AS 3753—2001
Reconfirmed 2016

Australian Standard™

Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry

Standards Australia

This Australian Standard was prepared by Committee CH-016, Spectroscopy. It was approved on behalf of the Council of Standards Australia on 30 March 2001 and published on 5 May 2001.

The following interests are represented on Committee CH-016:

Australian Chamber of Commerce and Industry

Australian Government Analytical Laboratories

CSIRO Energy Technology

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This Standard was issued in draft form for comment as DR 00194.

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 3753—2001

Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry

RECONFIRMATION NOTICE

Technical Committee CH-016 has reviewed the content of this publication and, in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 05 October 2016.

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Australian Institute of Physics
Environmental Laboratory Industry Group
National Association of Testing Authorities Australia
National Measurement Institute

NOTES

Australian Standard™

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Originated as AS CK19—1970.
Previous edition AS 3753—1990.
Second edition 2001.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 3855 9

PREFACE

This Standard was prepared by the Standards Committee CH-016, Spectroscopy to supersede AS 3753—1990.

The objective of this Standard is to describe recommended procedures, principles and techniques involved in the setting up and operation of UV/visible spectrophotometer for use in chemical methods for analysis.

In preparing this revised Standard, the opportunity was taken to update the description of the components of UV/visible spectrophotometers in line with modern practice. Recognisance was also made of the variability of performance among the different instruments available in the market and in consequence, the manufacturer's specifications for performance characteristics have been specified as the preferred criteria to be followed. The performance criteria specified in the superseded Standard have been retained as default criteria in cases where the manufacturer's specifications are unavailable.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out recommendations for instrumentation and operating techniques suitable for chemical analysis of solutions by ultraviolet/visible spectrophotometry, and includes a summary of testing procedures, calibration procedures and recommendations for safe operation. Although most sections of this Standard refer to the analysis of solutions, sections on instrumentation and instrument optimization are relevant to instruments used for gas analysis.

1.2 APPLICATION

This Standard is intended to be read in conjunction with the instrument manufacturer's recommendations.

1.3 PRINCIPLE

Ultraviolet/visible spectrophotometry relies upon the following:

(a) The absorption of radiation by a substance where the wavelength of the radiation corresponds to the energy required to raise the substance to a state of higher energy (excited state) in an allowed electronic transition. Absorption may be highly wavelength specific or may occur over a broad wavelength range.

(b) The excited state of the substance being unstable and reverting rapidly to the normal state without emission of radiation.

(c) The absorbance by the substance being a function of the number of absorbing molecules in the light path (see Appendix A, Bouguer's (Lambert's) Law and Beer's Law).

The technique described in this Standard involves passing radiation of known wavelength through a portion of a sample, and determining the absorbance at that wavelength.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

2162 Verification and use of volumetric apparatus
2162.1 Part 1: General—Volumetric glassware
2162.2 Part 2: Guide to the use of piston-operated volumetric apparatus (POVA)

2164 Laboratory glassware—One-mark volumetric flasks

2166 One-mark pipettes

2167 Graduate straight pipettes