INTERNATIONAL STANDARD

ISO 17190-1

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

Part 1: Determination of pH

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

Partie 1: Détermination du pH

Reference number
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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.

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 17190-1 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 1: Determination of pH

1 Scope

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

This method has been tested in the range of pH 5,92 to pH 6,14 (see annex A), but it is expected to be applicable to a wider range.

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 3696, *Water for analytical laboratory use — Specification and test methods*

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*

3 Principle

The pH of the saline solution to which PA superabsorbent powders are added is determined using a pH meter and a standardized glass pH-responsive electrode.

4 Reagents

WARNING — Concentrated acids and bases shall be handled with care. Safety protection, including gloves and face shields, shall be worn. Concentrated hydrochloric acid shall be handled under a fume hood.

Use only reagents of recognized analytical grade, unless otherwise specified.

4.1 Water, complying with ISO 3696.

4.2 Sodium hydroxide solution, c(NaOH) = 0,1 mol/l.

Weigh, to the nearest 0,1 g, 4 g sodium hydroxide into a 1 l volumetric flask (5.8) and make up to the mark with deionized water (grade 1, see 4.1). Stir until dissolved.

4.3 Hydrochloric acid solution, c(HCl) = 0,1 mol/l.

Add, to the nearest 0,1 ml, 8,9 ml concentrated hydrochloric acid to a 1 l volumetric flask (5.8) and make up to the mark with deionized water (grade 1, see 4.1). Stir until dissolved.

4.4 Sodium chloride solution, c(NaCl) = 0,9 % by mass.

Weigh, to the nearest 0,1 g, 9 g of sodium chloride into a 1 l volumetric flask (5.8) and make up to the mark with deionized water (grade 3, see 4.1). Stir until dissolved. Adjust the pH of the saline solution to 6,0 ± 0,05 using sodium hydroxide (4.2) or hydrochloric acid (4.3) solution.

4.5 Standard buffer solutions, having the following pH:

a) 4,0 ± 0,02

b) 7,0 ± 0,02

c) 10,0 ± 0,02

5 Apparatus

5.1 Analytical balance, capable of weighing, to the nearest 0,000 1 g, masses up to 0,500 0 g.

5.2 Analytical balance, capable of weighing, to the nearest 0,1 g, masses up to 9 g.

5.3 pH meter.

5.4 Glass pH-responsive electrode (referred to in the text as pH electrode).

5.5 Magnetic stirrer and **stirring bar**, having a cylindrical form, 30 mm × 6 mm or equivalent.

5.6 Glass beaker, of 250 ml capacity.

5.7 Glass graduated cylinder, of 100 ml capacity.

5.8 Volumetric flask, Grade A of 1 l capacity.

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 Calibrate the pH electrode (5.4) at pH 4,0 and pH 7,0 using the standard buffer solutions [respectively, 4.5 a) and 4.5 b)] in accordance with the operating instructions provided by the manufacturer.

7.2 Add 100 ml of 0,9% saline solution (4.4) to a 250 ml beaker (5.6). Place the beaker on a magnetic stirrer (5.5). Choose a moderate mixing speed so as to avoid air from being drawn into the solution.

7.3 Weigh, to the nearest 0,01 g, two 0,5 g test portions from the PA superabsorbent powder test sample. Perform the procedure given in 7.4 to 7.8 on each portion.

7.4 Disperse the test portion of PA superabsorbent powder into the saline solution and mix the suspension at moderate speed for 10 min.

7.5 Rinse the pH electrode with deionized water. Carefully blot the electrode dry with a soft, absorbent tissue.

7.6 One minute after the stirring has stopped, immerse the pH electrode in the supernatant layer of the test solution and measure the pH.

7.7 Record the pH to one decimal place.

7.8 Rinse the pH electrode with deionized water.

8 Precision

The data for the repeatability and reproducibility limits of this method are the result of interlaboratory tests carried out in 1997 by EDANA and are given in annex A.

The absolute difference between two single test results obtained under repeatability test conditions in accordance with ISO 5725-2 shall not exceed the repeatability limit r in more than 5 % of cases:

r = 0,14 pH units

The absolute difference between two single test results obtained under reproducibility test conditions in accordance with ISO 5725-2 shall not exceed the reproducibility limit R in more than 5 % of cases:

R = 0,58 pH units

If the repeatability and reproducibility test criteria are not met, the test shall be repeated twice, each in duplicate, after ensuring that the original sample is thoroughly mixed. If it fails to satisfy this criterion, report as unusual, then diagnose the source of error for example by verifying correct operation of the instruments, and testing a portion of a material with a known value.