Australian Standard®

Certified reference materials—General guide to material selection, preparation, testing and certification

This Australian Standard was prepared by Committee CH/23, General Methods of Chemical Analysis. It was approved on behalf of the Council of Standards Australia on 3 December 1990 and published on 28 March 1991.

The following interests are represented on Committee CH/23:

Australian Government Analytical Laboratories

Australian Mineral Development Laboratories

Confederation of Australian Industry

National Association of Testing Authorities, Australia

National Health and Medical Research Council

Railways of Australia Committee

Royal Australian Chemical Institute

University of Sydney

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

This Standard was issued in draft form for comment as DR 88024.

Australian Standard®

Certified reference materials—General guide to material selection, preparation, testing and certification

First published as AS 3870—1991.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140
ISBN 0 7262 6702 3

PREFACE

This Standard was prepared by the Standards Australia Committee on General Methods of Chemical Analysis.

In recent years Standards Australia committees are becoming more aware of the need for the calibration of apparatus and validation of test methods to attain the accuracy demanded by modern day technology. There has been a greater call for reference materials as a simple and readily available means of determining the accuracy of a test method as well as assisting in the calibration of test equipment to meet this demand.

In the course of turning more towards the use of reference materials, Standards Australia is aware of the limited number of certified reference materials that are available. Many committees have been forced to initiate their own preparation of suitable materials to reliably fulfil the needs of calibration and validation. With the cooperation of various laboratories, Standards Australia has already coordinated the preparation, testing and certification of reference materials such as electrode carbon (ASCRM-003), iron ore (ASCRM-004 to ASCRM-007), zircon sand concentrate (ASCRM-008), coal (ASCRM-009) and coal ash (ASCRM-010), all of which have been certified for chemical composition, and float glass (ASCRM-002) which has been certified for abrasion resistance.

Drawing on the experiences of laboratories involved in these programs, this Standard has been prepared to assist any committee or organization wishing to become involved in the preparation of certified reference materials for the aforementioned purposes.

This Standard is applicable to materials which may be certified for either chemical or physical properties, or both, and may be used in assessing products or processes applicable to many industries, e.g. the assessment of water quality, foodstuffs, chemical reagents, building materials, packaging, industrial and medical gases, coating materials and biological products.

Considerable reference has been made to documentation of ISO, BSI, ASTM, NBS and CANMET in the preparation of this Standard.

CONTENTS

STANDARDS AUSTRALIA

Australian Standard

Certified reference materials—

General guide to material selection, preparation, testing and certification

1 SCOPE This Standard provides broad guidelines for the selection of a suitable source material, and its subsequent preparation, testing and certification as a reference material intended for use in the calibration of apparatus, the assessment of a method of analysis, or for assigning compositional values to related materials.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS	
1152	Test sieves
1216	Classification, hazard identification and information systems for dangerous goods
1216.1	Part 1: Classification and class labels for dangerous goods
2243	Safety in laboratories
2252	Biological safety cabinets
2252.2	Part 2: Laminar flow biological safety cabinets (Class II) for personnel and product protection
2508	Safe storage and handling information cards for hazardous materials
2582	Complete, filled transport packages — Methods of test
2646	Sampling of solid mineral fuels
2646.6	Part 6: Hard coal — Preparation of samples
2667	Chemical testing — Sampling — Glossary of terms
2719	Traceable reference gases — For analysis of emission gases of internal combustion engines and motor vehicles — Preparation, analysis and certification
2830	Good laboratory practice
2830.1	Part 1: Chemical analysis
2850	Chemical analysis — Interlaboratory test programs — For determining precision of analytical method(s) — Guide to the planning and conduct
3536	Reference gases — Preparation of gravimetric standards
3638	Test sieving procedures
ISO	
Guide 30	Terms and definitions used in connection with reference materials
Guide 35	Certification of reference materials — General and statistical principles
ASTM	
E 826	Testing homogeneity of materials for the development of reference materials
ADG Code	Australian code for the transport of dangerous goods by road and rail (published by the Australian Government Publishing Service)

3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 2667 and ISO Guide 30, and those below apply.

3.1 Accuracy — the closeness of agreement between an observed value or test result, and the true value or accepted reference value.

NOTE: The smaller the systematic part of the experimental errors which affect the results, the more accurate is the procedure.

3.2 Certification — the process of assessing, defining and authorizing by the issue of a certificate, values for selected characteristics or properties of a material of defined form, by various well-established reproducible procedures.

3.3 Certifiable characteristics — those characteristics which remain stable under specified conditions for a defined period and which can be established by prescribed procedures.

3.4 Certified reference material (CRM) — a reference material of which one or more property values have been certified by validated procedures, and which is accompanied by, or traceable to, a certificate or other documentation issued by the certifying body and attesting to its property value(s).