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Photographic grade sodium thiosulphate, anhydrous — Specification

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3300 was drawn up by Technical Committee ISO/TC 42, *Photography,* and circulated to the Member Bodies in September 1974.

It has been approved by the Member Bodies of the following countries :

Australia	Japan	Turkey
Austria	Mexico	United Kingdom
Belgium	Netherlands	U.S.A.
Canada	Poland	U.S.S.R.
France	Romania	Yugoslavia
Germany	South Africa, Rep. of	
Italy	Spain	

No Member Body expressed disapproval of the document.

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Photographic grade sodium thiosulphate, anhydrous – Specification

0 INTRODUCTION

This International Standard is one of a series of specifications for photographic grade chemicals which are commonly used in the processing of sensitized photographic materials. These specifications have been prepared to establish criteria of purity which will provide a practical and economical grade and prevent possible faulty processing which might be caused by chemicals of inferior quality, and to furnish manufacturers, suppliers, and processors with reliable and readily available specifications for photographic chemicals of satisfactory quality.

Photographic grade chemicals are those which meet the requirements specified in the appropriate International Standards. These specifications set out purity standards and state the limiting concentrations and test methods for certain inert or photographically harmful impurities that may be present.

Originally these specifications were based on known requirements for black-and-white photographic processing, but increased attention has been paid to the requirements of colour processing. Experience to date indicates that chemicals meeting these specifications are satisfactory for colour processes in general use.

0.1 Specification requirements

These specifications set out chemical and physical requirements. While it is recognized that the ultimate criterion of the quality of a photographic chemical is its successful performance in a photographic test, present knowledge indicates that, from a practical standpoint, chemical and physical methods of testing are generally adequate. The photographic industry has accumulated a comprehensive collection of such chemical tests for impurities. These tests, which correlate with objectionable photographic effects, have been drawn upon in the formulation of these specifications. Chemical tests are generally more sensitive, less variable, and less costly than photographic tests.

Purity requirements have been set as low as possible, consistent with the objectives mentioned. If, however, 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 higher quality materials.

Every effort has been made to keep the number of requirements in each specification to a minimum. The requirements generally include only those photographically harmful impurities which, through experience, are likely to be present. Inert impurities, are limited to amounts which will not unduly reduce the assay.

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. All assays are intended to be made on undried samples in view of the fact that photographic processing chemicals are normally used "as received".

Identity tests have been included in the specifications wherever a possibility exists that another chemical or a mixture of chemicals could pass the other tests.

All requirements listed in clause 3 of each specification are mandatory. The physical appearance of the material and any footnotes are for general information only and are not part of the requirements.

0.2 Selection of test methods

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.

While the test methods set out in the specifications are recommended, the use of other equally reliable methods is allowed. 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.

0.3 Reagents

An effort has been made to minimize the number of reagents employed in this series of specifications. The methods of preparation and of standardization have been included in all cases where these are not common, or where a preferred method is desirable.

Details of reagent preparation and standardization are included in each specification in which the reagent is called for so that each specification shall be self-sufficient.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the purity requirements of, and test methods for, photographic grade sodium thiosulphate, anhydrous.

2 CHARACTERISTICS

Sodium thiosulphate, anhydrous, is in the form of a white powder, of chemical formula $Na_2S_2O_3$ and relative molar mass 158,1.

3 REQUIREMENTS

3.1 Assay

The assay shall be not less than 97,0 % (*m/m*), expressed as $Na_2S_2O_3$, when determined by the method described in 4.1.

3.2 Appearance of solution

An aqueous solution shall be clear and free from sediment, other than a slight flocculence, when examined by the method described in 4.2.

3.3 Calcium, magnesium and other matter insoluble in ammonia solution

The matter insoluble in ammonia solution shall be not greater than 0,4 % (*m/m*), when determined by the method given in 4.3.

3.4 pH value

The pH of a 100 g/l aqueous solution when prepared and measured by the method described in 4.4 shall be between 6,5 and 9,5 at 20 °C.

3.5 Sulphide content

The sulphide content, expressed as Na_2S, shall be not greater than 20 mg/kg.

Conformity with this requirement shall be determined by the limit test described in 4.5, when the colour produced in the test solution shall be not greater than that produced in the control solution.

3.6 Heavy metals content

The heavy metals content, expressed as lead (Pb), shall be not greater than 20 mg/kg.

Conformity with this requirement shall be determined by the limit test described in 4.6, when the colour produced in the test solution shall be not greater than that produced in the control solution.

3.7 Iron content

The iron content, expressed as iron (Fe), shall be not greater than 50 mg/kg.

Conformity with this requirement shall be determined by the limit test described in 4.7, when the colour produced in the test solution shall be not greater than that produced in the control solution.

4 TEST METHODS

Reagents used in the tests shall be recognized reagent grade chemicals normally used for careful analytical work. In all the directions the acids and ammonia solution referred to shall be of full strength unless dilution is specified. Dilution is specified in terms of molar concentration (molarity)[1] when standardization of the reagent is required. When dilution is indicated as $(1 + x)$, it means that 1 volume of the reagent or strong solution is added to x volumes of distilled water.

Distilled water, or water otherwise produced of at least equal purity, shall be used whenever water is required.

4.1 Assay

4.1.1 *Reagents*

4.1.1.1 Iodine, 0,15 M standard volumetric solution, 12,7 g of iodine per litre.

4.1.1.2 Starch indicator solution.

Stir 5 g of soluble starch with 100 ml of a 10 g/l salicylic acid solution. Then add 300 to 400 ml of boiling water and boil until the starch dissolves, finally diluting to 1 000 ml with water.

4.1.2 *Apparatus*

Ordinary laboratory apparatus and

4.1.2.1 Burette, 50 ml capacity, conforming to class A of ISO/R 385.

4.1.3 *Procedure*

Weigh, to the nearest 0,001 g, a test portion of about 0,6 g of the laboratory sample, transfer to a conical flask and dissolve in about 50 ml of water. Titrate with the standard volumetric iodine solution (4.1.1.1) from the burette (4.1.2.1), using the starch indicator solution (4.1.1.2), until the blue colour produced at the end-point remains for at least 1 min.

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1) $1\ mol/l = 1\ kmol/m^3 = 1\ mol/dm^3 = 1\ M$