INTERNATIONAL STANDARD

ISO 3943

Second edition
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Photography — Processing chemicals — Specifications for anhydrous sodium acetate

Photographie — Produits chimiques de traitement — Spécifications pour l'acétate de sodium anhydre

Reference number
ISO 3943:1993(E)

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 3943 was prepared by Technical Committee ISO/TC 42, *Photography*.

This second edition cancels and replaces the first edition (ISO 3943:1976), which has been technically revised.

International Organization for Standardization
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Introduction

0.1 This International Standard is one of a series that establishes criteria of purity for chemicals used in processing photographic materials. General test methods and procedures cited in this International Standard are compiled in parts 1, 3, 5, 6 and 7 of ISO 10349.

This International Standard is intended for use by individuals with a working knowledge of analytical techniques, which may not always be the case. Some of the procedures utilize caustic, toxic or otherwise hazardous chemicals. Safe laboratory practice for the handling of chemicals requires the use of safety glasses or goggles, rubber gloves and other protective apparel such as face masks or aprons where appropriate. Normal precautions required in the performance of any chemical procedure are to be exercised at all times but care has been taken to provide warnings for hazardous materials. Hazard warnings designated by a letter enclosed in angle brackets, <>, are used as a reminder in those steps detailing handling operations and are defined in ISO 10349-1. More detailed information regarding hazards, handling and use of these chemicals may be available from the manufacturer.

0.2 This International Standard provides chemical and physical requirements for the suitability of a photographic-grade chemical. The tests correlate with undesirable photographic effects. Purity requirements are set as low as possible consistent with these photographic effects. These criteria are considered the minimum requirements necessary to assure sufficient purity for use in photographic processing solutions, except that if the purity of a commonly available grade of chemical exceeds photographic processing requirements and if there is no economic penalty in its use, the purity requirements have been set to take advantage of the availability of the higher-quality material. Every effort has been made to keep the number of requirements to a minimum. Inert impurities are limited to amounts which will not unduly reduce the assay. All tests are performed on samples "as received" to reflect the condition of materials furnished for use. Although the ultimate criterion for suitability of such a chemical is its successful performance in an appropriate use test, the shorter, more economical test methods described in this International Standard are generally adequate.

Assay procedures have been included in all cases where a satisfactory method is available. An effective assay requirement serves not only as a safeguard of chemical purity but also as a valuable complement to the identity test. Identity tests have been included whenever a possibility exists that another chemical or mixture of chemicals could pass the other tests.

All requirements listed in clause 4 are mandatory. The physical appearance of the material and any footnotes are for general information only and are not part of the requirements.

0.3 Efforts have been made to employ tests which are capable of being run in any normally equipped laboratory and, wherever possible, to avoid tests which require highly specialized equipment or techniques. Instrumental methods have been specified only as alternative methods or alone in those cases where no other satisfactory method is available.

Over the past few years, great improvements have been made in instrumentation for various analyses. Where such techniques have equivalent or greater precision, they may be used in place of the tests described in this International Standard. Correlation of such alternative procedures with the given method is the responsibility of the user. In case of disagreement in results, the method called for in the specification shall prevail. Where a requirement states "to pass test", however, alternative methods shall not be used.

INTERNATIONAL STANDARD ISO 3943:1993(E)

Photography — Processing chemicals — Specifications for anhydrous sodium acetate

1 Scope

This International Standard establishes criteria for the purity of photographic-grade anhydrous sodium acetate and describes the tests to be used to determine the purity.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 385-1:1984, *Laboratory glassware — Burettes — Part 1: General requirements.*

ISO 10349-1:1992, *Photography — Photographic-grade chemicals — Test methods — Part 1: General.*

ISO 10349-3:1992, *Photography — Photographic-grade chemicals — Test methods — Part 3: Determination of matter insoluble in ammonium hydroxide solution.*

ISO 10349-5:1992, *Photography — Photographic-grade chemicals — Test methods — Part 5: Determination of heavy metals and iron content.*

ISO 10349-6:1992, *Photography — Photographic-grade chemicals — Test methods — Part 6: Determination of halide content.*

ISO 10349-7:1992, *Photography — Photographic-grade chemicals — Test methods — Part 7: Determination of alkalinity or acidity.*

3 General

3.1 Physical properties

Anhydrous sodium acetate (CH_3COONa) is a white powder or grey-white flakes. It has a relative molecular mass of 82,03.

3.2 Hazardous properties

Sodium acetate is not hazardous when handled with normal precautions. Refer to the manufacturer for additional information.

3.3 Handling and storage

Sodium acetate is hygroscopic and shall be stored in a tightly sealed container.

4 Requirements

A summary of the requirements is shown in table 1.

Table 1 — Summary of requirements

Test	Limit	Subclause	International Standard in which test method is given
Assay (as CH_3COONa)	98,5 % (*m/m*) min.	7.1	ISO 3943
Insoluble matter (as precipitate of calcium, magnesium and ammonium hydroxides)	0,5 % (*m/m*) max.	7.2	ISO 10349-3
Heavy metals (as Pb)	0,005 % (*m/m*) max.	7.3	ISO 10349-5
Iron (Fe)	0,005 % (*m/m*) max.	7.4	ISO 10349-5
Halides (as Cl^-)	0,3 % (*m/m*) max.	7.5	ISO 10349-6
Alkalinity (as NaOH)	0,04 % (*m/m*) max.	7.6	ISO 10349-7
Acidity (as CH_3COOH)	1,0 % (*m/m*) max.	7.7	ISO 10349-7
Appearance of solution	Clear and free from insoluble matter except for a slight flocculence	7.8	ISO 3943
NOTE — *m/m* = mass/mass			

5 Reagents and glassware

All reagents, materials and glassware shall conform to the requirements specified in ISO 10349-1 unless otherwise noted. The hazard warning symbols used as a reminder in those steps detailing handling operations are defined in ISO 10349-1. These symbols are used to provide information to the user and are not meant to provide conformance with hazardous labelling requirements, as these vary from country to country.

6 Sampling

See ISO 10349-1.

7 Test methods

7.1 Assay

7.1.1 Specification

Content of CH_3COONa shall be 98,5 % (*m/m*) min.

7.1.2 Reagents

7.1.2.1 Acetic acid, glacial (CH_3COOH) (DANGER: <C><B>)[1]

7.1.2.2 Perchloric acid[2], standard volumetric solution, $c(HClO_4)$ = 0,100 mol/l (10,046 g/l) in glacial acetic acid (DANGER: <C><O>).

7.1.3 Procedure

Weigh a test portion of 0,19 g to 0,21 g to the nearest 0,000 1 g and transfer it to a clean and dry 125 ml glass-stoppered conical flask. Add 25 ml of acetic acid (7.1.2.1) (<C><B>) to this flask and dissolve the test portion. Prepare a blank by adding 25 ml of acetic acid (7.1.2.1) to a second clean and dry flask. Titrate the test solution and blank to the colorimetric endpoint[3] with the perchloric acid solution (7.1.2.2) (<C><O>).

7.1.4 Expression of results

The assay, expressed as a percentage by mass of CH_3COONa, is given by

$$\frac{8{,}20\ c(V_S - V_B)}{m}$$

where

c is the actual concentration, expressed in moles of $HClO_4$ per litre, of the perchloric acid solution (7.1.2.2);

V_S is the volume, in millilitres, of the perchloric acid solution used to reach the

1) Hazard warning codes are defined in ISO 10349-1.

2) Commercially available standard reagent is recommended. If solution is to be prepared, see any quantitative analytical chemistry text.

3) Methyl violet dissolved in chlorobenzene (1 g/l) may be used as an indicator. The solution is titrated to the first true green endpoint.

endpoint for the titration of the test solution;

V_B is the volume, in millilitres, of the perchloric acid solution used to reach the endpoint for the titration of the blank;

m is the mass, in grams, of the test portion;

8,20 is a conversion factor obtained from the mass of sodium acetate equivalent to 1 mole of perchloric acid (i.e. 82,03) × the conversion factor for millilitres to litres (i.e. 0,001) × 100 %.

7.2 Insoluble matter content (as a precipitate of calcium, magnesium and ammonium hydroxides)

7.2.1 Specification

Maximum content of insoluble matter shall be 0,5 % (m/m).

7.2.2 Procedure

Determine the percentage of insoluble matter in accordance with ISO 10349-3.

7.3 Heavy metals content (as Pb)

7.3.1 Specification

Maximum content of heavy metals shall be 0,005 % (m/m).

7.3.2 Procedure

NOTE 1 The standard for the iron test (7.4) is prepared in the same way as the heavy metals standard.

Determine the percentage of heavy metals in accordance with ISO 10349-5. Use a test portion of 0,90 g to 1,10 g of the sample prepared in accordance with ISO 10349-5:1992, 7.2. Use 5 ml of the heavy metals standard prepared in accordance with ISO 10349-5:1992, 8.1.1.

7.4 Iron content

7.4.1 Specification

Maximum content of iron shall be 0,005 % (m/m).

7.4.2 Procedure

Determine the percentage of iron in accordance with ISO 10349-5. Use a test portion of 0,90 g to 1,10 g of the sample prepared in accordance with ISO 10349-5:1992, 7.2. Use 5 ml of the iron standard prepared in accordance with ISO 10349-5.

7.5 Halides content (as Cl^-)

7.5.1 Specification

Maximum content of halides shall be 0,3 % (m/m).

7.5.2 Procedure

Determine the percentage of halides (expressed as Cl^-) in accordance with ISO 10349-6.

7.6 Alkalinity (as NaOH)

7.6.1 Specification

Maximum free alkali content shall be 0,04 % (m/m).

7.6.2 Procedure

Prepare a test solution in accordance with ISO 10349-7 using a test portion of 4,9 g to 5,1 g. If the prepared test solution turns pink when the indicator is added, determine the percentage alkalinity as sodium hydroxide using a factor K equal to 4,00 in the calculation given in ISO 10349-7.

7.7 Acidity (as CH_3COOH)

7.7.1 Specification

Maximum free acid content shall be 1,0 % (m/m).

7.7.2 Procedure

If the prepared test solution in the alkalinity determination remains clear when the indicator is added, determine the percentage acidity as acetic acid in accordance with ISO 10349-7. Use a factor K equal to 6,01 in the calculation given in ISO 10349-7.

7.8 Appearance of solution

7.8.1 Specification

The solution shall be clear and free from insoluble matter except for a slight flocculence.

7.8.2 Procedure

Dissolve a test portion of 10,0 g in 50 ml of water and dilute to 100 ml with water. Let this solution stand for 30 min at ambient temperature (20 °C to 27 °C). Observe the solution for colour and clarity.

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