



Specific Criteria for Accreditation **Mechanical Testing**

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Specific Criteria for Accreditation

Mechanical Testing

AS LAB C4

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1 Introduction

International Accreditation New Zealand (IANZ) Specific Criteria amplify or particularise IANZ's generic accreditation criteria for specific fields of technology. A list of all published Criteria is available from IANZ on request.

This document must be read in conjunction with current issues of ISO/IEC 17025 and the IANZ publication *Procedures and Conditions for Accreditation*, the latter document describing the organisation and operation of the IANZ Laboratory Accreditation Programme.

This criteria document provides information on classes of test, staff, accommodation, equipment and other aspects of good laboratory management practice which are considered to be minimum standards for mechanical testing laboratories being accredited against ISO/IEC 17025.

It is recognised that some areas of mechanical testing have very specific requirements in aspects such as staff, accommodation, environment, safety, equipment, etc. To provide clarification of our requirements in these areas, the following supplementary criteria have been written:

AS LAB C4.1 / AS IB C1.3 Non-Destructive Testing

AS LAB C4.3 Gas Cylinder Testing

AS LAB C4.5 Seconded Sampling

AS IB C1.4 Welding

Others may be published from time to time on an as required basis

2 Scope

This document sets out the specific requirements a mechanical testing laboratory has to meet, in addition to the general requirements of ISO/IEC 17025, if it is to be accredited by IANZ.

3 Classes of Test

IANZ accreditation does not constitute a blanket approval of all a laboratory's activities. Therefore, it is necessary to identify those activities for which accreditation is granted. The classes of test provide the framework within which the scope of accreditation is expressed.

These classes and subclasses do not constitute any restriction on the work which a laboratory can perform but provide a convenient means of expressing a laboratory's recognised capability.

Classes of test appropriate to mechanical testing laboratories are listed in Appendix 1. These classes are an arbitrary subdivision of the potential range of activities involved in mechanical testing laboratories on the basis of the types of samples being tested, the scientific disciplines involved, and the test methods employed.

4 Laboratory Accommodation and Safety Requirements

As discussed below, some mechanical tests have specific accommodation and safety requirements. For further explanation on some of these please also refer to the supplementary criteria as listed in Section 1.

4.1 Accommodation

Accommodation requirements for laboratories working in the mechanical field vary widely depending upon the nature of the items to be tested and the uncertainty with which measurements are to be made. A formal laboratory area will be required for precise measurements but many measurements and tests can be satisfactorily performed in production areas or in the field.

Irrespective of where tests and measurements are performed there must be adequate space and storage facilities for carrying out the tests, recording of test data, report preparation, etc.

Formal laboratory areas must have good lighting, adequate bench space, freedom from excessive dust and fumes, freedom from unwanted vibration and acoustic noise and for some tests, control of temperature and humidity. The extent to which these environmental factors apply will vary according to the type and precision of the measurements.

When highly precise measurements are to be made the following factors may assume greater importance:

- (a) Isolation from sources of mechanical vibration and shock likely to have a detrimental effect on sensitive instruments (e.g. high accuracy balances)
- (b) Adequate ventilation when fumes are created by the tests such as in bitumen testing
- (c) Temperature and humidity control of the laboratory as specified in the relevant test procedure (e.g. paper testing)
- (d) Protection from excessive levels of dirt and dust (e.g. civil materials, some types of NDT, etc.)
- (e) Suitable equipment and areas for the preparation of test specimens such as in tensile testing and metallography
- (f) Isolation from stray electric and magnetic fields, particularly for thermocouples, strain gauges and other sensitive low output devices
- (g) Electromagnetic interference between items of test equipment and computers.

4.2 Safety

Safety has taken on an ever increasing emphasis of recent times and the safety of people within the testing environment must be of paramount concern to laboratory management.

Some types of tests have very specific safety requirements which must be met, e.g. radiography, and these may be subject to regulatory requirements.

Other tests will have less specific but otherwise significant safety concerns, e.g. compression tests on concrete. It is expected that accredited laboratories will have considered, and provided appropriate safety procedures to cover items such as:

- (a) Noise - from equipment such as mechanical sieve shakers and compaction hammers
- (b) Ventilation - adequate air flows in controlled environments - protection from corrosive or toxic fumes
- (c) Personal Protection - safety clothing, etc.
- (d) Physical Protection - safety screens on equipment such as compression testers.

The Health and Safety at Work Act (2015) places specific legal obligations on all employers, including laboratories. Safety is outside the scope of accreditation and will not be audited during an on-site laboratory accreditation assessment. However if, in the opinion of the assessment team, a safety issue is observed during an assessment it will be reported to the laboratory. The reporting of a safety issue will **not** indicate that a comprehensive safety audit has been carried out. Safety auditing is a specialist activity and the responsibility for ensuring compliance with the Health and Safety at Work Act rests entirely with laboratory management.

5 Traceability of Measurement

Traceability requires that there is a chain of equipment whose calibrations, to known levels of uncertainty, are traceable from one item to the next and eventually to a national standard of measurement. The concept of traceability also includes the competence of all the people involved, the fitness of each measurement environment, the suitability of the methods used and all other aspects of the quality management systems involved at each step in the chain of measurements

The IANZ policy on Traceability of Measurement is published in the IANZ publication *Technical Policy No. 1: Traceability of Measurement* (AS TP1). All IANZ accredited Mechanical Testing laboratories are required to maintain conformity with this policy.

Traceability must be established for all critical* measurement and calibration equipment either:

- a) Directly to the national metrology institute (Measurement Standards Laboratory, Callaghan Innovation) or another such national body (e.g. National Measurement Institute - Australia, etc.) acceptable to the Measurement Standards Laboratory, or
- b) From a third party accredited calibration laboratory which is accredited by an organisation with which IANZ has a mutual recognition arrangement.

*Critical measurements/calibrations are those which will significantly affect the accuracy or proper performance of tests.

The calibration certificates issued by accredited calibration laboratories must be endorsed in accordance with the requirements of the accreditation bodies concerned. This constitutes proof of traceability to national standards.

6 Laboratory Equipment Management and Calibration

Laboratory equipment, and its suitability, ranks on a level equal to the competence of the staff using it. An accredited laboratory will be expected to possess and maintain, under a documented management system, all equipment necessary to carry out the tests requested for inclusion in the scope of accreditation.

Guidelines on calibration requirements and recalibration intervals for specific items of equipment are detailed in Appendix 3. The guidelines set out **maximum** periods of use before equipment must be recalibrated. These periods have been established by accepted industry practice and, in most instances, are the maximum permitted recalibration intervals as laid down by international convention. Where a test method or operating environment requires a more stringent recalibration period than given here, more frequent calibration will apply.

IANZ may require **reduced** or accept **extended** calibration intervals based on factors such as history of stability, frequency of use, accuracy required and ability of staff to perform regular checks.

It is the responsibility of the laboratory to provide clear evidence that its calibration system, and any changes to an existing system, will ensure that confidence in the equipment can be maintained.

Force, impact and hardness testing machines generally require full recalibration if they are moved. Balances which are being used to their full readability (i.e. to the last place showing) will also require full recalibration by an appropriate calibration authority (i.e. external calibration). Balances being used for less than this accuracy limit may be revalidated using appropriate quality control methods (i.e. single point & repeatability checks with standard check masses).

Records of calibrations carried out in-house must confirm traceability of measurement (see section 5). This is normally achieved by the record specifically identifying the reference item used (this is the preferred method). Alternatively the documented calibration procedure may dictate the specific reference item to be used. The latter method does not allow any flexibility and the system will need to ensure that the procedure is updated when the reference item is changed.

A laboratory which uses a computerised testing system must satisfy the following criteria:

- (a) The system must be satisfactorily calibrated. The optimum calibration procedure for physical testing systems will depend upon the accessibility of individual components of the system, especially their input or output signals.

If a testing instrument cannot be isolated from the data processing system, the system as a whole must be calibrated either statically or dynamically. Calibrating the complete system is the preferred alternative.

If the testing instrument can be isolated from the data processing system, the opportunity is available to calibrate or verify each component of the system separately. The testing instrument can be calibrated (again, statically, or dynamically) in the conventional manner and a separate verification of the data processing system, including any interfacing systems, can be undertaken.

- (b) The computer program must be comprehensive in its coverage of the testing process and must have been checked at points covering the whole range of likely inputs and outputs.
- (c) The program must allow the operator to detect errors in data input and to monitor the progress of the test.
- (d) The system must be capable of being checked for error-free operation with respect to data capture, data processing, and freedom from sources of external interference. Where appropriate, manually checked data sets (or artefacts) must be available for regular system checks.

Other specific equipment requirements are given in the supplementary criteria listed in Section 1.

6.1 Measurement Uncertainty in Calibration

ISO/IEC 17025 requires testing laboratories which perform their own calibrations to have and apply a procedure to estimate the measurement uncertainty in all calibrations. The full rigour of this requirement will be expected to be applied where the equipment item being calibrated has performance (accuracy and precision) requirements that are critical to the accuracy or proper performance of the test and which are approaching the performance specification of the equipment item. Examples would include the calibration of high precision balances, thermometers requiring a high level of (relative) accuracy and the like.

Mechanical testing laboratories are recommended to have these items calibrated by an accredited external agency (see Section 5 above). If mechanical testing laboratories wish to calibrate these items themselves, a full measurement uncertainty budget is mandatory. The IANZ *Specific Criteria for Accreditation in Metrology and Calibration* (AS LAB C5) should be consulted for further information.

Measurement uncertainty estimations for periodic checks conducted in-house on calibrated equipment (i.e. conducted between full calibrations) are not required.

7 Laboratory Staff and Key Personnel

Competent and committed staff should be considered as a valued asset to any organisation. Procedures which select, train, retain, and develop appropriate staff need to be in place.

An accredited laboratory must have at least one staff member who is competent in the testing being undertaken.

The qualification and appointment of Key Technical Personnel is an internal process in the laboratory under the responsibility of the laboratory management.

The expected roles and qualifications of a Key Technical Person are given in Appendix 2.

The following requirements in regard to Key Technical Personnel are reviewed as part of the assessment process:

- (a) Appointment of Key Technical Personnel will be the responsibility of a designated senior laboratory officer who is a member of the laboratory's senior management team. Laboratories are required to have a documented person/position specification for Key Technical Persons and a documented and formal process for their qualification and appointment
- (b) The laboratory will maintain a list of current Key Technical Personnel, including the technical scope of their areas of responsibility. This list may be included in the laboratory's quality manual or as a separate document but must be maintained up-to-date at all times. The technical scope for each individual will be described in a manner to suit the laboratory's circumstance and organisational structure but there must be at least one Key Technical Person appointed for each test or group of tests in the laboratory's scope of accreditation. The laboratory may choose to use the Classes of Test detailed in Appendix 1 with additional qualifiers as appropriate, but this is not mandatory.
- (c) The list of Key Technical Personnel and their individual scope of responsibility must be notified to IANZ who will maintain this listing for each accreditation. IANZ will request this information in the Application for Accreditation or assessment documentation provided prior to Technical Assessments and Routine Reassessments. The list will also be reviewed with laboratories during their annual surveillance assessment.
- (d) Changes to Key Technical Personnel listings (including individuals who have left the laboratory, new Key Technical Person appointments, or changes in the technical scope of responsibility) made between annual on-site assessments must also be notified to IANZ. This is the responsibility of the laboratory's Authorised Representative.
- (e) In addition to the laboratory's usual training records, each Key Technical Person is required to have a brief CV-type summary of qualifications and experience. This CV information will be requested by IANZ for each appointed Key Technical Person in the Application for Accreditation/Technical/Reassessment documentation described above. This information is also expected to be provided to IANZ when new Key Technical Personnel are appointed and notified to IANZ outside of annual assessments.

- (f) Where a laboratory loses the sole Key Technical Person for all or part of their scope of accreditation and no new appointment is made by the laboratory management, then the laboratory's accreditation (or part thereof) will be suspended until such time as a new appointment is notified to IANZ. Where new Key Technical Personnel appointments are made outside of routine reassessments, and particularly when a new appointment is the sole Key Technical Person for all or part of the accreditation, IANZ reserves the right to conduct an on-site assessment of the laboratory to be assured the laboratory's systems and integrity of the laboratory's tests results will continue to be maintained.
- (g) All IANZ-endorsed test reports issued by an accredited laboratory must be signed or authorised by a Key Technical Person nominated by the laboratory. See Section 10.2.1.

The appointment of Key Technical Personnel effectively means the responsibility for qualification of key individuals within a laboratory lies with the laboratory management. IANZ Assessment Teams will no longer automatically interview all appointed Key Technical Personnel but the Key Technical Personnel will still generally be expected to be the escorts for IANZ assessment teams during the course of an on-site assessment, with any of the appointed individuals being selected for the particular part of the scope of accreditation being assessed. The team may also choose to interview other levels of technical staff. In the case where a particular Key Technical Person is not able to demonstrate to the assessment team that the laboratory is continuing to maintain the requirements for accreditation, it is not the individual who is considered to have "passed" or "failed" but rather the laboratory as a whole on the grounds of inadequate, continuous technical supervision and it may be that the affected part of the scope of accreditation is suspended.

8 Test Methods

Accreditation is normally granted only for internationally or nationally accepted standard test procedures or non-standard procedures (in-house methods) that have been appropriately validated, and which are performed regularly. The extent of a laboratory's scope of accreditation will therefore vary with the range of work performed, the scope and complexity of the tests involved, the competence and organisation of laboratory staff and the level of technology available in the laboratory.

8.1 Standard Methods

Where standard methods are prescribed and followed, the laboratory is expected to maintain current versions of the standard methods (reference texts) and up-date laboratory procedures in accordance with these.

Although full validation is not required, a laboratory must verify that it can properly operate the method and can demonstrate the specified limits of detection, selectivity, repeatability and reproducibility can be obtained.

8.2 In-house methods

In-house methods could include but need not be restricted to:

- (a) Methods developed in the laboratory
- (b) Methods developed by a client
- (c) Methods developed for an industry group
- (d) Functional tests
- (e) Modified standard test methods.

Validation of test methods shall involve, as appropriate, the use of certified reference materials, participation in inter-laboratory comparison/proficiency test programmes, comparison with standard test procedures, determination of method precision, etc.

Standard test methods should be used whenever possible in order to ensure comparability of test results between laboratories. Laboratories are discouraged from seeking accreditation for test methods that depart from recognised published standards. If however, approval of an in-house test method is required the following information must be provided:

- (a) A copy of the fully documented test method.
- (b) Details of the origin of the in-house test method.
- (c) Details of the reason for its development.
- (d) The results of comparative tests with standard methods (if possible).
- (e) Full details of test method validation including estimation of the measurement uncertainty.

8.3 Compliance with methods

Once a laboratory is accredited for a specific test method the detailed procedures of that method must be adhered to at all times. Occasionally it may be necessary to deviate from the documented test method. Any departures must be reported with the test results, and may invalidate accreditation status for that particular test.

In some instances, specific test methods published as national standards outside of New Zealand (e.g. ASTM) may call up normative references (e.g. quality assurance and accreditation standards) that are intended for the respective domestic market. Conformity with such normative references would not be considered mandatory by IANZ as long as IANZ accreditation requirements continue to be met.

9 Measurement uncertainty, Method Precision and Limits of Detection

It is important for testing laboratories to understand the concept of measurement uncertainty. Laboratory management should be aware of the effect that their own measurement uncertainty will have on test results produced in their laboratory.

For mechanical testing laboratories there are two specific areas where the estimation of uncertainty may be required to be reported:

- (a) When the client requests this information
- (b) When test results are used to determine if the sample conforms to a required numerical specification.

A great number of mechanical tests have quite large measurement uncertainties and laboratories should be aware of the magnitude of these. Some test methods, notably ASTM's, have included the repeatability and reproducibility at the end of the method. Accredited laboratories should be able to demonstrate, through an inter-laboratory trial or similar, that the uncertainty of the test results produced by them will be of similar precision.

Typical civil materials tests with high uncertainty include tests such as the Vial test, viscosity tests, skid resistance, bitumen penetration, liquid limit, etc. Similarly, hardness testing generally has an associated high uncertainty. It is obvious also that tests involving operator judgement will be included, e.g. some NDT testing, ALD/AGD and Broken Faces in civil materials, and visual tests such as assessment of internal corrosion in gas cylinders.

It is strongly recommended that laboratories participate in as many inter-operator and inter-laboratory trials as possible. These are excellent means for establishing an awareness of uncertainty. Involvement in such programmes will not only raise technical knowledge with regard to testing, but will aid in the appropriate selection and application of tests. See also sections 11 and 12 below.

Estimation of the measurement uncertainty is not required where test results are qualitative (i.e. non-numeric such as pass/fail or fracture/no fracture). However, an understanding of the causes of variability in such cases (that may cause a false positive or false negative) would be expected.

Some mechanical test methods can be classified as "well recognized test method(s) with specified limits to major sources of measurement uncertainty and specified form of presentation of calculated results". Under ISO/IEC 17025 such tests can be considered to have satisfied the clause if the method is followed and results are reported as required by the test procedure. As above, an understanding of the sources of variability of results will still be beneficial in understanding any anomalies during testing and guide efforts to improve test procedures.

Where test methods do not fall into the above categories, including in-house and modified methods, laboratories will need to have a programme prepared for the estimation of measurement uncertainty. In cases where laboratories request extensions to their scope or apply for accreditation, estimates of

measurement uncertainty will be required. This may include calibration of equipment, in-house methods or any other method. Guidance can be found in references 4 and 5.

10 Test Records and Reports

10.1 Test Records

An adequate records system is essential. It must contain sufficient information on each test to permit another operator to repeat the test and, within the variation of the method, produce a comparable result.

Any variation from a standard test procedure must be noted and reported in test documents.

Sample identification, the client's instructions, the test procedure, all test data and the test results must be recorded. All records must be traceable to the article under test.

Most laboratories have developed forms (pro forma sheets) for all of their routine testing. These are generally the preferred option as laboratories are able to control the type of information being recorded, maintain consistency of records, and increase recording efficiency. Test records may also be contained in personal or test specific workbooks. This type of records system is generally less efficient, and requires a greater level of management to ensure that records are not lost. For these reasons this system is now usually found only in research organisations where a high level of non-routine testing is carried out.

10.2 Test Reports

Test reports must give the client all relevant information. Every effort should be made to ensure that the test report is unambiguous. All information in a test report must be supported by the records pertaining to the test. All information required to be reported by the test specification must be included in the report.

It is important to note that in many instances the test standards, regulatory requirements and industry accepted practice will determine the report format and content.

Laboratories must retain an exact copy of all reports issued. These copies must be retained securely and be readily available for the time specified in the laboratory's documented policies.

10.2.1 IANZ-Endorsed Test Reports

Accredited laboratories are permitted to include reference to their accreditation in the test reports they issue. The general rules governing the use of IANZ endorsements are detailed in Appendix 1 of the IANZ publication *Procedures and Conditions for Accreditation* (AS 1).

For mechanical testing laboratories, all test reports carrying the IANZ endorsement must be formally authorised by at least one of the laboratory's Key Technical Personnel (see Section 7 and Appendix 2). This would normally be by a signature on the report itself (see also Section 10.2.2 below).

It is recognised that many laboratories are multi-disciplinary in nature and, in some cases, very specialised within disciplines. Test reports pertaining to a particular sample or set of samples may include test results from several specialist areas and/or disciplines.

While the technical scope of nominated Key Technical Personnel is expected to match their expertise in various specialist areas and/or disciplines, it is not practical to expect a number of Key Technical Personnel to sign a test report to cover each of the results that may be reported therein. In these instances it is acceptable that a multi-disciplinary test report is signed by only one of the laboratory's Key Technical Personnel under the following conditions:

- (a) The individual authorising the test report is responsible for ensuring all results which are outside their technical scope as a Key Technical Person (and that are included in the test report) have been authorised or released internally by a Key Technical Person (or delegated staff) with these tests in their technical scope
- (b) There is a clear audit trail within the laboratory's system to demonstrate this.

10.2.1.1 Opinions and Interpretations

ISO/IEC 17025 allows for test reports to include statements of opinion and interpretation related to the test results. In mechanical testing, it is the policy of IANZ that accreditation is not granted to laboratories for providing statements of opinion and interpretation of test results.

Except where an interpretation is clearly factual e.g. a statement of compliance or otherwise with a specification, opinions and interpretations cannot be implied as being within the scope of the laboratory's accreditation on an IANZ-endorsed test report. Where compliance statements are made, the laboratory shall document the decision rule applied.

This does not preclude accredited laboratories from making such statements as an added value service to their clients. However, they should either be given in a (non-IANZ endorsed) separate document to the test report or, if included directly in IANZ-endorsed reports, a clear disclaimer made that the statements made are outside the laboratory's scope of accreditation.

10.2.2 Electronic Reporting

While it is difficult to specify in detail a set of requirements to address every eventuality (as laboratories will tend to develop electronic reporting systems to suit their own circumstances and those of their clients), the following is intended to provide guidance on common issues of concern.

10.2.2.1 Transmission of Reports

It is the responsibility of the issuing laboratory to ensure that what is transmitted electronically is what is received by the client.

Email systems have proven to be robust in this regard, but laboratories need to consider whether clients will have the appropriate software and version to open attachments without corruption.

Laboratories should verify (at least initially and periodically thereafter is recommended) the integrity of the electronic link e.g. by asking the client to supply a copy of what was received and comparing it with what was transmitted. It is also important the laboratory and its client agree as to which part of the electronic transfer system they are responsible for and the laboratory must be able to demonstrate data integrity at the point the data comes under the control of the client.

10.2.2.2 Security

Laboratories should avoid sending test reports in an electronic format that can be readily amended by the recipient. Examples would be in word processing or spreadsheet software. Where possible, reports should be in a read only format e.g. pdf files.

Where this is not possible e.g. the client may wish to transfer the reported results file into a larger database, then laboratories are recommended to indicate these electronic reports have an interim status and are followed-up by a hard copy (or more secure) final report.

Laboratories must retain an exact copy of what was sent. This may be a hard copy (recommended) or an electronic copy. These copies must be retained securely and be readily available for the time specified in the laboratory's documented policies.

10.2.2.3 Electronic Signatures/Authorisations

All reports (whether hard copy or electronic) must not be released to the client until authorised by individuals with the authority to do so. For electronic reports there must be a clear audit trail with a positive authorisation record to demonstrate this is the case. Where this is managed through password access levels in the laboratory's electronic system, appropriate procedures should be in place to prevent abuse of password access.

The electronic report should show the identity of the individual releasing the report (a Key Technical Person in the case of IANZ-endorsed reports). This may involve an electronic signature. The security of these signatures should be such as to prevent inadvertent use or abuse.

10.2.2.4 Electronic Report Formats

ISO/IEC 17025 allows for simplified report formats for internal clients or in the case of written agreement from the client. This is often the case for electronic reports. While the laboratory may be accredited for the testing, it is usual such reports would not normally carry the formal IANZ-endorsement.

IANZ-endorsed reports, whether electronic or not, would normally be expected to comply with the requirements of ISO/IEC 17025 as appropriate.

11 Quality Control

It is important for laboratories to understand where tests can go wrong so that steps can be taken to either eliminate the potential error point, or put in a means for alerting the technicians when the test has gone wrong.

Quality control in some form is possible over any test being performed. There is a disciplined approach required for the development of a suitable quality control plan and this approach can be applied on a test by test basis.

It is expected that accredited mechanical testing laboratories will have developed, documented, and implemented an appropriate quality control programme.

Where tests are performed infrequently, the laboratory should carry out regular performance checks to demonstrate its continuing competence to perform them or have in place a system for demonstrating proficiency prior to performing the test on a client sample.

12 Proficiency Testing

The IANZ policy on participation in proficiency testing activities is set out in the IANZ publication *Technical Policy No.2: Participation in Proficiency Testing Activities* (AS TP2). All IANZ accredited Mechanical Testing laboratories are required to maintain conformity with this policy.

The results from proficiency testing activities and their analysis will be viewed by IANZ at each assessment.

13 References

1. *Procedures and Conditions for Accreditation* (AS 1)
2. *ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories*
3. *Health and Safety at Work Act* (2015)
4. *The expression of Uncertainty and Confidence in Measurement for Calibration, UKAS M3003, Edition 2, Jan 2007.*
5. *JCGM 100:2008 (GUM 1995 with minor corrections) – Evaluation of measurement data – Guide to the expression of uncertainty in measurement*
6. *IANZ Technical Policy No. 1: Traceability of Measurement*
7. *IANZ Technical Policy No. 2: Participation in Proficiency Testing Activities*

Appendix 1: Classes of Test – Mechanical Testing

4.01	Aggregates	Test 6.3.2
	(a) NZS 3111	(vi) Part 7: Soil Consolidation Tests
	(b) NZS 4407, Part 2	Test 7.1
	(c) NZS 4407, Part 3	(b) AS Methods
	(d) AS & AS/NZS Methods	(c) ASTM Methods
	(e) ASTM Methods	(d) BS/BSEN/EN Methods
	(f) BS/BSEN/EN Methods	(e) Other Methods
	(g) Other Methods	(f) In-House Methods
	(h) In-House Methods	4.10 Geomechanical Field Tests
4.02	Bituminous Materials	(a) NZS 4402
	(a) Sampling	(i) Part 5: Soil Density Tests
	(b) Bituminous Mixtures	Test 5.1.1
	(c) Bitumens	Test 5.1.2
	(d) Emulsions	Test 5.1.3
	(e) Filters	(ii) Part 6: Soil Strength Tests
	(f) Other Methods	Test 6.1.3
4.03	Cements and Pozzolanic Materials	Test 6.5.1
	(a) NZS 3122	Test 6.5.2
	(b) AS 2350	Test 6.5.3
	(c) ASTM Methods	(b) NZS 4407: Part 4
	(d) Other Methods	Test 4.1.1
	(e) In-House Methods	Test 4.2.1
4.04	Concrete	Test 4.2.2
	(a) NZS 3112, Part 1	(c) AS Methods
	(b) NZS 3112, Part 2	(d) ASTM Methods
	(c) NZS 3112, Part 3	(e) BS/BSEN/EN Methods
	(d) NZS 3112, Part 4	(f) Other Methods
	(e) AS & AS/NZS Methods	(g) In-House Methods
	(f) ASTM Methods	4.12 Stone Masonry Tests
	(g) BS/BSEN/EN Methods	4.15 Sampling & Fresh Concrete tests by
	(h) Other Methods	seconded personnel
	(i) In-House Method	(a) Sampling
4.08	Soils	(i) Aggregates
	(a) NZS 4402	(ii) Bituminous materials
	(i) Part 2: Soil Classification Tests	(iii) Fresh concrete
	(ii) Part 3: Soil Chemical Tests	(b) Field tests on fresh concrete
	(iii) Part 4: Soil Compaction Tests	4.20 Pavement Testing
	(iv) Part 5: Soil Density Tests	(a) TNZ Methods
	Test 5.1.4	(i) T/1 Pavement deflection by
	Test 5.1.5	Benkelman Beam
	(v) Part 6: Soil Strength Tests	(ii) T/3 Pavement texture by sand
	Test 6.1.1	circle
	Test 6.1.2	(b) NZS Methods
	Test 6.2.1	4.21 Traffic Count and Classification
	Test 6.3.1	4.25 Cement Products
		(a) AS/NZS 4456

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| <p>4.26 Fibre Rope and Cordage</p> <ul style="list-style-type: none"> (a) Tension tests (b) Other tests <p>4.30 Safety Equipment</p> <ul style="list-style-type: none"> (a) Seat belts (b) Safety helmets (c) Eye protectors (d) Hearing protectors (e) Safety footwear (f) Other safety products <p>4.31 Motor Vehicle Safety Tests</p> <ul style="list-style-type: none"> (a) Door latches and hangers (b) Seat anchorages (c) Seat belt anchorages (d) Hydraulic brake hoses (e) Steering columns (f) Sun visors (g) Rear view mirrors (h) Windscreen wipers and washers (i) Fuel systems for goods vehicles (j) Safety rims (k) Instrument panels (l) Head restraints (m) Tyres (n) Door strength (o) Hydraulic braking systems (p) Motor cycle and moped braking systems (q) Child restraint anchorages (r) Commercial vehicle braking systems (s) Other tests (t) Highway Safety Products <p>4.33 Lifting Gear, Chain, Wire Rope and Fittings</p> <ul style="list-style-type: none"> (a) Proof tests (b) Tension tests (c) Other tests <p>4.36 Industrial Fasteners</p> <ul style="list-style-type: none"> (a) Tension tests (b) Proof tests (c) Tension-torque tests (d) Stripping tests (e) Torsion tests (f) Drive tests (g) Other tests | <p>4.37 Hand Tools</p> <ul style="list-style-type: none"> (a) Open end and adjustable wrenches (b) Torque wrenches (c) Hand hammers (d) Screwdrivers (e) Pliers, pincers and nippers (f) Woodworking saws (g) Axes and hatchets (h) Chisels (i) Other hand tools <p>4.39 Weighing Devices</p> <p>4.40 Window and Door Hardware</p> <ul style="list-style-type: none"> (a) ASTM Methods <ul style="list-style-type: none"> (i) list tests (b) Other Methods <p>4.41 Windows, Doors and Building Envelopes</p> <ul style="list-style-type: none"> (a) Windows and Doors <ul style="list-style-type: none"> (i) list tests (b) Facades and Curtain Walls <ul style="list-style-type: none"> (i) list tests (c) Building Envelopes (On-site) <ul style="list-style-type: none"> (i) list tests (d) Other Methods <ul style="list-style-type: none"> (i) list methods <p>4.42 Assemblies and Structures</p> <ul style="list-style-type: none"> (a) Windows and doors (b) Wall, floor, and ceiling panels (c) Trusses (d) Cranes (e) Insulator and conductor fittings (f) Transmission towers (g) Aircraft structures (h) Slide fasteners (i) Ladders (j) Other assemblies (k) Special Tests <p>4.43 Toys and Games</p> <p>4.44 Sporting and Recreational Equipment</p> <p>4.45 Commercial Items</p> <p>4.46 Packaging and Containers</p> |
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| <p>4.47 Building Boards and Plywood</p> <ul style="list-style-type: none"> (a) Particle board (b) Hardwood (c) Plywood (d) Fibreboard (e) Other building boards <p>4.48 Paper and Paperboard</p> <ul style="list-style-type: none"> (a) Sampling (b) Tension tests (c) Tear tests (d) Burst tests (e) Compression tests (f) Other tests <p>4.49 Timber and Timber Products</p> <ul style="list-style-type: none"> (a) Bending tests (b) Stress grading timber tests (c) Other tests <p>4.54 Gas Cylinders</p> <ul style="list-style-type: none"> (a) Hydrostatic pressure tests (b) Internal and external examination (c) Pulsating pressure tests <p>4.55 Pipes, Hoses, Valves, and Fittings</p> <ul style="list-style-type: none"> (a) Hydraulic pressure tests (b) Head loss tests (c) Calibration of jets (d) Fire hose (e) Other tests <p>4.56 Pumps</p> <p>4.57 Compressors</p> <p>4.58 Fans and Blowers</p> <p>4.59 Engines and Vehicles</p> <p>4.61 Glass</p> <ul style="list-style-type: none"> (a) Glass (b) Glass products (c) Glass fibre <p>4.62 Textiles</p> <ul style="list-style-type: none"> (a) Tension tests (b) Tear tests (c) Burst tests (d) Flammability tests (e) Wear tests (f) Other tests <p>4.64 Leather and Leather Products</p> | <p>4.65 Rubber and Rubber Products</p> <ul style="list-style-type: none"> (a) Tension tests (b) Tear tests (c) Tension set tests (d) Compression set tests (e) Hardness tests (f) Flexure tests (g) Low temperature brittleness (h) Accelerated aging tests (i) Flammability tests (j) Swelling in liquids (k) Density and specific gravity (l) Belting (m) Elastomeric bearings (n) Other products <p>4.66 Composite Materials</p> <ul style="list-style-type: none"> (a) Tensile tests (b) Compression tests (c) Flexure and stiffness (d) Shear strength (e) Density and specific gravity (f) Constituent tests (g) Impact tests (h) Other tests <p>4.68 Plumbing and Fittings</p> <p>4.69 Plastics and Plastic Products</p> <ul style="list-style-type: none"> (a) Tensile tests (b) Tear tests (c) Burst tests (d) Impact tests (e) Hardness tests (f) Low temperature tests (g) Flammability tests (h) Density and specific gravity (i) Flow properties (j) Heat distortion tests (k) Other tests <p>4.71 Coatings</p> <ul style="list-style-type: none"> (a) AS & AS/NZS Methods (b) ASTM Methods <p>4.72 Corrosion Tests</p> <ul style="list-style-type: none"> (a) ASTM Methods <p>4.73 Adhesives and Sealants</p> <p>4.75 Welder Qualification Tests</p> |
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4.76 Metals and Metal Products

- (a) Tension tests
- (b) Compression tests
- (c) Bend tests
- (d) Deflection tests
- (e) Hardness tests
- (f) Impact tests
- (g) Weld tests
- (h) Other tests

4.79 Metallographic Tests on Metals

- (a) Grain size
- (b) Case depth and depth of decarburisation
- (c) Depth of surface defects
- (d) Non-metallic inclusion content
- (e) Macroscopic examination of steels
- (f) Graphite type and distribution in cast iron
- (g) Corrosion resistance of austenitic stainless steels
- (h) Tests on welds
- (i) Other tests

4.81 Non Destructive Tests by Radiography

- (a) Radiographic examination of metals
 - (i) Single wall or rolled product
 - thickness measurements ‡
 - corrosion pitting ‡
 - (ii) Welded Joints ‡
 - (iii) Castings ‡
 - (iv) Forgings ‡
 - (v) Other specified metallic products
 - aircraft components and assemblies
- (b) Radiographic examination of bonded metals
 - (i) Soldered and brazed joints
 - (ii) Hard faced components
- (c) Radiographic examination of metal inserts in non-metals
 - (i) Concrete
 - (ii) Reinforcing in conveyor belts, hoses, etc.
- (d) Radiographic examination of non-metals
 - (i) Rubber and plastics
 - (ii) Timber
 - Bonded non-metallic components
 - Other specified materials
- (e) Digital Radiography

4.82 Non Destructive Tests by Ultrasonics

- (a) Ultrasonic examination of metals
 - (i) Single wall or rolled product
 - thickness measurements ‡
 - corrosion pitting ‡
 - (ii) Welded Joints ‡
 - (iii) Castings ‡
 - (iv) Forgings ‡
 - (v) Extruded products ‡
 - (vi) Other specified metallic products
 - aircraft components and assemblies
 - machined components
 - (vii) Nozzle and node welds
- (b) Ultrasonic examination of bonded metals
 - (i) Soldered and brazed joints
 - (ii) Hard faced components
 - (iii) Machine bearings
 - (iv) Friction welded components
 - (v) Other specified components
- (c) Ultrasonic examination of components and assemblies
 - (i) Aircraft structures
 - (ii) Bonded assemblies
 - (iii) Components and assemblies
 - (iv) Thickness measurement
- (d) Ultrasonic examination of non-metals
 - (i) Rubber and plastics
 - (ii) Timber and plywood
 - (iii) Bonded non-metallic components
 - (iv) Ceramics and refractories
 - (v) Other specified non-metals
- (e) Manual Phased Array
 - (i) Single wall or rolled product
 - thickness measurements ‡
 - corrosion pitting ‡
 - (ii) Welded Joints ‡
 - (iii) Castings ‡
 - (iv) Forgings ‡
 - (v) Extruded products ‡
 - (vi) Other specified metallic products
 - aircraft components and assemblies
 - machined components

4.83 Non Destructive Test by Visual Inspection

- (a) Visual inspection of metals
 - (i) Flat or rolled products ‡
 - (ii) Welded joints ‡
 - (iii) Castings ‡
 - (iv) Forgings ‡
 - (v) Metallic coatings ‡

4.84 Non Destructive Test by Dye Penetrant Methods

- (a) Visible dye
 - (i) Water washable ‡
 - (ii) Solvent removable method ‡
 - (iii) Post emulsifiable method ‡
- (b) Fluorescent dye
 - (i) Water washable method ‡
 - (ii) Solvent removable method ‡
 - (iii) Post emulsifiable method ‡

4.85 Non Destructive Test by Magnetic Particle Methods

- (a) Magnetic flow method
 - (i) Welded joints ‡
 - (ii) Forgings ‡
 - (iii) Castings ‡
 - (iv) Machined parts ‡
- (b) Current flow method †
 - (i) Welded joints ‡
 - (ii) Forgings ‡
 - (iii) Castings ‡
 - (iv) Machined parts ‡
- (c) Coil method †
 - (i) Welded joints ‡
 - (ii) Forgings ‡
 - (iii) Castings ‡
 - (iv) Machined parts ‡

4.86 Non Destructive Tests by Eddy Current

- (a) Surface flaw detection ‡
- (b) Metallic coating thickness measurement ‡
- (c) Sorting of materials and components ‡
- (d) Sub-surface flaw detection ‡
- (e) Weld testing ‡

4.87 Non Destructive Tests by Specialised Techniques

- (a) Ultrasonic examination by Time of Flight Diffraction ‡
- (b) Acoustic emission testing ‡
- (c) Flaw detection in coatings by electrical continuity
- (d) Automatic Phased Array
- (e) IRIS (Internal Rotation Inspection System) - UT method
- (f) Alternating Current Field Measurement (ACFM)
- (g) Magnetic Flux Leakage

† Add power capability: Specify capability - amps, AC, DC

‡ Add Materials classification: Specify:

- Fe - Plain Carbon and Low Alloy Steels
- Al - Aluminium alloys
- Mg - Magnesium alloys
- Cu - Copper alloys
- Zn - Zinc alloys
- Ni - Nickel, Chromium or Cobalt alloys
- Ti - Titanium

Other specified products (including High Alloy and Stainless Steels)

Appendix 2: Supervisory Staff and Key Technical Personnel

Supervisory staff in accredited laboratories must be competent and experienced in the technical areas covered by their accreditation. They must be able to oversee the operations and cope with any problems that might arise in their work or that of their colleague or subordinates. Such staff members, formally appointed by the senior management of the laboratory, are referred to as Key Technical Personnel.

The following sets out IANZ's expectations in relation to who the laboratory management should be appointing as Key Technical Persons.

- (a) Key Technical Persons would be expected to have:
 - (i) A tertiary qualification or equivalent professional recognition in the relevant discipline. Laboratories engaged in a restricted range of repetitive work may be able to appoint Key Technical Personnel with appropriate practical experience and specific training in that work but without formal qualifications;
 - (ii) A position in the staff structure which provides for the authority to implement necessary changes in the laboratory operation to ensure the integrity of test results is maintained. The position in the staff structure should ensure the individual can maintain a working knowledge of the quality assurance and technical systems in operation in the laboratory on a day to day basis;
 - (iii) A working knowledge of and commitment to the requirements for IANZ accreditation, including the quality and technical management principles embodied in ISO/IEC 17025 and relevant Specific Criteria;
 - (iv) The necessary engineering/scientific expertise and experience to be aware of and understand any limitations of the test procedures and to fully understand the scientific basis of the procedures;
 - (v) Sufficient experience in the accredited laboratory to address all of the above points.
- (b) Key Technical Personnel are those individuals who are given both the responsibility and authority to:
 - (i) Develop and implement new operational procedures;
 - (ii) Design quality control programmes, set action criteria and take corrective action when these criteria are exceeded;
 - (iii) Identify and resolve problems;
 - (iv) Take responsibility for the validity of the outputs.
- (c) Laboratory management may choose to appoint an individual engaged by the accredited laboratory as a consultant where their Key Technical Person responsibilities relate to work done within the scope of accreditation. There is an expectation that there would be a written agreement between the parties setting out the extent of the authority and responsibility of the consultant in relation to the services provided. The consultant's position in the laboratory organisation should be such that they can perform their role as a technical decision maker as effectively as if they were an employee.
- (d) Staff members of an accredited laboratory who are not engaged full-time could also be appointed as Key Technical Persons. However, the circumstances in which they are called upon to exercise their Key Technical Person responsibilities and their access to and knowledge of the technical operations should be such that they are able to take full responsibility for the work they authorise or oversee.

Appendix 3: Equipment Calibration Intervals

The following table sets out the normal periods between successive calibrations for a number of reference standards and measuring instruments. It must be stressed that each period is generally considered to be the maximum appropriate in each case providing that the other criteria as specified below are met:

- (a) The equipment is of good quality and of proven adequate stability, and
- (b) The laboratory has both the equipment capability and staff expertise to perform adequate internal checks, and
- (c) If any suspicion or indication of overloading or mishandling arises, the equipment is checked immediately and thereafter at frequent intervals until it can be shown that stability has not been impaired.

Where the above criteria cannot be met, appropriately shorter intervals may be necessary.

It is possible to consider submissions for extension of calibration intervals based on factors such as history of stability, frequency of use, accuracy required and ability of staff to perform regular checks. It is the responsibility of the testing laboratory to provide evidence that its calibration system ensures that confidence in the equipment is maintained. Application of the requirements of ISO 10012, Parts 1 and 2 needs to be considered when seeking an extension of intervals.

Where calibrations have been performed as above, adequate records of these measurements must be maintained.

*NB: Checks or calibrations indicated * can be done internally by a laboratory providing they possess the necessary reference equipment, documented procedure and technical competence.*

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Accelerometers	One year	By an accredited calibration authority. Twelve month service recommended.
Anemometers	One year	
Balances and Scales	Three years	
	accompanied by:	
	*Each weighing	Zero check
	*One month	One point check using a known mass close to balance capacity (see CSIRO paper).

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
NB:	*Six monthly	Repeatability checks (see MSL Technical Guide 12 – Assuring the quality of weighing results). The standard deviation of the results can be compared against the results recorded in the last external calibration certificate.
Barometers	Five years for weighing appliances where the required accuracy is not better than 0.5% *Three months (single point)	By an accredited calibration authority. Check daily when in use at mid and extreme points of range using calibrated check masses. (Contact IANZ for further details). Telephone comparison with nearest Meteorological office.
<p>Computerised Systems</p> <p>Instruments with electronic readouts e.g. accelerometers, must be calibrated as a system, including the electronic readout. The period between calibrations will depend entirely upon the nature of the instrument and the use it is being put to. Computer programs used to manipulate data into test results must be validated, against manually calculated data, upon commissioning. The results of this validation must be retained on file, in the same manner as a calibration record, and may be used for on-going quality control checks. The programs will need revalidation if the program is reloaded, subjected to a voltage spike, or doubt of their integrity exists. In any event it is recommended that they be revalidated occasionally, e.g. annually.</p> <p>It is insufficient for the laboratory to assume that proprietary programs, or programs adopted from another laboratory, are inherently correct. The laboratory will need to run its own commissioning validations and subsequent quality control checks.</p>		
Dial Gauges	*Two years or less depending on use	BS 907/AS 2103
Dies and Cutters For preparation of test specimens		Frequent examination for damage. Full dimensional check whenever re-sharpened.
Extensometers		
Lever and mirror types	Five years	BS EN 10002-4/AS 1545 Grade D (for proof stress tests and load-extension curves for prestressing wires).
Micrometer screw types	Five years	
Dial indicator types	Two years	

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Recording types with electrical output.	Two years	AS 1545 Grade B (for modulus of elasticity determination).
Force Testing Machines		
Tension, Compression, & Universal	One year	AS 2193. Note: Some Standards specify the recalibration period (e.g. EN10002 specifies 13 months).
TYPE 1 – Mechanical Force Measuring System		
Dead weight	Five years	
Knife edge, lever and steelyard	Five years	
Pendulum dynamometer	Two years	
Elastic dynamometer (e.g. spring, ring with dial gauge)	Two years	
Note: Chain testing and similar machines in frequent use	One year	
TYPE 2 – Hydraulic or Pneumatic Force Measuring Systems		
Mechanical system incorporating a pneumatic or hydraulic link, e.g. proportional cylinder	Two years	
Bourdon Tube or diaphragm pressure gauge as force indicator	Six months	
Type (b) fitted also with a master gauge which can be disconnected during normal testing	One year (plus frequent checks by user of working gauge against master gauge).	
Bourdon tube or diaphragm gauge used only as a null detector for a mechanical system	Two years	
Bourdon tube with Measuring System	Two years	

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
TYPE 3 – Electrical Force Measuring Systems	Two years	Or more frequent as appropriate to usage.
Gauge Blocks		
Used as reference standards	Five years	
Used as working equipment	Two years	
Hardness Testers for Metals		BS EN 10003/AS 1816.2 (Brinell) BS EN ISO 6507/AS 1817.2 (Vickers) BS EN 10109/AS 1815.1 (Rockwell)
Brinell, Vickers and Rockwell machines	Daily check when in use One year partial Three years (complete)	
Portable Brinell microscopes	One year (with calibrated graticule)	
Diamond indenters	*One year (inspection)	
Hardness Testers for Rubber Plastics and Ebonite		ISO 48
Dead weight testers for rubber	Three years	
Dead weight testers for plastics	Three years	
Meters (durometers) for rubber	Frequent checks by user on reference hardness blocks	
Hydrometers	*Five years (one point)	BS 718
Hygrometers		
Assman hygrometers and sling type	*Six months Five years (complete)	Compare thermometers at ambient with wick dry.
Recorders accurate to $\pm 1\%$ RH	Two years	
Other recorders including hair types	Weekly (with Assman hygrometer)	ASTM E77
Digital instruments	One year	

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Impact Testing Machines (Pendulum type)		
Charpy, Izod and Universal testers for metals	Frequent inspection by user. One year (complete calibration)	AS 1544.4 and BS EN 10045-2 Include verification using standard test pieces appropriate to required operating range(s).
Charpy and Izod testers for plastics	Frequent inspection by user. One year (partial calibration) Five years (complete calibration)	AS 1146.3
Notching tools		Check regularly and whenever reground.
Length Measuring Devices		
Linearly Variable Differential Transformers	Daily or whenever used	Check against length standard such as a micrometer setting bar.
Micrometers (hand)		
For measurement of diameters smaller than 2.5mm and thickness less than 1.3mm	*Five years (complete)	ISO 3611. See IANZ Technical Guide AS TG 1 <i>Simple Linear Measurement Instruments</i> .
For measurement of diameters down to 2.5mm and thickness down to 1.3mm	*Five years (reference)	See IANZ Technical Guide AS TG 1 <i>Simple Linear Measurement Instruments</i> .
Rules	*Five years (reference)	See IANZ Technical Guide AS TG 1 <i>Simple Linear Measurement Instruments</i> for requirements for in-house use (non-reference).
Callipers – Vernier/Dial		
Reference	*Three years (reference)	
Working	*Annual	Against a reference length standard such as gauge bars.
Masses		
Reference masses of integral construction stainless steel or nickel-chromium alloy	Five years	NB: Separate criteria apply to check masses used to calibrate balances with accuracy not better than 0.5% . (Contact IANZ for details).

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Masses of screw knob or sealed plug construction, made of stainless steel, nichrome, plated brass or other non-corrodible highly finished material	Three years	
Masses of cast iron, carbon steel, or unplated brass	*One year (if calibrated to 1 in 10 ⁴) *Five years (if calibrated to 1 in 10 ³)	ASTM E617 See MSL Technical Guide 7. "Calibrating Standard Weights"
Nuclear Densometers	*Daily *Six monthly Two yearly	Standard count (comparison against rolling average). Drift and stability checks as per manufacturers instructions. Full calibration to manufacturers instructions.
Orifice Plates	Initial *Six months Ten years	PD ISO/TR 15377 Visual inspection for damage wear or contamination. For orifice plates being used in window testing, a full recalibration is required after ten years.
Ovens		
Drying	*Daily *Five years	For laboratories drying soils, a daily record of oven temperature is required. For laboratories drying aggregates, records showing temperature stability are required. NZS4402 and 4407 require that the oven shall not exceed 110°C at any point. This verification can only be achieved by carrying out a spatial temperature calibration. Both standards recommend an evaporation test only to confirm efficiency during oven selection.
Ageing	*Five years or less depending on permissible tolerances (temperature variations, recovery time, rate of ventilation)	Both drying and ageing ovens require full recalibration after major servicing.

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Pressure Gauge Testers		
Dead weight	Five years	
Manometers		
- liquid in glass	Five years	
- digital	One year	
Pressure and Vacuum Gauges		
Test gauges for calibration of working gauges	One year	BS EN 837AS 1349 See MSL Technical Guide 13. "Pressure Gauge Calibration"
Working gauges subject to shock loading	*Six months or less depending on use	NB: AS2337 requires more frequent calibration.
Working gauges not subject to shock loading	*One year	
Manometers		
Reference	Five years	
Working	*Three years	Check against reference. Check fluid every three years.
Digital	*One Year	
Proving Devices for calibration of force testing machines		
TYPE 1 – Elastic devices		
Dial gauge for deflection measurement	Two years	
Micrometer screw for deflection measurement (mechanical or optical indication)	Five years	
Electrical deflection measurement	Two years	
TYPE 2 – Proving levers	Two years	
TYPE 3 – Weights	Five years	
Sieves		
Reference	* Initial	Test sieves manufactured in accordance with ISO 3310 by Endecotts Ltd are acceptable without further calibration. Sieves from other manufacturers may be

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Working	*One year or less dependent on usage	acceptable if the manufacturers' certificates indicate traceability of calibration to an acceptable national standard of measurement. When in use all sieves should be monitored for wear either by the use of a stable standard sand sample which is periodically sieved, or by comparison with a reference set of sieves. As stated in AS 3310, it is usual for sieves with aperture sizes larger than 3.35mm to be checked using engineers' gauges.
Soil Testing Machines		
Force measurement	Two years	
Displacement measurement	As for appropriate instrument (e.g. dial gauge, micrometer, LVDT)	
Pressure measurement	As for pressure and vacuum gauges (hardness of rubber base)	
Squares		
Reference	Five years	Against a reference square.
Working	*Annual	
Stop Watches and Clocks		See MSL Technical Guide 8. "Calibration of Stop-watches"
Electric	*Twelve months	Comparison against radio time "pips", Telecom talking clock, or Teletext timer.
Mechanical	*Three months	
Straight Edges		
Reference	Five years	
Strain Rate Meters	*Six months (using stop watch)	
Tachometer Calibrators	Five years	
(Tuning devices)		
Tachometers	One year	BS 3403

Type of Equipment	Period between successive calibrations	Calibration procedures and equipment requirements
Thermometers		
Reference liquid-in-glass	Five years (complete) *Six months (check ice point immediately after initial calibration then at least every six months)	See MSL Technical Guide TG1 – “The Ice Point”
Working liquid-in-glass	Five years (complete) *Six months (check ice point immediately after initial calibration then at least every six months)	
or alternatively	Inter-compare with reference thermometer at points in the working range every six months	See IANZ Technical Guide AS TG 3 Working Thermometers – Calibration Procedures.
Electronic (sensors that are thermocouples, thermistors, or other integrated circuit devices)	One year (full calibration)	See MSL Technical Guide 17
Resistance	Five years (full calibration), or when ice point drift is more than five times the uncertainty of calibration. Check at ice point before use or at least every six months.	Working hand held resistance thermometers can be checked using the alternative procedure above for glass thermometers.
Thickness Gauges (for compressible materials)	Two years	Dial gauge, dimensions and pressure of foot.
Volumetric glassware		
Flasks, pipette, burettes and measuring cylinders used for reference purposes	*Five years	ISO 4787
Working flasks, pipettes burettes, measuring cylinders	*On commissioning	Cross check by weighing with distilled water. See MSL Technical Guide TG17 “Measuring Volume by Weighing Water “
Density bottles	*Two years	

Appendix 4: Associated and Subsidiary Laboratories

Branch Laboratories

If an accredited organisation has two or more sites each of which can accept new clients or new work without reference to any of the others, then each site is considered to be a separate organisation and separate applications for accreditation are required from each location together with the appropriate fees.

Temporary Laboratories

If an organisation is required to establish a subsidiary facility to service a particular project or location it is termed a temporary facility and the following procedures apply. Temporary laboratories are divided into three categories according to the length of time for which they are established. These categories are as follows:

- (a) If a temporary facility is established by an accredited organisation for less than two months this is regarded as a routine on-site project. Such projects are covered by the accredited organisation's accreditation and if the temporary facility complies with IANZ criteria for accreditation then reports issued by a Key Technical Person of the temporary facility may be IANZ endorsed.
- (b) If a temporary facility is established for a period between two months and twelve months it will be regarded as a field facility. When a field facility is established IANZ must be informed, an Accreditation Questionnaire must be completed, and the following additional information must be supplied:
 - (i) Field facility's location
 - (ii) Expected duration of the work or project
 - (iii) details of the work involved
 - (iv) Name and background details of the person in charge of the facility
 - (v) Staff complement at the facility
 - (vi) Details of the accommodation and equipment provided for the facility
 - (vii) Volume of work to be undertaken.

Upon receipt of this information and payment of a special assessment fee an assessment of the field facility is arranged. If this assessment so recommends, the facility will be empowered to issue IANZ endorsed reports under the accreditation of the base organisation. In such cases it is essential that a Key Technical Person from the base accredited organisation provides close supervision of the field facility's activities and that documentary evidence of this supervision is maintained.

- (c) When a temporary facility is to be established for a period in excess of 12 months it is regarded as being a separate organisation in its own right. A separate accreditation must therefore be sought and the appropriate fees paid.

It should be noted that the field laboratories detailed in (b) above would normally be expected to confine their activities to the work associated with the projects they are established to service. If a field facility is empowered to accept new commissions from clients in its locality without reference to the base accredited organisation then such a facility will be regarded as falling with category (c).