

INTERNATIONAL STANDARD

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Assessment of industrial laundry machinery by its effect on textiles —

Part 4: Batch-drying tumblers

*Évaluation des machines à laver industrielles par leurs effets sur les
textiles —*

Partie 4: Séchoirs rotatifs



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 7772-4 was prepared jointly by Technical Committees ISO/TC 38, *Textiles*, and ISO/TC 72, *Textile machinery and allied machinery and accessories*.

ISO 7772 consists of the following parts, under the general title *Assessment of industrial laundry machinery by its effect on textiles*:

- *Part 1: Washing machines*
- *Part 2: Extracting machines*
- *Part 3: Flatwork-ironing machines*
- *Part 4: Batch-drying tumblers*

Annexes A to D form an integral part of this part of ISO 7772. Annex E is for information only.

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Introduction

The rapid technical development of laundry machinery and the changes in the pattern of purchasing have led to an urgent need for a standard means of assessment of the effect of machine performance on textiles.

Two different approaches to the provision of the necessary information were considered:

- a) definition of essential specifications for laundry machinery for use by agreement between manufacturer and customer (see for example ISO 9398);
- b) preparation of standard methods for rating and assessing the effect of the principal types of machine so that the results obtained on machines of a similar type could be compared directly wherever the machines were located and whenever they were tested.

This International Standard deals with the second approach, since the urgent need was for procedures that could be used on a range of machines to evaluate their effects under reproducible conditions, including specification of the loads to be used.

Thus it will be possible to compare the basic effects of one machine against another, and a machine against a specification quoted in a contract. No performance level is set. Another advantage in the approach adopted is that the tests can be conducted at any location where the necessary services are available.

It is planned to publish the following four parts to ISO 7772:

Part 1: Washing machines

Part 2: Extracting machines

Part 3: Flatwork-ironing machines

Part 4: Batch-drying tumblers

It is hoped that, with the advance of techniques, and widespread use of these parts of ISO 7772, updated methods can be incorporated.

Assessment of industrial laundry machinery by its effect on textiles —

Part 4: Batch-drying tumblers

1 Scope

This part of ISO 7772 specifies methods for the assessment of cylindrical, rotating, drying tumbler machines and similar machines in which the damp washing is loosened and partially or completely dried under the action of heated air and mechanical energy.

This part of ISO 7772 only applies to batch-drying tumblers with a load capacity in excess of 10 kg of air-dry textiles.

The tests results provide an indication of drying efficiency in terms of energy consumption (see clause 9) and an output rating independent of operator efficiency.

The following characteristics are determined:

- a) the ability to dry textile test articles, expressed in kilograms of moisture removed or as a percentage of the bone-dry mass of a test load for a given drying-cycle time;
- b) the total energy consumption, in terms of heat and electricity, per kilogram of moisture removed;
- c) the average and maximum mass moisture removed, per minute, from a load of textiles of known bone-dry mass;
- d) the time to achieve a fully dried condition.

This part of ISO 7772 specifies two series of tests:

employing sheets as test pieces and determining the results for partial drying;

employing towels as test pieces and determining the results for full drying.

The methods described in this part of ISO 7772 can be used separately, and therefore any combination of them can be agreed on between the interested parties.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7772. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7772 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3801:1977, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area*.

ISO 5081:1977, *Textiles — Woven fabrics — Determination of breaking strength and elongation (Strip method)*.

ISO 6348:1980, *Textiles — Determination of mass — Vocabulary*.

ISO 7211-2:1984, *Textiles — Woven fabrics — Construction — Methods of analysis — Part 2: Determination of number of threads per unit length*.

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

ISO 9398-2:1993, *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics — Part 2: Batch drying tumblers.*

ISO 9398-3:1993, *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics — Part 3: Washing tunnels.*

ISO 9398-4:1993, *Specifications for industrial laundry machines — Definitions and testing of capacity and consumption characteristics — Part 4: Washer-extractors.*

3 Definitions

For the purposes of this part of ISO 7772, the following definitions apply.

NOTE 1 Particular details of drying tumblers are given in annex A.

3.1 air-dry mass (ADM): The total mass of clean textile articles including the mass of the moisture absorbed from the ambient atmosphere (see also 3.2).

3.2 bone-dry mass (BDM) (moisture content between 0,5 % and 1,0 %): The mass of a clean textile article (or number of articles) after being dried in a specified manner, when successive determinations of mass after several drying procedures show no progressive change in mass of the textile greater than 0,5 %.

NOTE 2 Specified drying procedures include repeated processing of the article or articles in a heated tumbler from which the exhaust air reaches a temperature of not less than 80 °C nor more than 120 °C, or by repeatedly passing the article or articles through a flatwork-ironing machine. These temperatures are appropriate to cotton fabrics which constitute the test loads and test pieces specified in this part of ISO 7772.

3.3 initial moisture content: The mass of the textile articles before the drying process, less the bone-dry mass.

NOTE 3 The initial moisture content is usually expressed as a percentage of the bone-dry mass.

3.4 final moisture content: The mass of the textile articles after the drying process, less the bone-dry mass.

NOTE 4 The final moisture content is usually expressed as a percentage of the bone-dry mass.

4 Apparatus

4.1 For all types of machine

4.1.1 Integrating kilowatt-hour meter, accurate to $\pm 0,1$ %, for measuring electrical-energy consumption.

4.1.2 Test meter, for volts and amps, accurate to $\pm 0,1$ %.

4.1.3 Stopwatch.

4.1.4 Multi-point temperature recorder, accurate to $\pm 0,1^\circ \text{C}$.

4.1.5 Air-flow measurement apparatus.

4.1.6 Weighing machine, capable of weighing 150 kg and with an accuracy of $\pm 0,5$ % at full-scale deflection.

4.1.7 Measuring tape, accurate to ± 1 mm.

4.1.8 Moisture meter, of the electrical-conductivity type, with a flat probe.

Care shall be taken to confirm the accuracy of the meter and to ensure that the accuracy is not affected by chemicals in the textiles used.

4.2 For steam-heated machines

4.2.1 Recording and integrating steam-flow meter, accurate to ± 5 %.

or

4.2.2 Condensate-measurement tank, accurate to ± 5 %, with temperature measurement facilities as described in ISO 7772-3:1992, clause B.2.

4.2.3 Recording steam-pressure gauge, accurate to ± 2 %.

4.2.4 Condensate pressure gauge.

4.3 For thermal-fluid-heated machines

4.3.1 Recording and integrating flow-meter, for measuring the flow of heat-transfer fluid, accurate to $\pm 0,2$ %.

4.3.2 Fluid inlet pressure gauge.

4.3.3 Fluid outlet pressure gauge.

4.3.4 Two recording thermometers, for measuring the fluid inlet and fluid outlet temperatures.

4.4 For gas-heated machines

4.4.1 Integrating gas-flow meter.

4.4.2 Manometer, for measuring gas pressure.