American National Standard

for Photography –

Processing Chemicals – Specifications for Anhydrous Citric Acid and Citric Acid Monohydrate

ANSI/I3A IT4.107-2002

Approved American National Standard

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Secretariat

International Imaging Industry Association, Inc. (I3A)

Approved May 21, 2002

American National Standards Institute, Inc.

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Foreword (This foreword is not part of American National Standard ANSI/I3A IT4.107-2002.)

This standard is one of a series of standards establishing criteria of purity for chemicals used in processing photographic materials. In the current review process, this series of standards is being updated and revised in format. Many of the standards in this series, but not all, also exist as standards of the International Organization for Standardization (ISO). The current updates and revisions are in accord with that done for the ISO standards. In an effort to promote the concept of international standardization, references to ISO standards have been left in place.

Suggestions for the improvement of this standard will be welcome. They should be sent to the International Imaging Industry Association, Inc. (I3A), 550 Mamaroneck Avenue, Suite 307, Harrison, NY 10528-1615; e-mail: i3astds@i3a.org.

This standard was processed and approved for submittal to ANSI by I3A Technical Committee IT4 on Photographic Processing. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this edition of the standard, the IT4 Committee had the following members:

Joseph M. Rao, Chairman
John Gignac, Secretary

Organization Represented	*Name of Representative*
International Imaging Industry Association, Inc. (I3A)	Jan Carlock Linda Crosby Kunihiro Fujiwara Ronald A. Klein Laszlo Papai Anthony Jarkowski
General Chemical Corporation	Mark Dulik
Photographic Society of America, Inc.	Grant Haist
Photo Marketing Association International	Herb Stein

Individual Experts

Peter Krause
Norman Newman
Joseph M. Rao

Subcommittee IT4-1 on Specifications for Photographic Chemicals, which was responsible for this edition, had the following members:

Joseph M. Rao, Chairman-protem	Jan Carlock Linda Crosby Mark Dulik Kunihiro Fujiwara Norman Newman Laszlo Papai Herb Stein

0 Introduction

0.1 This 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 standard are compiled in Parts 1, 4, 5, 6, and 7 of ISO 10349.

This 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 and other protective apparel such as rubber gloves, face masks, or aprons where appropriate.

Normal precautions required in the performance of any chemical procedure shall be exercised at all times, but care has been taken in this standard 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 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 that 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 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 that are capable of being run in any normally equipped laboratory and, wherever possible, to avoid tests that 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 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, alterative methods shall not be used.

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1 Scope

This standard establishes criteria for the purity of photographic-grade citric acid, anhydrous and monohydrate, and specifies 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 standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this 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 standards.

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

ISO 10349-4:1992 (R1999), *Photography – Photographic-grade chemicals – Test methods – Part 4: Determination of residue after ignition*.

ISO 10349-5:1992 (R1999), *Photography – Photographic-grade chemicals – Test methods – Part 5: Determination of heavy metals and iron content.*

ISO 10349-6:1992 (R1999), *Photography – Photographic-grade chemicals – Test methods – Part 6: Determination of halide content.*

ISO 10349-7:1992 (R1999), *Photography – Photographic-grade chemicals – Test methods – Part 7: Determination of alkalinity or acidity.*

3 General

3.1 Physical properties

Anhydrous citric acid, $C_6H_8O_7$, exists as white or colorless crystals. It has a relative molecular mass of 192.12.

Citric acid monohydrate, $C_6H_8O_7 \cdot H_2O$, exists as white or colorless crystals. It has a relative molecular mass of 210.14.

3.2 Hazardous properties

Anhydrous citric acid and citric acid monohydrate are organic acids that may irritate the eyes.

3.3 Storage

Citric acid shall be stored in a closed container at room temperature away from combustible material.