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Photography — Processing chemicals — Specifications for glacial acetic acid

*Photographie — Produits chimiques pour traitement — Spécifications
relatives à l'acide acétique cristallisable*



Reference number
ISO 3298:1994(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 3298 was prepared by Technical Committee ISO/TC 42, *Photography*.

This second edition cancels and replaces the first edition (ISO 3298:1976), which has been technically revised.

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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 and 5 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.

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Photography — Processing chemicals — Specifications for glacial acetic acid

1 Scope

This International Standard establishes criteria for the purity of photographic-grade glacial acetic acid 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 10349-1:1992, *Photography — Photographic-grade chemicals — Test methods — Part 1: General*.

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

3 General

3.1 Physical properties

Glacial acetic acid, CH_3COOH , is a colourless liquid with a pungent odour. It has a relative molecular mass of 60,05.

3.2 Hazardous properties

Glacial acetic acid causes severe skin burns and is highly toxic by ingestion. Refer to the manufacturer for additional information.

3.3 Storage

Protect glacial acetic acid from prolonged storage at temperatures below 17 °C.

4 Requirements

A summary of the requirements is shown in table 1.

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.

Table 1 — Summary of requirements

Test	Limit	Subclause	International Standard in which test method is given
Assay (as CH ₃ COOH)	99,5 % (m/m) min.	7.1	ISO 3298
Non-volatile matter	0,005 % (m/m) max.	7.2	ISO 3298
Heavy metals (as Pb)	0,002 % (m/m) max.	7.3	ISO 10349-5
Iron (Fe)	0,001 % (m/m) max.	7.4	ISO 10349-5
Appearance of solution	Clear and colourless	7.5	ISO 3298
NOTE — <i>m/m</i> = mass/mass			

7 Test methods

7.1 Assay

7.1.1 Specification

Content of CH₃COOH shall be 99,5 % (m/m) min.

7.1.2 Apparatus

7.1.2.1 Thermometer, with a range of 7 °C to 38 °C graduated in 0,05 °C steps, calibrated against a known standard.

7.1.3 Procedure

Insert the thermometer (7.1.2.1) in a dry test tube of approximately 25 mm diameter. Add sufficient acetic acid (DANGER: <C>)¹⁾ to reach the immersion mark on the thermometer when the bulb of the thermometer is approximately 13 mm above the bottom of the test tube and chill in an ice bath, with stirring, until the mass becomes slushy. Remove the test tube from the ice bath, stir gently, and note the point at which the temperature remains constant for 2 min. The melting point should not be less than 15,7 °C.

7.2 Non-volatile matter

7.2.1 Specification

Maximum content of non-volatile matter shall be 0,005 % (m/m).

7.2.2 Procedure

Evaporate 95 ml ± 1 ml²⁾ of the sample (<C>) in a tared platinum dish to dryness on a steam bath. Dry the outside of the dish and then dry the residue at 105 °C ± 2 °C for 1 h. Cool in a desiccator and weigh accurately to the nearest 1 mg. The residue weight should be not more than 0,005 g.

7.3 Heavy metals content

7.3.1 Specification

Maximum content of heavy metals shall be 0,002 % (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 1,90 g to 2,10 g prepared in accordance with ISO 10349-5:1992, 7.3. Use 4 ml of the heavy metals standard prepared in accordance with ISO 10349-5:1992, 8.1.2.

1) Hazard warning codes are defined in ISO 10349-1:1992, clause 4.

2) Note that the non-volatile residue is expressed as a percentage (m/m) although the sample is taken by volume. Since the density of acetic acid is about 1,05, the 95 ml sample is equivalent to a 100 g sample.