AS/NZS 4782.3:2014

Australian/New Zealand Standard™

Double-capped fluorescent lamps—Performance specifications

Part 3: Procedure for quantitative analysis of mercury present in fluorescent lamps

STANDARDS Australia

STANDARDS NEW ZEALAND PAEREWA AOTEAROA

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Electrical Compliance Testing Association
Electrical Regulatory Authorities Council
Energy Efficiency and Conservation Authority of New Zealand
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Australian/New Zealand Standard™

Double-capped fluorescent lamps—Performance specifications

Part 3: Procedure for quantitative analysis of mercury present in fluorescent lamps

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PREFACE

This Standard was prepared by the members of the Joint Standards Australia/Standards New Zealand Committee EL-041, Lamps and Related Equipment to supersede AS/NZS 4782.3(Int):2006.

The objective of this Standard is to specify procedures for quantitative analysis of mercury present in general purpose fluorescent lamps that are intended to be sold in Australia and New Zealand.

The series consists of the following parts:

AS/NZS	
4782	Double-capped fluorescent lamps—Performance specifications
4782.1	Part 1: General (IEC 60081:2000, MOD)
4782.2	Part 2: Minimum Energy Performance Standard (MEPS)
4782.3	Part 3: Procedure for quantitative analysis of mercury present in fluorescent lamps (this Standard)

This Standard is published with the approval of the combined state and territory regulatory authorities and is structured to be suitable for reference in Minimum Energy Performance Standards legislation.

Statements expressed in mandatory terms in notes to figures, are deemed to be requirements of this Standard. 'Shall' indicates a requirement is mandatory, while 'should' indicates a recommendation and good practice.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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FOREWORD

This Standard describes a general procedure for quantitative analysis of mercury present in a fluorescent lamp. It encompasses all methods of determination of mercury by wet chemical analysis process such as by dissolving the mercury and/or amalgam in suitable solvents. The method described is based on both the Japanese and European methodology. It is suitable for all types of fluorescent lamps with or without amalgams and is not limited by the type or size of the fluorescent lamp.

The method is based on recent practical experiments with contemporary fluorescent lamps and modified to suit modern instrument and measurement techniques.

The procedures stated are based on the fact that mercury in fluorescent lamps exists in one or more combination(s) of the possible states namely vapour, liquid metal or oxidized liquid or as an amalgam of mercury. The total amount of mercury present in a fluorescent lamp is determined by adding the measured values of metal mercury, oxidized mercury and amalgam. The latter is used in order to introduce mercury in a lamp more accurately. There are also many fluorescent lamps devoid of amalgam.

Metal mercury and oxidized mercury easily dissolve in nitric acid, however some amalgams (e.g. titanium/mercury, bismuth/lead/tin/mercury) do not dissolve in nitric acid entirely, so other acids in combination must be used. It is important to identify the type of amalgam used in the fluorescent lamp under test.

The procedure in this Standard includes methods to dissolve metal mercury, oxidized mercury, and some types of amalgams. Mercury in vapour form is not considered for determination as the vapour portion is relatively insignificant.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Double-capped fluorescent lamps—Performance specifications

Part 3: Procedure for quantitative analysis of mercury present in fluorescent lamps

1 SCOPE AND GENERAL

1.1 Scope

This Standard outlines a procedure for quantitative analysis of mercury present in fluorescent lamps that are used in general lighting service and which are covered within the scope of AS/NZS 4782.1 and AS/NZS 60901.

This Standard applies to fluorescent lamps that contain mercury in the form of vapour, liquid, oxidized liquid or in combination with amalgams.

The testing method specifies the procedures that can be used to determine accurately the mercury content in a fluorescent lamp in which mercury is introduced as the medium for discharge between the electrodes.

The method involves the chemical digestion of the mercury contained within a lamp and the determination of that mercury content on a per unit basis. This is achieved using a method of solubilization of the entire mercury content contained within the tube using acidic digestion methods and the accurate determination of that mercury content using standard mercury solutions. This will allow comparisons between lamps in batches and comparisons with other internationally accepted standards for mercury content in fluorescent lamps.

This Standard covers methods of determination of mercury by wet chemical analysis.

1.2 Application

This Standard is intended to be read in conjunction with AS/NZS 4782.1 and AS/NZS 4782.2.

The methods contained in the following IEC standards can be used as alternatives to the methods outlined in this Standard:

(a) Sample preparation. IEC 62554.

(b) Determination of mercury content: IEC 62321-4.

1.3 Referenced documents

The following documents are referred to in this Standard:

NOTE: Documents that may be referred to for additional information are listed in the Bibliography.

AS

2164 Laboratory glassware—One-mark volumetric flasks

2165 Laboratory glassware—Burettes

2166 Laboratory glassware—One-mark pipettes

2234 Laboratory glassware—Beakers

2245 Laboratory glassware—Filter funnels