Certification of Measuring Equipment

Introduction

At present the IAAF Rules use the terms "must be certified by an appropriate authority", and "shall be certified by an appropriate Weights and Measures authority" for wind gauges and distance/height measuring apparatus respectively. In the cases of timing/photo-finish and false start equipment no advice is given as to who will certify/calibrate the equipment.
It is time to be more specific. The following statement has been taken from the European Cooperation for Accreditation web site:

"What is accreditation?

Today, there are more products and services available than ever before. This means the need for consumer protection has never been greater. Consumers can be protected by certification, inspection and testing of products and by manufacturing under certified quality systems.

Consumers need confidence in the certification, inspection and testing work carried out on their behalf, but which they cannot check for themselves. This checking is the job of accreditation bodies.

But certifiers of systems and products as well as testing and calibration laboratories need to demonstrate their competence. They do this by being accredited by a nationally recognised accreditation body.

Accreditation delivers confidence in certificates and reports by implementing widely accepted criteria set by the European (CEN) or international (ISO) standardisation bodies. The standards address issues such as impartiality, competence and reliability; leading to confidence in the comparability of certificates and reports across national borders. Governments have confidence in testing and certification in support of regulatory functions. "

Network of Accredited Laboratories

Government and private enterprise laboratories that meet accreditation requirements of the national accreditation authority are accredited to undertake specific testing. In relation to length, weight and time these measurements are traceable back to national and international standard measures.

Proposal to Change the IAAF Rules

A more definite way to ensure quality would be to word the IAAF Rules at the appropriate places that "certification be undertaken by a laboratory that is

accredited by the nationally recognised accreditation body for undertaking the required testing or calibration".

There are lists of national accreditation bodies on the web sites of the International Laboratory Accreditation Cooperation and the International Accreditation Forum. It would seem that some national bodies may not be as active as others in meeting international obligations. However, I think that the wording I am proposing is better than what we have at present and provides better guidance for federations in determining which local laboratories might be acceptable to us as certifiers.

Calibration Handbook

There is a need for an IAAF Calibration Handbook as whilst there are international and/or national standards for many instruments these do not apply specifically apply to athletics instruments and in any case there are various levels of accuracy allowed depending on the purpose of the instrument. Therefore the IAAF must provide advice to testing laboratories on its calibration requirements both in testing and the details required on the calibration certificate. Unfortunately many of the certificates issued at present are not worth the paper on which they are written.

At Appendix A is the draft of a Calibration Handbook. It is still very incomplete, as it does not cover as yet many important apparatus such as photo finish and false start equipment.

Recommendations

1. Note the need for rewrite of the appropriate IAAF Rules to better define acceptable testing laboratories.
2. Adopt the concept of an IAAF Calibration Handbook and have the Certification Working Group together with an internationally recognised testing authority develop the Handbook.

Denis Wilson
January 2003

Appendix A

CALIBRATION HANDBOOK

Introduction

The purpose of this Handbook is to provide testing organisations, federations and manufacturers with clear advice on the testing and calibration methods to be adopted for measuring devices used in IAAF competitions.

Where possible international standards or national standards are referred to and complemented as necessary.

It is intended that the Handbook will be updated and refined as experience is gained in use of the methods listed.

Any comments on the Handbook might be addressed to:

Competition Department
IAAF
17 rue Princesse Florestine
BP 359 - MC98007
Monaco Cedex

Appropriate Testing Organisations

Certification, inspection and testing work on measuring devices used in IAAF competitions should be undertaken by organisations that have demonstrated their competence by being accredited by a nationally recognised accreditation body.

Nationally recognised accreditation bodies are listed on the WebPages of the International Laboratory Accreditation Cooperation and the International Accreditation Forum. The European Cooperation for Accreditation is also a source of information on European accreditation organisations.

Test and Calibration Reports

The test and/or calibration reports should provide all the necessary information for verifying that the measuring device is suitable for use in IAAF competitions.

The following information should be included in each report:

- A title
- Name and address of the laboratory, and the location where the testing/calibrations were carried out, if different from the address of the location.

- Unique identification of the test/calibration document, including on each page an identification to ensure that the page is recognised as part of the document and a clear identification of the end of the document.
- Name and address of the client.
- Identification of the method used.
- Description, condition and identification of the item tested or calibrated.
- Date of receipt of the test/calibration item where applicable and the date the work was carried out.
- Reference to the sampling plan and procedures used by the laboratory or other bodies where applicable.
- Results with, where appropriate, the units of measurement.
- Name, function and signature or equivalent identification of the person authorising the test/calibration document.
- A statement on the estimated uncertainty of measurement where applicable
- A statement to the effect that the results relate only to the item tested or calibrated where appropriate.
- Where necessary for the interpretation of the test results the following shall be included:

1. Deviations, additions or exclusions from the test method, and specific test conditions, e.g. environmental conditions.
2. A statement of compliance/non-compliance with requirements and/or specifications.
3. Additional information required by specific methods or clients.
4. Opinions and interpretations where appropriate and needed.
5. Additional information required by specific methods or clients.

Calibration Certificates in addition to the information listed above shall include also where necessary for the interpretation of calibration results:

- Conditions, e.g. environmental conditions during calibration that have an influence on the measurement results.
- Uncertainty of measurement and/or a statement of compliance with an identified metrological specification
- Evidence that the measurements are traceable.
- If a statement of compliance with a specification is made, the clauses of the specification, which are met or not met, must be identified.
- Where a statement of compliance is made omitting the measurement results and associated uncertainties, the laboratory must record and retain those results.
- The uncertainty of measurement must be taken into account when statements of compliance are made.
- The calibration results before and after adjustment or repair, if available, must be reported.
- Calibration certificates or labels must not contain any recommendation on the calibration interval except when requested by the client.

When testing and calibration results are obtained from sub-contractors, the results of tests performed by sub-contractors must be clearly identified.

Where calibration work has been sub-contracted, the laboratory performing the work must issue the calibration certificate to the contracting laboratory.

Amendments to a test report or calibration certificate after issue must be in the form of another document and include reference to the original document. If a new test report or calibration certificate is required, it must be uniquely identified and include reference to the original it replaces.

Measurement for Distance

The devices covered by these regulations include steel measuring tapes, steel bars and electronic distance measuring (EDM) apparatus.

Steel Measuring Tapes

Applicable Standards:
ISO 8322-2 1999 Building construction - Measuring instruments - Procedures for determining accuracy in use - Part 2 Measuring tapes, or
BS 4035 Specification for linear measuring instruments for use on building and civil engineering construction works. Steel measuring tapes and retractable steel pocket rules, or
AS 1290.5-1999 Linear measuring instruments used in construction. Part 5: Coated and etched steel measuring tapes.

Tape Tension:
50m or shorter 50N
longer than 50m 100N or the tape manufacturer's specified tensile force

Test Temperature:
$20^{o}C$

Accuracy:
±(0.5 mm + 0.1 mm/m)

Reading
To the next lower graduation if it is not an even graduation.

Graduation Test Intervals:
Every 10m for initial and subsequent calibrations.

Recalibration Intervals:
Every four years or after damage/repair of the tape.

Limitation on Use:
The calibrated steel tape should not be used for other than measuring records or checking the accuracy of other working tapes.

Steel Measuring Bars

Applicable Standards:
BS 4372 1968 Specifications for engineer's steel measuring rules

Test Temperature:
20^{o}C

Accuracy:
±(0.5 mm + 0.1 mm/m)

Reading
To the next lower graduation if it is not an even graduation.

Graduation Test Intervals:
Every 1m for initial and subsequent calibrations.

Recalibration Intervals:
Every four years or after damage/repair of the bar.

Limitation on Use:
The calibrated steel tape should be used for checking the accuracy of other working measuring bars.

Measurement of Mass

Mechanical or electronic scales that meet the specifications below may weigh the mass of implements, and other equipment such as relay batons and crossbars.

Weighing Machines

Applicable Standards:
As laid down by the national laboratory accreditation authority.

Test Temperature:
20^{o}C

Accuracy:
± 0.1 gram

Reading
To the next lower graduation if it is not an even graduation.

Test Intervals:
Every 0.5kg from 0.5kg to 10kg for initial and subsequent calibrations.

Recalibration Intervals:
Every year or after damage/repair of the machine.

Limitation on Use:
The weighing machine should be located on a firm flat surface and not be moved.

Comment:
When implements and other equipment are being check weighed at the stadium the mass shall be recorded to the next lower gram unless the mass measured is an even gram. The current calibration certificate shall accompany record applications for the weighing apparatus used to check the mass of the implement before and after the competition.