INTERNATIONAL STANDARD



Second edition 2020-10

Urine-absorbing aids for incontinence — Polyacrylate superabsorbent powders —

Part 4:

Test method for estimation of the moisture content as weight loss upon heating (standards.iteh.ai)

> Aides pour absorption d'urine — Méthodes d'essai pour caractériser les m<mark>atériaux₎absor</mark>bants à base de polymères —

https://standards.itch.prattle 4: Détermination de la teneur en humidité au moyen de la b3perte de masse par chauffage



Reference number ISO 17190-4:2020(E)

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<u>ISO 17190-4:2020</u> https://standards.iteh.ai/catalog/standards/sist/9d0e37c3-0460-4ad5-a41bb381b691182e/iso-17190-4-2020



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 173, Assistive products, Subcommittee SC 3, Aids for ostomy and incontinence. ISO 17190-4:2020 https://standards.iteh.ai/catalog/standards/sist/9d0e37c3-0460-4ad5-a41b-

This second edition cancels and replaces the fibst edition (ISO17190-4:2001), which has been technically revised. The main changes compared to the previous edition are as follows:

— full text review and new laboratory analysis with statistical evaluation.

A list of all parts in the ISO 17190 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at <u>www.iso.org/members.html</u>.

Urine-absorbing aids for incontinence — Polyacrylate superabsorbent powders —

Part 4: Test method for estimation of the moisture content as weight loss upon heating

WARNING — This document does not claim to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. It is expected that the person performing this test has been fully trained in all aspects of this procedure.

1 Scope

This document provides a test method for the evaluation of mass loss upon heating for cross-linked polyacrylate superabsorbent powders.

This method is applicable to powdered polymeric superabsorbent materials that are free-flowing under the specified test conditions. Substances other than water that are volatile in this temperature range will interfere. The onus is on the polymer formulator/producer to decide if such interference is possible and either exclude the method from use, provide an alternative or modify the method accordingly.

2 Normative references b381b691182e/iso-17190-4-2020

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 187, Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <u>https://www.iso.org/obp</u>
- IEC Electropedia: available at http://www.electropedia.org/

3.1

sample

product or portion of a product taken from a production lot for testing purposes and identifiable and traceable back to its origin

3.2

specimen

specific portion of the identified *sample* (3.1) upon which a test is performed

4 Principle

This procedure determines the mass loss upon dehydration of the test portion in an electrically heated drying oven at (105 ± 2) °C at atmospheric pressure.

5 Reagents and materials

None.

6 Apparatus

6.1 Analytical balance, capable of weighing a sample amount of 4 grams plus the weight of the drying container with an accuracy of ± 0,001 g.

6.2 Drying container, (glass or aluminium dish), with corresponding removable lid and at least 8 cm diameter so that an even layer of polymer can be dispersed for efficient drying.

6.3 Air-circulating thermostatic oven, capable of maintaining a temperature of (105 ± 2) °C.

- 6.4 **Desiccator**, with indicating silica gel (or equivalent) as an active drying agent.
- 6.5 Spatula, capable of holding about 1 g of polyacrylate superabsorbent powder.

7 Conditioning

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Samples shall be delivered in a closed container, to prevent absorption of atmospheric moisture. Allow the closed container to equilibrate to the debratory conditions. The preferred test conditions are (23 ± 2) °C and (45 ± 15) % relative humidity. If these conditions are not available, test at ambient conditions and report the temperature and relative humidity. Measure these laboratory conditions in accordance with ISO 187.

8 Sampling

WARNING — Powder Handling – The German Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area (MAK Commission) has provided a guideline value for long-term exposure to the respirable portion of superabsorbent polyacrylate dust of 0,05 mg.m-3. The respirable portion is defined as those particles of less than 10 μ m diameter. Commercial superabsorbent polymers typically contain less than 0,1 % of such particles. Precautions should be taken to avoid routine exposure to atmospheric respirable particles above this guideline value.

8.1 Before taking a test portion out of the container to run the test, rotate the container five to ten times in a three-dimensional figure of eight motion (see Figure 1), so as to obtain a homogeneous product. For that matter, sample bottles should not be filled more than 80 % of their nominal capacity.



Figure 1 — Sense of motion of the container

8.2 Make sure the test portion is substantially free of lumps of size greater than 1 mm in diameter before proceeding with testing. Lumps can pierce the screen and disqualify the equipment and the test.

9 Procedure

9.1 Dry each dish and lid in the oven at 105 °C to constant weight to remove any moisture. During heating, the lid shall be separated from the dish.

9.2 At the end of this heating period, transfer the dish and lid to a desiccator and allow to cool to room temperature.

9.3 Do not combine the dish and lid during cooling as a partial vacuum may form making it difficult to separate them.

9.4 Weigh to the nearest 0,001 g, the combined dish and lid and record this mass as m_1 .

9.5 Remove the cover and add approximately 4,0 g of a well-mixed test portion of polyacrylate superabsorbent powder test sample that is free from lumps.

Transfer the sample portion from the sample bottle to the weighing vessel or laboratory paper in one spatula portion. Discard any excess material on the spatula. Do not return it to the sample bottle. Keep the sample container closed as much as possible during this process.

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9.6 Distribute the test portion in a uniform particulate layer over the bottom of the dish, e.g. by gentle tapping or shaking.

9.7 Replace the lid and weigh the closed dish containing the sample immediately to the nearest 0,001 g. Record this mass as $m_2^{\text{standards.iteh.ai/catalog/standards/sist/9d0e37c3-0460-4ad5-a41b-}$

9.8 Place the open dish, containing the sample, and the corresponding lid, together in the oven at 105 °C for 3 hours.

9.9 After drying, remove each sample dish with its corresponding lid and transfer to a desiccator, close the desiccator and allow to cool for 30 minutes.

9.10 Do not combine the dish and lid as a partial vacuum may form making it difficult to separate them.

9.11 When the dish containing the test portion has cooled to room temperature, combine the dish and lid and remove from the desiccator.

9.12 Weigh immediately to the nearest 0,001 g. Record this mass as m_3 .

9.13 Carry out at least two determinations on the same well-mixed laboratory sample, simultaneously or successively, by the same analyst.

10 Calculation

Calculate the moisture, w_m , expressed as a percentage of the weight of the original test sample, using Formula (1):

$$w_{\rm m} = \frac{Massofwaterlost during drying}{Massof the polymer before drying} = \frac{m_2 - m_3}{m_2 - m_1} 100 \tag{1}$$

where

- m_1 is the mass, expressed in grams, of the dried empty, complete (top and bottom) dish
- m_2 is the mass, expressed in grams, of the complete dish with the test portion before drying
- m_3 is the mass, expressed in grams, of the complete dish with test portion after drying

Calculate the average of the 2 replicate determinations.

11 Report

In addition to the precise test results, the report shall include the following information:

- a) Reference to this document, i.e. ISO 17190-4:2020;
- b) Complete identification of all materials tested and method of sampling
- c) Name and address of testing institution: (Standards.iteh.ai)
- d) The type of polymer-based absorbent materials, including all technical details and source information required for complete identification of the sample;
- e) The results of moisture content by mass loss for each test portion expressed in g/kg of the weighed material to the nearest 1 g/kg and average for duplicate determinations;
- f) Make and model of testing equipment;
- g) Laboratory testing conditions;
- h) Number of specimens tested;
- i) For computer processed data, identify the software used and the version;
- j) Deviation from the standard test procedure, if any;
- k) Whether or not samples were conditioned prior to testing and, if so, for how long;
- l) Anything unusual noted during the testing;
- m) Any unusual features noted during the determination or if the reproducibility and/or repeatability criteria were not met.

SI values are regarded as the official standard system of measurement for this standard test method. If other systems of measurement are used in place of SI units (including inch-pound) their values shall be reported independently. Systems of measurement shall not be combined in any way, but shall be regarded and reported separately.

12 Precision

Laboratory data was returned to EDANA and compiled and anonymized before analysis. A statistical summary was prepared and presented to the (former) SPACE Analytical & Industrial Hygiene

Committee. The general form of the data was checked by the members and its validity confirmed. At the same time, it was agreed that only one round of outliers would be removed from the analyses.

Data distributions were evaluated and extreme outliers were removed before analysis of variance was performed. The data from the analysis of variance was used to calculate repeatability and reproducibility statistics for each test and for each of the samples tested. <u>Table 1</u> provides the results of that evaluation.

The method has been validated over the range of 0,4 % to 1,82 %. In the opinion of EDANA, the method can be used for values beyond this range, but such values should be validated by the interested parties.

Test	Sample	N	Min	Max	Mean	r	R
LOD	AJ224	127	0,70	1,82	1,20	0,47	0,54
	WR384	119	0,45	1,42	0,88	0,39	0,45
	XZ329	144	0,40	1,60	0,85	0,65	0,74

Table 1 — Repeatability (r) and reproducibility (R) of the method

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