Specific Accreditation Criteria

ISO/IEC 17025 Application Document

Manufactured Goods - Annex

Electrical appliance performance testing

July 2018

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Electrical appliance performance testing

This document provides interpretative criteria and recommendations for the application of ISO/IEC 17025 for both applicant and accredited facilities conducting electrical appliance performance testing.

Applicant and accredited facilities must comply with all relevant documents in the NATA Accreditation Criteria (NAC) package for Manufactured Goods (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.

6 Resource requirements

6.2 Personnel

6.2.3 Energy efficiency and appliance performance testing requires expertise in a broad range of measurement disciplines. While extensive knowledge in all of these is not expected, staff performing such tests must have been trained to a level which permits them to evaluate all aspects of the testing processes.

For a facility performing tests on a broad range of products, this expertise would normally cover the following measurement disciplines:

- energy
- liquid flow
- photometry
- spectrophotometry
- temperature (absolute and differential)
- temperature rise
- water analysis

In particular, it is necessary for testing staff to understand the limitations and uncertainties associated with the various measurement techniques used in their facility.

While it may be difficult (or impossible) to determine combined uncertainties for such parameters as percentage soil removal (for clothes washing machines) or the actual energy consumption of the appliance or device, it is still necessary for staff to have an adequate understanding of the relative importance of the various uncertainties associated with the measurements.

For high precision measurements of such parameters as temperature differentials used in air-conditioner testing, a high level of expertise in temperature measurement and uncertainty analysis is essential.

6.2.5 The facility's management must ensure that staff involved in tests such as those for dish washing machines which require a visual examination of the washed load must have adequate visual acuity and colour vision.

6.3 Facilities and environmental conditions

6.3.1 Power supplies must be suitably conditioned where noise or voltage fluctuations on the mains supply would impact on the measured performance of the equipment under test.

Facilities must provide for adequate isolation of the test instrumentation from the test environment where these may compromise the reliability of the test results.

6.4 Equipment

6.4.1 Standard materials, such as wash swatches for washing machine testing and spinach for dish washing machine testing, are to be sourced from suppliers identified by, or directly from, Standards Australia.

When testing to foreign or international standards, the relevant standards writing body should be contacted regarding suitable sources of reference materials.

6.4.4 Where instruments having specifications which differ from those of the standard method are to be considered for use, the facility must be able to demonstrate their equivalence quantitatively.

Care must be taken where manufacturer's supply 'reference' artefacts for the calibration of instruments. Unless provided with a calibration certificate from an accredited facility, such an artefact must be calibrated as part of the usual commissioning processes and included on the facility's equipment calibration schedule.

While reflectance standards, such as barium sulphate reference tiles used in the measurement of the reflectance of wash swatches during washing machine tests, may be regarded as having an absolute reflectance of almost 100%, commissioning checks must be performed to ensure that the reference is in fact as specified.

6.4.7

Artefact calibration

Some digital instruments are adjusted by a process usually referred to as 'artefact calibration'. This typically consists of connecting the instrument with one or more reference devices such as a DC voltage reference and a standard resistor.

While this procedure is specified by the manufacturer and should be performed at the specified intervals, it does not constitute an adequate calibration by itself. It is still necessary to perform the full calibration (verification) of the instrument as specified by the manufacturer.

7 Process requirements

7.2 Selection, verification and validation of methods

7.2.1 Selection and verification of methods

Where a facility requests a variation to the scope of accreditation and this variation relates to changes or additions of published standards, the request must be supported by a gap analysis between relevant standards that are already covered by the scope of accreditation and the new standard.

7.2.1.1

Power Measurements

Facilities wishing to perform power measurements in accordance with AS/NZS 4665.1 must be aware of the specification requirements for the power analyser used for these measurements.

Measurements of power of 0.5 W or greater should be made with an uncertainty of 2% or less at the 95% confidence level. Measurements of power less than 0.5 W should be made with an uncertainty 0.01 W or less at the 95% confidence level.

Annex B of AS/NZS 62301 'Notes on measurement of low power modes' discusses the need for the crest factor capability of the meter to be greater than the actual crest factor of the load, otherwise the peak value of the current will be lopped off and the integration for power will be incorrect. The crest factors for standby loads are typically 3 and can in some circumstances be as high as 10.

To meet these requirements, the power analyser would typically have a power resolution of 1mW or better and a minimum current range of 10 mA or less. In order to capture harmonic components in instances where the current is distorted and the current appears as a series of short spikes or a series of pulses over a typical AC cycle (for example switch mode power supplies), the power analyser would typically have the ability to measure the signal up to at least 2.5 kHz and thus have a sampling rate of greater than 5 kHz in order to avoid aliasing.

The instrument should be able to average power over any user selected time interval or be capable of integrating energy over any user selected time interval with an energy resolution of less than or equal to 0.1 mW/hr and integrating time displayed with a resolution of 1 s or less. For cyclic or pulsing loads, the analyser must be capable to provide a power average over a reasonable period (i.e. several minutes).

The facility must be able to demonstrate control of these factors when making measurements, including calibration of the power analyser to a suitable level of accuracy at a current crest factor of at least 3.

If the analyser does not meet the above capabilities, the facility must be able to demonstrate (in the test method) how it will ensure the measurements taken are correct.

7.2.1.2 Test procedures or work instructions must, where possible, meet the exact requirements of the standards.

In some instances, facilities testing products to a range of national, regional or international standards may choose to develop generic test procedures. These must, however, clearly identify where reference to a particular national or regional difference must be taken into consideration.

Where particular operator techniques may have an effect on the test results (such as positioning and application method of thermocouples for temperature measurement, loading of clothes washing machines or application of soil to plates for dish washer tests), test procedures must fully describe these to a level where another operator could reasonably be expected to replicate the technique.

Where visual examination forms a part of the testing, test procedures must incorporate detailed protocols and criteria for evaluation of the test outputs such that different testing officers can achieve consistency.

7.3 Sampling

7.3.1 For registration tests, products tested will usually be as submitted by the supplier or manufacturer.

Where ‘check testing’ is to be performed, as per the requirements of a regulatory authority for market surveillance, the regulator is responsible for the test samples.

7.7 Ensuring the validity of results

7.7.1 Facilities must undertake intra-laboratory proficiency tests using reference test items to ensure the ongoing stability of their testing processes and the suitability of consumables.

This must, where possible, include the performance of tests by different staff members as a means of ensuring consistency of testing techniques.

7.7.2 Inter-laboratory testing is to be coordinated with the relevant regulatory authorities.

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.

Standards

AS/NZS 4665.1	Performance of external power supplies Part 1: Test method and energy performance mark
AS/NZS 62301	Household electrical appliances – Measurement of standby power (IEC 62301, Ed. 1.0 (2005) MOD)
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories

NATA publications

NATA Accreditation Criteria (NAC) package for Manufactured Goods

Amendment Table

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

Section or Clause	Amendment
Whole document	Clauses have been aligned with ISO/IEC 17025:2017. Any criteria included in the previous issue that are now covered by ISO/IEC 17025:2017 have been removed. No new interpretative criteria or recommendations have been included other than editorial changes. Addition of Security Classification Label