

Australian Standard™

**Recommended practice for chemical
analysis by ultraviolet/visible
spectrophotometry**



S t a n d a r d s 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.

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Australian Chamber of Commerce and Industry
Australian Government Analytical Laboratories
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STANDARDS AUSTRALIA

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OF

AS 3753—2001

Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry

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NOTES

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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 The performance criteria specified in the superseded Standard have been retained as default criteria in cases where the manufacturer's specifications are unavailable.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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STANDARDS AUSTRALIA

Australian Standard

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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 solution 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