

INTERNATIONAL STANDARD

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Assessment of industrial laundry machinery by its effect on textiles —

Part 2: Extracting machines

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

Partie 2: Machines à essorer



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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.

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 7772-2 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.

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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 2: Extracting machines

1 Scope

This part of ISO 7772 specifies methods for the assessment of extracting machines in which water is removed mechanically from textile articles in their wet state after washing. This part of ISO 7772 does not apply to high-speed centrifugal extractors having a cycle time of less than 4 min.

In the case of batch-extracting machines, this part of ISO 7772 only covers machines with a load capacity in excess of 7 kg of air-dry textiles.

The following characteristics are determined:

- a) For batch machines only, the moisture retention of the extracted load in relation to the length of the extraction cycle time, for a specific degree or for specific degrees of machine loading. The method is selected in accordance with the particular circumstances of use of the machine, as follows:
 - 1) when operated as an independent extraction unit and normally loaded to the full rated capacity, the method described in clause 5 is used;
 - 2) when operated as an extraction component of an automatic-transfer processing unit that consecutively processes discrete batch loads of a given mass within given intervals of cycle time, the procedures described in clause 6 are used.
- b) For roller-type extractors which normally form an integral part of an automatic-transfer processing unit, the moisture retention in relation to the pro-

ductive capacity corresponding to a specified mass flow rate or rate of loading. The procedures described in clause 6 are used.

- c) Specific electrical-energy consumption and characteristics of power requirements. The method described in clause 7 is used.

The methods described in this International Standard 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 653:1980, *Long solid-stem thermometers for precision use*.

ISO 1770:1981, *Solid-stem general purpose thermometers*.

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

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*.

IEC 258:1968, *Direct acting recording electrical measuring instruments and their accessories*.

3 Definitions

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

3.1 air-dry mass (ADM): The total mass of clean textile articles including the mass of 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 1 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 g-factor: The numerical value obtained from the following equation:

$$g\text{-factor} = 0,56 d \left(\frac{n}{1000} \right)^2$$

where

d is the diameter, in centimetres, of the cage;

n is the revolutions per minute of the cage.

3.4 hourly output: The mass of textile articles that a hydro-extractor processes in one hour under defined conditions.

3.5 moisture retention: The amount of moisture retained by textile articles after extraction, usually expressed as a percentage of the mass of the textile articles in their dry state as defined at commencement of test.

3.6 laundry regain: The difference between air-dry mass and bone-dry mass expressed as a percentage of bone-dry mass.

NOTES

2 Laundry regain is not applicable when air-dry mass is used as a basis for calculations.

3 This term is used for practical purposes for industrial laundry machinery, but does not have the same meaning as "moisture regain" (see ISO 6348).

3.7 used sheets: Sheets subjected to conditions of average normal use.

3.8 steady state: The state in which the rate of flow of textile articles, the temperatures, the chemical conditions and the rates of flow of appropriate services in a continuous-washing machine are stabilized at the conditions required for the specific tests to be carried out.

4 Preparation

4.1 Machine identification

The data required for the identification of the test machine and of any mechanical aids used for loading, unloading or feeding, and of any other ancillary equipment directly associated with and necessary for the operation of the test machine shall be recorded in accordance with annex A. The reference numbers of any diagrams, drawings or photographs necessary to supplement these data shall also be recorded.

4.2 Test pieces for moisture-retention tests

4.2.1 All test articles shall be in good repair and shall be free from tears, snags or repaired sections. In addition, they shall satisfy the requirements specified in table 1.

Table 1 — Requirements for test pieces

Property	Method of test	Requirement
Mass per unit area	ISO 3801	175 g/m ² ± 20 g/m ²
Threads per centimetre, min.	ISO 7211-2	
warp		24,4
weft		22,4
Breaking strength, min.	ISO 5081	
warp		465 N
weft		510 N

4.2.2 For machines of load capacity in excess of 20 kg, the test pieces shall be sheets complying with the requirements of 4.2.1 and of dimensions $(1,8 \pm 0,4) \text{ m} \times (2,5 \pm 0,5) \text{ m}$.

4.2.3 For machines of load capacity 20 kg or less, the test pieces shall comply with the requirements of 4.2.1 and shall, after hemming any cut edges, be of dimensions $(1,0 \pm 0,2) \text{ m} \times (1,0 \pm 0,2) \text{ m}$.

4.2.4 For ready recognition, test pieces shall be identified by permanently sewing, within each of the four corners, a marker piece of fast-dyed coloured cotton material whose mass per unit area is not greater than that of the test piece. The dimensions of these marker pieces shall be approximately 15 cm × 15 cm.

4.2.5 Test pieces shall be washed and ironed once before being used in any test. The washing process in annex C is suitable.

4.2.6 If determining results based on air-dry mass, follow the procedure specified in 7.4 of ISO 7772-4.

4.2.7 If the test pieces have a wettability of greater than 5 s when determined by the following test, they shall be discarded:

With a pipette, place a drop of water on the test piece and start a stopwatch. When the liquid has been absorbed by the fabric so that the drop is no longer visible on the test piece, stop the stopwatch and record the time to the nearest 0,1 s. Repeat the procedure at four other locations on the test piece, chosen so that the centre of the area on which the drop is placed is at least 25 mm from any previously tested locations.

In the same manner, test two further test pieces to make a total of 15 measurements. Calculate the mean of the 15 measurements.

4.2.8 The life of test pieces shall be limited to 20 times [e.g. in the case of centrifuges this comprises the pre-treatment (see 4.2.5) plus two complete tests (5.5.1 to 5.5.7)]. To ensure that this life is not exceeded, the test pieces shall be suitably marked after each time to indicate the total number of times they have been used.

4.3 Availability of test loads and other materials

Sheets and all other materials required for a particular method shall be assembled in sufficient quantities to ensure that the test is carried out in full without interruption.

4.4 Installation and test running conditions

4.4.1 The manufacturer of the machine to be tested shall be invited to provide a complete statement of requirements in respect of the installation conditions of the machine and of the running conditions required for test purposes. Wherever practicable, each requirement shall be expressed as a range of values within which the test procedure is acceptable, rather than as a single specific value.

4.4.2 The installation of the test machine shall be in accordance with the manufacturer's requirements in respect of foundations and fixing, working space, electric power supply, other external supply services and drainage of effluent.

The voltage of the electrical supply shall be within the limits for which the electrical equipment is designed, and all electric cables shall be of sufficient size to maintain adequate voltage at all times.

Particular attention shall be paid to the effect of voltage drop on the acceleration of centrifugal hydro-extractors. This can arise from coincidental peak current demands of other machines.

4.4.3 The running conditions under which the machine is to be tested shall be within the limits stated by the manufacturer.

4.4.4 The manufacturer shall be informed and invited to inspect, check and certify in the test report that the machine and all relevant aspects of its installation and functioning under test conditions are satisfactory.

4.4.5 The power rating of the electric motor or motors, the function which each motor performs and the manufacturer's stated peak loading in kilovolt amps shall be recorded in a table with the format shown in table 2.