INTERNATIONAL STANDARD

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Urine-absorbing aids for incontinence — Test methods for characterizing polymer-based absorbent materials —

Part 8: Gravimetric determination of flowrate

Aides pour absorption d'urine — Méthodes d'essai pour caractériser les matériaux absorbants à base de polymères —

Partie 8: Détermination gravimétrique du débit

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 17190 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 17190-8 was prepared by Technical Committee ISO/TC 173, *Technical systems and aids for disabled or handicapped persons*, Subcommittee SC 3, *Aids for ostomy and incontinence*.

ISO 17190 consists of the following parts, under the general title *Urine-absorbing aids for incontinence — Test methods for characterizing polymer-based absorbent materials*:

— *Part 1: Determination of pH*

— *Part 2: Determination of amount of residual monomers*

— *Part 3: Determination of particle size distribution by sieve fractionation*

— *Part 4: Determination of moisture content by mass loss upon heating*

— *Part 5: Gravimetric determination of free swell capacity in saline solution*

— *Part 6: Gravimetric determination of fluid retention capacity in saline solution after centrifugation*

— *Part 7: Gravimetric determination of absorption under pressure*

— *Part 8: Gravimetric determination of flowrate*

— *Part 9: Gravimetric determination of density*

— *Part 10: Determination of extractable polymer content by potentiometric titration*

— *Part 11: Determination of content of respirable particles*

ISO 17190 is intended to be used in conjunction with ISO 17191, *Urine-absorbing aids for incontinence — Airborne polyacrylate superabsorbent material in the workplace — Determination of the content in respirable dust by sodium atomic absorption spectrometry*.

Annex A of this part of ISO 17190 is given for information only.

Introduction

ISO 17190 consists of a series of test methods originally developed by *European Disposables and Nonwovens Association (EDANA)*. These test methods have been incorporated without technical changes into one International Standard consisting of eleven parts.

These test methods have been in practical use for several years, and have proven to be reliable with respect to common criteria of quality of test methods (validity, repeatability, etc.). They are applicable to polyacrylate superabsorbent materials, which occur in hygiene products, including urine-absorbing aids for incontinent persons. The test methods are addressed to the *material* exclusively. They are not intended to be used, and are not applicable for use with finished manufactured urine-absorbing aids.

Urine-absorbing aids for incontinence — Test methods for characterizing polymer-based absorbent materials —

Part 8: Gravimetric determination of flowrate

1 Scope

This part of ISO 17190 specifies a method for determining the mass flowrate of polyacrylate (PA) superabsorbent powders.

This method has been tested in the range 10,62 g/s to 11,93 g/s (see annex A), but it is expected to be applicable to a wider range of mass flowrates.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 17190. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 17190 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO/TR 15510, *Stainless steels — Chemical composition*

3 Terms and definitions

For the purposes of this part of ISO 17190, the following terms and definitions apply.

3.1
flowability
time for a mass of the powder to pass through a specified funnel

NOTE The mass of the powder is expressed in grams.

3.2
flowrate
mass of the powder flowing through a specified funnel per unit time

NOTE 1 Flowrate is expressed in grams per second.

NOTE 2 For the purposes of simplification of this part of ISO 17190, “flowrate” is used to mean “mass flowrate”.

4 Principle

The flowability of PA superabsorbent powders is determined by pouring a representative sample through a specified funnel and recording the time required for the entire sample to flow out of the funnel. The mass of the sample is divided by the time recorded to calculate the flowrate.

5 Apparatus

5.1 Funnel with an orifice damper (see Figure 1), made of polished stainless steel (steel designation X5CrNiMo17-12-3 specified in ISO/TR 15510) having the following characteristics:

— orifice internal diameter (10 ± 0,01) mm

— inclination angle of cone generatrix 20°

— height (145 ± 0,5) mm.

5.2 Funnel brush.

5.3 Spatula, spoon or V-shaped.

5.4 Analytical balance, capable of weighing, to the nearest 0,01 g, masses up to 100,00 g.

5.5 Utility tray, 40 cm × 25 cm × 6 cm.

5.6 Beakers, two of 250 ml capacity.

5.7 Ring stand, capable of holding the funnel in the ring.

Dimensions in millimetres

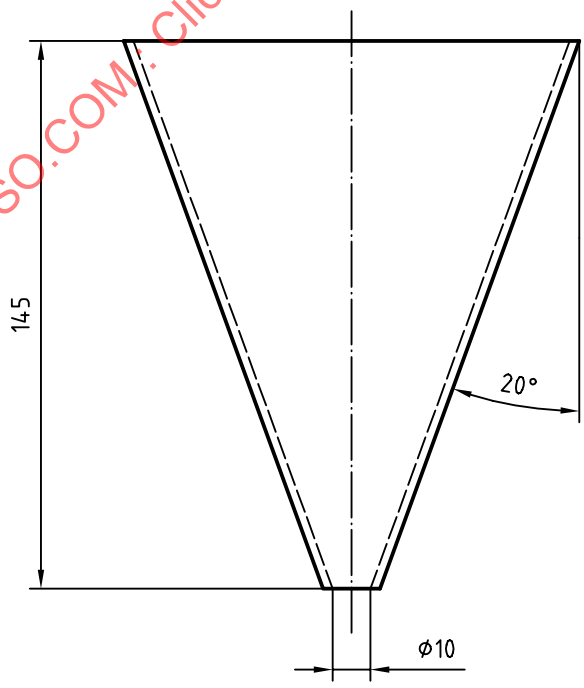

Figure 1 — Determination of flowrate using funnel

6 Sampling

CAUTION — Use respiratory protection, dust mask or fume hood, when handling sample amounts greater than 10 g.

In order to guarantee that a representative sample is taken from the bulk material contained in a large bag or a silo truck, remove the top layer (approximately 20 cm). Take the test sample with a scoop. Place it in an airtight container of adequate size within 3 min after sampling.

Keep the test samples in a closed container and allow them to equilibrate to the ambient laboratory temperature before removing a test portion to run the test. The preferred test conditions are (23 ± 2) °C and (50 ± 10) % 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.

Before taking a test portion out of the container to run the test, rotate the container three to five times so as to obtain a homogeneous product. Allow the container to sit 5 min before opening the lid and removing the test portion.

Make sure the test portion is substantially free of lumps of size greater than 1 mm in diameter before proceeding with testing.

7 Procedure

7.1 Place the funnel (5.1) into the ring of the ring stand (5.7). Then place the ring stand holding the funnel into the utility tray (5.5).

7.2 Weigh, to the nearest 0,01 g, a 100,00 g test portion (m_s) from the PA superabsorbent powder test sample into a 250 ml beaker (5.6).

7.3 Close the orifice damper located at the bottom of the funnel and pour the test portion along wall of the funnel to avoid settling.

7.4 Place a container (e.g. a beaker, see 5.6) directly beneath the orifice of the funnel.

7.5 Open the orifice damper and immediately start the timer.

7.6 Stop the timer when the last portion of the test portion empties out of the funnel, and read the time (t) in seconds.

7.7 Carry out at least two determinations on the same well-mixed laboratory sample, in rapid succession by the same analyst.

7.8 The funnel should be cleaned with the funnel brush (5.2) to remove any remaining polymer.

8 Calculation

The flowability is the time (t) in seconds for the 100 g test portion to pass through the funnel. Report the flowability to the nearest 0,1 s.