



Specific Accreditation Criteria

ISO/IEC 17025 Application Document Materials - Annex

Characterisation of Materials by X-Ray Fluorescence, Laser Induced Breakdown and Atomic Emission Techniques

Issued: November 2024

Effective: March 2025

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Purpose

In addition to the *ISO/IEC 17025 Standard Application Document (SAD)*, this document provides interpretative criteria and recommendations for both applicant and accredited facilities conducting characterisation of materials by X-ray fluorescence (XRF) and atomic emission techniques (Arc/Spark Optical Emission spectroscopy (OES) and Laser Induced Breakdown Spectrometry (LIBS)) covered by their scope of accreditation.

Applicant and accredited facilities must comply with all relevant documents in the NATA Accreditation Criteria (NAC) package for Materials (refer to *NATA Procedures for Accreditation*).

The clause numbers in this document follow those of ISO/IEC 17025, but since not all clauses require interpretation, the numbering may not be consecutive.

General

The use of X-ray fluorescence (XRF) and atomic emission techniques (AES and LIBS) for characterising materials can be accredited either as a quantitative or qualitative (sorting or presence/absence) process, depending upon the equipment used. The nature of the corresponding accreditation criteria varies significantly between the testing technique and device capability.

Where non-portable laboratory-based instruments are used, the applicable criteria can be found in *Specific Accreditation Criteria ISO/IEC 17025 Application Document Materials - Annex Characterisation of Industrial Materials - General*.

Quantitative testing

Advances in analytical capability have significantly improved for laboratory-based and hand-held (portable) equipment.

Using current technology, it is possible to analyse for carbon and other light elements in materials using laboratory and hand-held equipment.

Due to the variation in type, age and capability of equipment in current use, accreditation of analyses by specific equipment will be considered on a case-by-case basis.

7 Process requirements

7.8 Reporting of results

7.8.3 Specific requirements for test reports

7.8.3.1 Results of elemental analysis for quantitative testing, where applicable, must be reported within the defined measurement uncertainty values.

7.8.6 Reporting statements of conformity

7.8.6.2 It may be possible to assign a compliance statement against a given material specification, where the method used is that nominated in the material specification.

Qualitative testing

Accreditation for qualitative testing is offered and usually involves the use of hand-held (portable) equipment in the field. It is indicated within scopes of accreditation by the term 'Comparative indication of elemental content'.

Qualitative testing is a screening method only and further analysis by a quantitative method may be required.

Methods using this equipment are unlikely to meet precision requirements for legislative or regulatory classification of waste materials. Nor are these techniques cited in the usual standard methods for waste classification (e.g. US EPA SW-846, AS 4439 parts 1, 2 and 3). Therefore, tests using this equipment cannot be used to classify a substrate or material as a hazardous chemical, nor can it be used for waste classification purposes.

Note 1: Setting a hand-held unit in a benchtop rig does not alter the fundamental 'portable' nature of the equipment.

6 Resource requirements

6.4 Equipment

6.4.5 Analyses using hand-held or portable equipment may be applicable to certain materials but may not be capable of covering the entire range of elements in the material. The capability and limits of detection may be obtained from the manufacturer's specifications.

6.5 Metrological traceability

6.5.2 This kind of instrumentation compares results of the material under test to a library of stored spectral features to generate reportable results. As this library is rarely traceable, side-by-side verification using a traceable reference material, preferably a Certified Reference Material, is required. Traceable Reference Materials held by the laboratory for this purpose are listed in the scope of accreditation.

7 Process requirements

7.5 Technical records

7.5.1 A record of the displayed composition, representing the original data upon which any conclusion is based, must be retained.

7.8 Reporting of results

7.8.3 Specific requirements for test reports

7.8.3.1 When using this technology, no positive conclusion can be drawn as to the identity of the material under test. Accordingly, the actual elemental determinations shall be reported.

The laboratory may include in the report the specification of the reference material used for comparison purposes, and if required, the material identified by the instrument from its database.

Reports shall not indicate compliance or noncompliance to any material specification.

A suitable disclaimer as to the capability of the instrument and indeterminate accuracy of the elemental analyses shall be included. Further, the reports shall contain a statement that the inclusion of the specification and the material determined by the instrument are included for information to enable the client to determine whether the item/s under test are acceptable.

For testing conducted in the field, a suitable disclaimer on the measurement depth as given by the manufacturer's specifications shall be included in reports.

References

This section lists publications referenced in this document. The year of publication is not included as it is expected that only current versions of the references shall be used.

NATA publications

NATA Accreditation Criteria (NAC) package for Materials

Further reading

AS 2563 Iron ores - Wavelength dispersive X-ray fluorescence spectrometers - Determination of precision

AS 2883 Analysis of metals - Procedures for the setting up, calibration and standardization of atomic emission spectrometers using arc/spark discharge

Amendment table

The table below provides a summary of changes made to the document with this issue.

Section or Clause	Amendment
Whole document	Extensive revision to change the document type from guidance to criteria and to incorporate technological developments. Clarification of current laboratory-based and portable XRF & AES instrumentation capabilities