

INTERNATIONAL  
STANDARD

**ISO**  
**6849**

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**Photography — Processing wastes —  
Determination of boron**

*Photographie — Effluents de traitement — Détermination du bore*

**Sample Document**

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Reference number  
ISO 6849:1996(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 6849 was prepared by Technical Committee ISO/TC 42, *Photography*.

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## Introduction

This International Standard is one of a series devoted to the analysis of photographic wastes; it encompasses the field of analysis of boron in photographic effluents.

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 clause 4. More detailed information regarding hazards, handling and use of these chemicals may be available from the manufacturer.

In the case of effluents, the photographic laboratory can best establish its conformity to regulations by appropriate chemical analysis. In some cases, in-house analyses will be possible; often the use of an outside laboratory will be required.

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# Photography — Processing wastes — Determination of boron

## 1 Scope

This International Standard specifies two methods for the determination of boron in photographic processing wastes. The first method is the estimation of borates by titration of the boric acid-mannitol complex, which is a stronger acid than the boric acid from which it is formed. It is suitable for boron concentrations of 0,1 mg/l and higher. In the range 0,1 mg/l to 5 mg/l, phosphate is removed by precipitation by lead acetate. In the range 1 mg/l to 100 mg/l, the sample is diluted 25 times; this eliminates phosphorous interference if the phosphorous concentration is below 500 mg/l.

The second and alternative method is a spectrophotometric technique using methylene blue and is useful in the boron range of 0,1 mg/l to 1,0 mg/l, this being the concentration likely to be encountered in photographic processing wastes.

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## 2 Normative references

The following International 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 5667-1:1980, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes.*

ISO 5667-2:1991, *Water quality — Sampling — Part 2: Guidance on sampling techniques.*

ISO 5667-3:1994, *Water quality — Sampling — Part 3: Guidance on the preservation and handling of samples.*

ISO 6353-1:1982, *Reagents for chemical analysis — Part 1: General test methods.*

ISO 6353-2:1983, *Reagents for chemical analysis — Part 2: Specifications — First series.*

ISO 6353-3:1987, *Reagents for chemical analysis — Part 3: Specifications — Second series.*

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

## 3 Principle

In the method using boric acid-mannitol complex, sodium acetate is added to stabilize the pH. The sample is then acidified with sulfuric acid and boiled to expel carbon dioxide. Upon cooling, the pH is adjusted to 7 with sodium