INTERNATIONAL STANDARD

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Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics —

Part 1: Flatwork ironing machines

Spécifications pour les machines de blanchisserie industrielles — Définitions et contrôle des caractéristiques de capacité et de consommation —

Partie 1: Sécheuses-repasseuses

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Case postale 56 • CH-1211 Geneva 20
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Fax + 41 22 749 09 47
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 9398-1 was prepared by Technical Committee ISO/TC 72, *Textile machinery and machinery for drycleaning and industrial laundering*, Subcommittee SC 5, *Industrial laundry and dry-cleaning machinery and accessories*.

This second edition cancels and replaces the first edition (ISO 9398-1:1993), which has been technically revised.

ISO 9398 consists of the following parts, under the general title *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics*:

— *Part 1: Flatwork ironing machines*

— *Part 2: Batch drying tumblers*

— *Part 3: Washing tunnels*

— *Part 4: Washer-extractors*

Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics —

Part 1: Flatwork ironing machines

1 Scope

This part of ISO 9398 defines the characteristics of flatwork ironing machines and gives the usual test methods for determining these characteristics with regard to machine capacity, power consumption and hourly productivity. It is applicable for use as a reference in the drafting of purchasing orders for flatwork ironing machines having a contact surface area greater than 0,25 m^2. It does not cover safety requirements (see ISO 10472-5).

NOTE Where more detailed information on the effect of laundry machines on textiles is required, see ISO 7772 after agreement between the parties involved.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 6348, *Textiles — Determination of mass — Vocabulary*

3 Terms and definitions

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

3.1
nominal capacity (of a flatwork ironing machine)
⟨extraction rate⟩ maximum water quantity, expressed in kilograms per hour, which may be extracted from decatized cotton articles mangled on a machine under the specified test conditions

See 4.1.

NOTE The value of this evaporation capacity can be given on the rating plate of the machine.

3.2
nominal capacity (of a flatwork ironing machine)
⟨dimension⟩ maximum value of the dimension of passage of decatized cotton articles mangled on a machine under the specified test conditions

3.3
dried mass
mass of a load of decatized cotton articles dried by appropriate methods

See ISO 6348.

3.4
moisture content
mass of water, determined by appropriate methods, contained in a load of decatized cotton articles in relation to the dried mass of the same load, and expressed as a percentage of this dried mass

3.5
mass at $\left(8^{+1}_{0}\right)$ % moisture
mass of a load of decatized cotton articles whose moisture content is $\left(8^{+1}_{0}\right)$ %

See 4.1.

3.6
residual moisture content
⟨after extraction⟩ mass of water contained in a load of decatized cotton articles after suitable rinsing and extraction, in relation to the dried mass of the same load, and expressed as a percentage of this dried mass

See 4.1.

3.7
residual moisture content
⟨after drying⟩ mass of water contained in a load of decatized cotton articles, after suitable drying, in relation to the dried mass of the same load and expressed as a percentage of this dried mass

See 4.1.

4 General test conditions

4.1 Machine load

4.1.1 Amount of load

The test load shall correspond to 200 sheets, or the number of sheets necessary to allow the machine to operate for 30 min at the linear speeds specified by the manufacturer.

4.1.2 Nature of load

The test load shall comprise sheets made of white decatized cotton with a mass per unit area of (140 ± 20) g/m^2 and dimensions of (240 ± 20) cm × (180 ± 20) cm.

4.1.3 Conditioning

The residual moisture content of the test load shall be (55 ± 1) % after rinsing in water and suitable extraction. This moisture level may also be expressed as a level of 51 % with respect to a dried mass which has regained moisture to a level of $\left(8^{+1}_{0}\right)$ %.

4.1.4 Number of loads

Two identical loads, as defined in 4.1.1, shall be tested.

If the test loads, conditioned in accordance with 4.1.3, have to be kept for a period of time in the area where the tests are carried out, they shall be stored under a cover which will prevent any evaporation.

4.2 Energy supply

Energy for the test shall be supplied by steam, gas, electricity or heat-transport fluid, as specified by the manufacturer.

4.3 Temperature of rinse water before extraction

The temperature of the rinse water used in the test shall be (17 ± 3) °C before extraction.

For tropical countries, a temperature of (25 ± 5) °C is allowed.

4.4 Ambient air

The ambient air temperature during the test shall be (24 ± 6) °C.

4.5 Condition of machine

The machine shall be clean.

5 Determination of residual moisture content after flat-ironing

5.1 Test method

5.1.1 Under the general test conditions specified in Clause 4, condition the flatwork ironing machine for 30 min so that thermal equilibrium of the machine is attained.

5.1.2 Flat iron a first test load (see 4.1) adjusting the linear speed to $0{,}85v_0$, where v_0, in metres per minute, is the speed specified by the manufacturer. Record the value of the mass of the load thus treated.

5.1.3 Flat iron a second test load (see 4.1) adjusting the linear speed to 1,15 v_0. Record the value of the mass of the load thus treated.

5.1.4 Repeat the operations given in 5.1.2 and 5.1.3. Record the mean values of the mass of the load for each of the linear speeds specified (0,85 v_0 and 1,15 v_0).

5.2 Expression of results

5.2.1 Plot the values found in 5.1.4 on a graph and draw the curve of the residual moisture content after flat-ironing as a function of the linear speeds specified.

5.2.2 Determine from the graph the linear speed, v_1, that permits drying of the test load (see 4.1), to give a residual moisture value after flat-ironing of $\left(8^{+1}_{0}\right)$ %.

6 Energy consumption of machine

6.1 General

The energy consumption of a flatwork ironing machine is defined as the number of kilojoules or kilowatt hours of steam, gas, electricity or heat-transport fluid energy required for flat-ironing one test load (see 4.1) having a residual moisture level on discharge from the flatwork ironing machine of $\left(8^{+1}_{0}\right)$ % (see 6.3).

6.2 Test method

6.2.1 Under the general test conditions specified in Clause 4, condition the flatwork ironing machine for 30 min so that thermal equilibrium of the machine is attained.

6.2.2 Carry out two series of operations in succession, pausing 15 min between one operation and the next, at the linear speed v_1 determined in 5.2.2, so that the load when discharged from the machine has a residual moisture content of $\left(8^{+1}_{0}\right)$ %, corresponding to a “dry feel”. The sheets shall be spaced about 0,20 m apart on passage through the machine.

6.2.3 Calculate the mean value of the energy consumption recorded during the two tests.

6.3 Expression of results

6.3.1 The energy required by the machine to produce the heat necessary may be expressed in two ways:

a) as the consumption in kilojoules or kilowatt hours per kilogram required for the flat-ironing of a test load of decatized cotton sheets as specified in 4.1, the residual moisture content of which has been reduced from (55 ± 1) % to $\left(8^{+1}_{0}\right)$ % after flat-ironing;

b) as the consumption, expressed as kilojoules or kilowatt hours per kilogram of water evaporated in 1 h from decatized cotton sheets as specified in 4.1, the residual moisture content of which has been reduced from (55 ± 1) % to $\left(8^{+1}_{0}\right)$ % after flat-ironing.

6.3.2 Record the energy consumption required by the motor or motors for the mechanical drive.

6.3.3 The total energy consumption required by a flatwork ironing machine is the sum of the mechanical and thermal energy required.

EXAMPLE

Motor(s) ..... kWh

Heating ..... kWh

Total ..... kWh

7 Hourly productivity of machine

7.1 General

The hourly productivity of the flatwork ironing machine shall be controlled simultaneously with its energy consumption.

The flatwork ironing machine in an industrial laundry can be part of a production chain comprising

— a preparation section (smoothing out),

— a feeding section,

— the actual flatwork ironing, and

— a folding section.

The rapidity with which the operators work throughout the feed-in (with laundry articles) and collection points of this chain has a very marked effect on the efficiency of the machine. Therefore, the method proposed for measuring the production is intended to permit comparison between the productivity of different machines.

7.2 Throughput

The hourly productivity, or throughput, of a flatwork ironing machine is defined as the number of sheets which may be flat-ironed in 1 h under the test conditions specified in this part of ISO 9398.

7.3 Test method

The test conditions for determining the hourly productivity are identical to those specified in 6.2.

7.4 Expression of results

The hourly productivity at a flatwork ironing machine shall be expressed as

a) the mass of water evaporated from the test load in 1 h under the test conditions specified in 6.2, and

b) the number of sheets, as specified in 4.1, discharged from the machine in 1 h and under the test conditions specified in 6.2.

The productivity may also be expressed as

c) the mass, in kilograms, of decatized cotton sheets (as specified in 4.1) that can be flat-ironed within 1 h to a residual moisture content of $\left(8^{+1}_{0}\right)$ %.

8 Machine information

8.1 Identification

The following information shall be used to identify the machine:

— manufacturer;

— manufacturer's address;

— machine type and reference number.

8.2 Specifications

The following information shall be given in the machine specifications:

a) number of beds or cylinders;

b) nominal diameter of cylinder;

c) nominal diameter of clothed rolls, in millimetres;

d) type of roll;

e) description of roll springing and covering, including whether hard spring or soft spring;

f) working pressure range of the beds, in kilopascals;

g) working pressure range of rolls, in kilopascals;

h) nominal steam pressure, in kilopascals, for steam energy;

i) maximum linear speed, in metres per second;

j) compressed air supply requirements, in kilopascals;

k) working width, in millimetres;

l) machine mass, in kilograms;

m) type of heating energy

   1) electrical — electrical energy consumption in kilowatt hours,

   2) steam — pressure in kilopascals, consumption in kilowatt hours,

   3) gas — thermal consumption in kilowatt hours,

   4) thermal oil — thermal consumption in kilowatt hours;

n) maximum electric power supply in kilowatts.

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