

INTERLABORATORY COMPARISON: THE VIEWS OF LABORATORIES

Context

Participation in interlaboratory comparison and especially in proficiency testing constitutes an important tool for laboratories to check the reliability of their results compared to assigned values (reference or consensus) and to give confidence by external elements of validation of their competence to clients and accreditation bodies. Participation in interlaboratory comparison may be imposed by authorities or by customers. ISO/IEC 17025-2017 § 7.7.2 states: "The laboratory shall monitor its performance by comparison with results of other laboratories, where available and appropriate."

The publication in 2010 of two documents ILAC P9 "ILAC Policy for Participation in Proficiency Testing Activities" and EA 4/18 "Guidance on the level and frequency of proficiency testing participation" leads accreditors to review their policies and focus a part of their assessments on this topic.

The purpose of this document is to provide the people audited, elements in order to have in mind the purpose of interlaboratory comparisons, that is to say one of the tools which contribute to monitoring the validity of results. It allows them, when questions are sometimes too focused on comparisons, to put these questions in a broader context.

Questions

What participation?

If asked: *What is your participation plan to interlaboratory comparisons consistent with your accreditation scope?*

Think / Rephrase: How the monitoring of the validity of tests and calibrations is planned and reviewed?

This allows to present the laboratory's policy on surveillance, interlaboratory comparisons (and bilateral) being not necessarily the only possible means (see 7.7 17025 and 3. (1) EA 4/18). The laboratory may present the consistency of its policy on surveillance, using a risks estimation approach (see 3. (2) EA 4/18).

If asked: *What is the justification by the laboratory of his non-participation in such a comparison?*

Think / Rephrase: is the protocol for this comparison proposed by the organiser of the comparison, adapted to the problem of monitoring the results of my lab?

This allows the identification of inappropriate elements of the protocol. e.g. defining the objectives of the comparison; of scope; choice of treatment of the results; choice of the origin of the metrological traceability and measurement uncertainty of the support of the comparison (standard solution, material, ...) (see 4.4.1.3 and C.2 of the 17043 standard).

If asked: *Is the provider, to whom you outsource the organization of comparisons, accredited to 17043 standards?*

Think / Rephrase: Is my provider able to provide a valid comparison?

This allows to present the elements used to select a supplier (see cook-book No. 2, "Criteria for the selection of a proficiency testing scheme").

The competence of the provider comparison can be assessed through the completeness of the plane of comparison he offers (see 4.4.1.3 and C.2.2 of the 17043 standard).

Participant in a comparison is not obliged to apply the 17043 standards, it is only applicable to the organizers (see scope of the 17043 standard). The participant must comply with the instructions of the organizer.

If asked: Have you done a comparison for such measurement technique, property, instrument or product?
Think / Rephrase: What are the elements available to show my skills?

This allows to highlight groups of skills for methods practiced with common equipment or by common personal. (See 4. Document EA 4/18)

What data processing?

If asked: What are your pre-established criteria for processing the results of comparisons?

Think / Rephrase: What are the recognized methods of treatment? What are the criteria established by the organizer of the comparison?

This allows to specify:

- That the results of proficiency testing can appear in many forms, covering a wide range of types of data and underlying statistics distributions. It is necessary that the statistical methods used to analyze the results are tailored to each situation (see B.1 of the 17043 standard).
- That the organizer of proficiency testing must document a plan before starting the proficiency testing program that specifically addresses "the criteria for assessing the performance of the participants" (cf. 4.4.1.3. r of 17043 standard). The laboratory can consider this criterion once the program of comparison known.
- That calculation of performance statistics is described in Appendix B.3 of the 17043 standard.
- It is advisable to explicitly mention the Annex B of the 17043 standards in the quality system

If you are asked: why you don't take the usual test $E_n \leq 1$ to determine if your lab is good or bad?

Think / Rephrase: What is the significance of the E_n number, is this statistic relevant, should Z score be chosen?

$$E_n = \frac{x - X}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

x is the participant's result; X is the assigned value;

U_{lab} is the expanded uncertainty of a participant's result;

U_{ref} is the expanded uncertainty of the reference laboratory's assigned value.

It can be said that:

- $E_n \leq 1$ may mean that the stated uncertainty does not allow to conclude that the deviation from the assigned value is significant;
- $E_n > 1$ may mean that the reported uncertainties are undervalued and do not cover the difference observed.

The Performance Evaluation based on the evaluation of statistical scores should be performed with caution (see C.5.1.2 of the 17043 standard).

There is not necessarily "proof" of a performance. This depends on the purpose of the comparison (cf. introduction of the 17043 standard). It depends on the objective of the laboratory which may for example seek to improve their knowledge of the quality of its results, search trends...

What actions:

If asked: What are the provisions regarding corrective actions taken when the results of a comparison call into question the quality of accredited services?

Think / Rephrase: What are the policies and procedures implemented when any aspect of testing and/or calibration work, or the results of this work, do not conform?

This allows to present general procedures for handling non-conforming work and examples of application in the context of comparisons (see 7.10 17025). It is advisable to explicitly specify in the quality system that these procedures apply to comparisons.

Think / Rephrase: What actions have been taken after comparisons.

This allows to introduce the consideration of « outcomes of the assurance of the validity of results » (see 8.9.2.n 17025) during management reviews and present policy and actions of the laboratory to ensure and improve the validity of its results.

Conclusion

Interlaboratory comparison is a tool for progress. Its use should be defined according to the needs of the laboratory and its customers and the regulatory authorities.

In some areas, the comparison circuits are imposed by regulations.

In other cases, the laboratory must ask the right questions to clarify its needs and policy to select appropriate comparisons. This allows to have useful thinking elements for discussion with accreditors.

References

- [1] ISO/IEC 17043:2010, “Conformity assessment - General requirements for proficiency testing”
- [2] ILAC P9:2010, “ILAC Policy for Participation in Proficiency Testing Activities”
- [3] EA 4/18:2010, “Guidance on the level and frequency of proficiency testing participation”
- [4] ISO/IEC 17025:2017, “General requirements for the competence of testing and calibration laboratories”
- [5] Eurolab cookbook N°2:2007, “criteria for the selection of a proficiency testing scheme”