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**Specifications for industrial laundry
machines — Definitions and testing of
capacity and consumption
characteristics —
(Part 3:
Washing tunnels**

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

Partie 3: Tunnels de lavage



Reference number
ISO 9398-3:1993(E)

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.

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.

International Standard ISO 9398-3 was prepared by Technical Committee ISO/TC 72, *Textile machinery and allied machinery and accessories*, Subcommittee SC 4, *Dyeing, finishing and allied machinery and accessories*.

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: *Washers-extractors*

Annex A of this part of ISO 9398 is for information only.

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

Part 3: Washing tunnels

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1 Scope

This part of ISO 9398 defines the characteristics of washing tunnels and gives the usual test methods for power and water consumption and the hourly productivity of these machines.

It does not cover safety requirements, for which reference should be made to the appropriate national regulations and legal texts.

This part of ISO 9398 is used for reference in the drafting of purchasing orders for washing tunnels.

NOTE 1 If more detailed information on the effect of laundry machines on textiles is required, reference should be made to ISO 7772 after agreement between the parties involved.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 9398. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9398 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9398-1:1993, *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics — Part 1: Flatwork ironing machines.*

3 Definitions

For the purposes of this part of ISO 9398, the definitions given in ISO 9398-1 and the following definitions 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 as specified in 4.1 in the cage or compartment of a machine, multiplied by the number of cages or compartments (one or more) in the machine.

The mass of this maximum load is defined as the mass at $(8 \pm 0,5) \%$ residual moisture content of these 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 3.2.

4.1.2 Nature of the load

The test load shall comprise decatized white cotton sheets with a mass per unit area of $(175 \pm 20) \text{ g/m}^2$ and dimensions of $(250 \pm 50) \text{ cm} \times (180 \pm 36) \text{ cm}$.

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 the feed water

The temperature of the feed water used in the test shall be $(17 \pm 7) \text{ }^\circ\text{C}$.

4.4 Ambient air

The ambient air temperature during the test shall be $(24 \pm 6) \text{ }^\circ\text{C}$.

4.5 Condition of the machine

The machine shall be clean.

5 Energy consumption of the 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 5.1), in a machine operating at its nominal capacity during one cycle as specified by the manufacturer (see 5.3).

1) Includes the water needed for both washing and rinsing.

5.2 Test method

5.2.1 Under the general test conditions as 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 the operation in 5.2.2 two times.

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 $(8 \pm 0,5) \%$ as specified in 4.1.

5.3.2 Indicate the energy consumption required by the motor(s) for the mechanical operation of the machine.

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
<hr/>	
Total	kWh

6 Determination of water consumption

6.1 General

The water consumption¹⁾ of a washing tunnel is defined as the number of litres of water necessary to wash one test load (4.1) in one 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 as specified in clause 4, operate the washing tunnel at nominal capacity for 30 min to obtain thermal equilibrium.

6.2.2 Measure the water consumption¹⁾ during three test loads (4.1) using one of the standard cycles specified by the manufacturer.

6.2.3 Repeat the operation in 6.2.2 (two times) consecutively.

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

6.3 Expression of results

Indicate the water consumption¹⁾, in litres, needed to wash 1 kg of decatized cotton sheets as specified in 4.1.

7 Hourly productivity of the 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 a cycle specified by the manufacturer.

8 Machine information

8.1 Identification

- manufacturer;
- manufacturer's address;
- machine type and reference number.

8.2 Specifications

- number of cages;
- cage capacity, in kilograms;
- overall dimensions of length, height and width, in millimetres;
- gross mass, in kilograms;
- steam supply pipe diameter, in millimetres;
- energy consumption, in kilojoules or kilowatt-hours.

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Annex A (informative)

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:—²⁾, *Assessment of industrial laundry machinery and its effect on textiles — Part 1: Washing machines*.
- [4] ISO 7772-2:—²⁾, *Assessment of industrial laundry machinery and its effect on textiles — Part 2: Extracting machines*.
- [5] ISO 7772-3:—²⁾, *Assessment of industrial laundry machinery and its effect on textiles — Part 3: Flatwork ironing machines*.
- [6] ISO 7772-4:—²⁾, *Assessment of industrial laundry machinery and its effect on textiles — Part 4: Batch drying tumblers*.

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2) To be published.

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