INTERNATIONAL STANDARD

ISO 9398-3

Second edition
2003-01-15

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

Part 3: Washing tunnels

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

Partie 3: Tunnels de lavage

Reference number
ISO 9398-3:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9398-3 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 9398-3:1993), 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 3: Washing tunnels

1 Scope

This part of ISO 9398 defines the characteristics of washing tunnels and gives the usual test methods for determining machine power consumption and hourly productivity. It is applicable for use as a reference in the drafting of purchasing orders for washing tunnels. It does not cover safety requirements (see ISO 10472-3).

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 9398-1:2002, *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics — Part 1: Flatwork ironing machines*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9398-1 and the following apply.

3.1
washing tunnel
automatic washing plant that processes laundry in continuous operation or in batches

3.2
nominal capacity (of a washing tunnel)
maximum load, in kilograms, of decatized cotton articles in the cage or compartment of a machine, multiplied by the number of cages or compartments (one or more) in the machine

See 4.1.

NOTE 1 The mass of this load is defined as the mass at $\left(8^{+1}_{0}\right)$ % residual moisture content of the cotton articles.

NOTE 2 The value of this load is given on the rating plate of the machine, for example:

— 1 cage max. 350 kg;

— 10 cages max. 50 kg each.

3.3
process time
time, in minutes, for the washing to pass through the entire length of the tunnel

4 General test conditions

4.1 Machine load

4.1.1 Amount of load

The test load shall correspond to the nominal capacity of the machine.

4.1.2 Nature of load

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

4.1.3 Number of loads

One load is necessary for carrying out each test, in so far as the tests are not executed simultaneously.

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 feed water

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

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 Energy consumption of machine

5.1 General

The energy consumption of a washing tunnel is defined as the number of kilojoules or kilowatt hours of steam, gas, electric or heat-transport fluid required for the washing of one test load (see 4.1) in a machine operating at its nominal capacity during one cycle, as specified by the manufacturer (see 5.3).

5.2 Test method

5.2.1 Under the general test conditions specified in Clause 4, run the machine until thermal equilibrium of the washing tunnel is attained.

5.2.2 Measure the energy consumption over one operating cycle as specified by the manufacturer.

5.2.3 Repeat twice the operation in 5.2.2.

5.2.4 Determine the mean value of energy consumption of the three tests.

5.3 Expression of results

5.3.1 Indicate the energy consumption, expressed as kilojoules or kilowatt hours, for washing one load of decatized cotton sheets with an initial moisture content of $\left(8^{+1}_{0}\right)$ % as specified in 4.1.

5.3.2 Indicate the energy consumption required by the motor or motors.

5.3.3 The total energy consumption required by a washing tunnel is the sum of the mechanical and thermal energies required.

EXAMPLE

Motor(s) ..... kWh

Heating ..... kWh

Total ..... kWh

6 Determination of water consumption

6.1 General

The water consumption (including the water needed for both washing and rinsing) of a washing tunnel is defined as the number of litres of water necessary to wash one test load (see 4.1) in a machine operating at its nominal capacity during one cycle, as specified by the manufacturer (see 6.3).

6.2 Test method

6.2.1 Under the general test conditions specified in Clause 4, operate the washing tunnel at nominal capacity for 30 min to obtain thermal equilibrium.

6.2.2 Measure the water consumption (including the water needed for both washing and rinsing) during three test loads (see 4.1) using one of the standard cycles specified by the manufacturer.

6.2.3 Repeat the operation in 6.2.2 twice and consecutively.

6.2.4 Determine the mean value of water consumption for the three measurements.

6.3 Expression of results

Indicate the water consumption, in litres, needed to wash 1 kg of decatized cotton sheets as specified in 4.1.

7 Hourly productivity of machine

The hourly productivity of a washing tunnel is defined as the mass of decatized cotton sheets, as specified in 4.1, washed in 1 h in the machine operating at its nominal capacity in one cycle as specified by the manufacturer.

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 cages;

b) cage capacity, in kilograms;

c) overall dimensions of length, height and width, in millimetres;

d) machine mass, in kilograms;

e) steam pressure in kilopascals;

f) energy consumption, in kilojoules or kilowatt hours;

g) machine electric power supply, in kilowatts.

Bibliography

[1] ISO 6348:1980, *Textiles — Determination of mass — Vocabulary*

[2] ISO 6741-1:1989, *Textiles — Fibres and yarns — Determination of commercial mass of consignments — Part 1: Mass determination and calculations*

[3] ISO 7772-1:1998, *Assessment of industrial laundry machinery by its effect on textiles — Part 1: Washing machines*

[4] ISO 7772-2:1996, *Assessment of industrial laundry machinery by its effect on textiles — Part 2: Extracting machines*

[5] ISO 7772-3:1996, *Assessment of industrial laundry machinery by its effect on textiles — Part 3: Flatwork-ironing machines*

[6] ISO 7772-4:1996, *Assessment of industrial laundry machinery by its effect on textiles — Part 4: Batch-drying tumblers*

[7] ISO 10472-1:1997, *Safety requirements for industrial laundry machinery — Part 1: Common requirements*

[8] ISO 10472-2:1997, *Safety requirements for industrial laundry machinery — Part 2: Washing machines and washer-extractors*

[9] ISO 10472-3:1997, *Safety requirements for industrial laundry machinery — Part 3: Washing tunnel lines including component machines*

[10] ISO 10472-4:1997, *Safety requirements for industrial laundry machinery — Part 4: Air dryers*

[11] ISO 10472-5:1997, *Safety requirements for industrial laundry machinery — Part 5: Flatwork ironers, feeders and folders*

[12] ISO 10472-6:1997, *Safety requirements for industrial laundry machinery — Part 6: Ironing and fusing presses*