sample : product name, part number, etc.
- 6) Counted number of live mites in 0.025 g (or 0.050 g) of mite medium used for test and counting method used
- 7) Population density of mite medium used for test (mites/g)
- 8) Coefficient of variation determined from the counted number of live mites in 0.025 g (or 0.050 g) of mite medium used for test
- 9) Any deviation from the test method specified in this Standard and reason for deviation
- 10) Other matters of significance related to the test

b) Repelling methods For repelling methods, the following information shall be re-

ported in addition to a).

- 1) Number of migrating mites in the untreated sample
 - 2) Number of migrating mites in the treated sample
 - 3) Rate of repellency
 - 4) Measured temperature of the heating process, if the heat escape method was used for counting mites.
- c) **Proliferation methods** For proliferation methods, the following information shall be reported in addition to a).
- 1) Number of live mites in 0.1 g of the mite medium for inoculation (initial population)
 - 2) Number of live mites in the untreated sample at each observation.
 - 3) Number of live mites in the treated sample at each observation
 - 4) Rate of suppression of house dust mite reproduction at each observation
 - 5) Measured temperature of the heating process, if the heat escape method was used for counting mites.
- d) **Penetration method** For penetration method, the following information shall be reported in addition to a).
- 1) Identification of tested surface (front/back)
 - 2) Number of mites which passed through the standard woven fabric (each of adult, larva and nymph), and total number
 - 3) Number of mites which passed through treated sample (each of adult, larva and nymph), and total number

Annex A (normative)

Preparation of mite medium

A.1 Species of mites used for testing

The following species of mites after colonization according to this Annex shall be used for the test methods specified in this Standard.

- *Dermatophagoides pteronyssinus*
- *Dermatophagoides farinae*

A.2 Colonization procedure (see Figure A.1)

A.2.1 Apparatus

A.2.1.1 Breeding container, with a suitable volume, preferably made of glass (e.g. a glass Petri dish).

A.2.1.2 Airtight container, as specified in 5.2.17, containing saturated sodium chloride solution for control of relative humidity which will serve as a trap for mites crawling out of the mite medium (see Figure A.1). If an additional trap is needed to prevent mite contamination of the laboratory, a sticky sheet (5.2.14) shall be used.

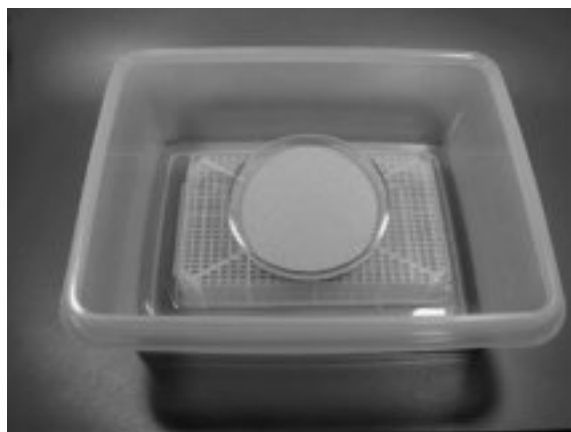


Figure A.1 Airtight container with mite medium (example)

A.2.2 Preparation of culture medium

- a) Sieve [5.2.21 b)] the powder diet (5.2.18), and use the particles that passed through the sieve as the material for culture medium.
- b) Mix the sieved powder diet in a) and dried yeast (5.1.2) in mass ratio of 1 : 1, and spread the mixed diet in the breeding container to a thickness of approximately 10 mm.