

Supplementary material: Thirty-six multiple choice questions to investigate root causes of laboratory unsatisfactory results in proficiency testing activities (questionnaire part 3)

	Nr.	Items investigated by the laboratory during cause analysis	ISO/IEC 17025:2005 clause
I – Purchase of calibration services	3.1	Does the laboratory investigate the procedure used for qualification of suppliers of reference standards' calibrations?	4.6.4
	3.2	Does the laboratory investigate the records of evaluations carried out to qualify suppliers of reference standards' calibrations?	4.6.3
	3.3	Does the laboratory confirm if calibration certificates of reference standards were critically evaluated upon receipt and before they are used?	4.6.2
	3.4	Does the laboratory check if the calibration of standards was carried out according to the laboratory specifications?	5.5.2
	3.5	Does the laboratory investigate if the reference standards and equipment used in the calibration are appropriate to the required accuracy?	5.6.1
II – Equipment and reference standards	3.6	Does the laboratory investigate if calibrations of reference standards and equipment were carried out according to the laboratory calibration programme?	5.5.2
	3.7	Does the laboratory check if the specifications set for reference standards' calibrations are appropriate?	5.5.3
	3.8	Does the laboratory check the records in order to ensure that equipment are operated only by authorized personnel?	5.5.10
	3.9	Does the laboratory investigate the registers of equipment intermediate checks?	5.5.11
	3.10	Does the laboratory investigate if calibration correction factors, whenever used, are updated?	5.5.12
	3.11	Does the laboratory investigate if calibration equipment (hardware and software) are safeguarded from adjustments that could invalidate the results?	5.5.7
	3.12	Does the laboratory confirm if equipment subjected to overloading or mishandling is taken out of service?	5.5.6
	3.13	Does the laboratory check if reference standards are properly handled?	5.5.8
	3.14	Does the laboratory check the calibration status of equipment?	5.4.2
	3.15	Does the laboratory investigate the adequacy of calibration methods?	4.4.1, 5.4.2
III – Methods	3.16	Does the laboratory investigate if used methods comply with the contract and meet the customer needs?	5.4.6.3
	3.17	Does the laboratory evaluate the contributions of estimated uncertainties?	5.4.5
	3.18	Does the laboratory investigate if methods are properly validated?	5.4.7.2
	3.19	Does the laboratory investigate if developed computer software is suitably validated and if procedures ensure protection and integrity of data?	5.3.2
	3.20	Does the laboratory confirm if environmental conditions of calibration facilities are appropriate (e.g.: temperature, humidity)?	5.3.2
IV – Environmental conditions	3.21	Does the laboratory investigate if there are vibrations or other interfering conditions (e.g.: unwanted air flow) in the calibration facilities?	5.3.3
	3.22	Does the laboratory check if calibration facilities are clean and organized?	5.3.3
	3.23	Does the laboratory investigate if there is any risk of cross-contamination in the calibration facilities?	5.3.2
	3.24	Does the laboratory investigate if electromagnetic disturbs, radiations, electrical current instabilities or sound levels may affect the calibration results?	5.3.4
	3.25	Does the laboratory investigate if the access to calibration facilities is controlled?	5.2.1
	3.26	Does the laboratory check personnel experience, qualification and training?	5.2.2
V – Personnel	3.27	Does the laboratory confirm if the laboratory personnel training is sufficient to the perform tasks?	5.2.2
	3.28	Does the laboratory confirm if the laboratory personnel are competent to operate the equipment?	5.2.5
	3.29	Does the laboratory confirm if the calibration is carried out only by authorized laboratory personnel?	5.8
	3.30	Does the laboratory investigate if calibration items are properly handled?	4.13.2
	3.31	Does the laboratory check records to confirm if reference standards are handled according to the calibration procedure?	4.13.2
VI – Measuring parameters	3.32	Does the laboratory check records to confirm if the used reference standards ensure metrological traceability?	4.13.2
	3.33	Does the laboratory check records to confirm if the number of calibration points or cycles described in the calibration procedures is followed?	4.13.2
	3.34	Does the laboratory check records to confirm if equipment zero adjustments are carried out prior to calibration?	4.13.2
	3.35	Does the laboratory check records to confirm the calculations performed, the adequacy of data transfers, as well as uncertainty components?	4.13.2
	3.36	Does the laboratory confirm if the information on calibration certificates comply with the calibration records?	5.10