



APMP-APLAC Joint Proficiency Testing Programme  
(APLAC T095)  
Determination of Elements (Calcium and Cadmium)  
in Drinking Water



**FINAL REPORT SUMMARY**

**on**

**APMP-APLAC Joint Proficiency Testing Programme**  
**(APLAC T095)**

**Determination of Elements (Calcium and Cadmium)**  
**in Drinking Water**

Jointly Organized by

National Metrology Institute of Japan (NMIJ)  
and  
Government Laboratory of Hong Kong (GLHK)

8 July 2016



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## Summary

1. This proficiency testing programme (APLAC T095) was jointly organized by the National Metrology Institute of Japan (NMIJ) and the Government Laboratory of Hong Kong (GLHK) under the auspices of the APLAC Joint PT Working Group. The purposes of the study were (i) to assist participating laboratories in demonstrating competence on the measurement of the mass fractions of the two analytes (mandatory measurand: calcium; optional measurand: cadmium) in the proficiency test sample of water by various analytical techniques; and (ii) to identify problems and opportunities for improvement. The mass fractions of the analytes on an as-received basis are used for comparability purposes.
2. A total of 99 laboratories from 58 economies enrolled in the PT programme and 94 of them returned the Result Proforma to GLHK within the scheduled timeline.
3. The programme was concurrently conducted in parallel with the key comparison CCQM-K124 “Trace Elements in Drinking Water” using the same test material. It was stipulated in the proposal for the PT programme that the key comparison reference values (KCRV) obtained from CCQM-K124, which had participation from national metrology institutes and designated institutes worldwide, were used as the assigned values for evaluating the performance of participants in the APLAC T095. The standard deviation for proficiency assessment was derived from the Horwitz Equation. The z-scores were used to show the performance of participants with respect to the assigned values of the analytes of interest.
4. Participants’ z-scores on the two analytes are summarized as follows:

z-Score	Number of Participants (Percentage)	
	Calcium (Mandatory)	Cadmium (Optional)
$ z  \leq 2.0$	86 (91.4%)	33 (65.0%)
$2.0 <  z  < 3.0$	4 (4.3%)	6 (12.0%)
$ z  \geq 3.0$	4 (4.3%)	12 (23.0%)
Total:	94 (100%)	51 (100%)



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5. To allow participants to check any transcription errors, the Interim Report on APLAC T095 was issued in July 2015. The proposed KCRV for Calcium and Cadmium were discussed at the CCQM IAWG Meeting in April 2016 and were approved by the CCQM IAWG. As agreed that the KCRV of CCQM-K124 would be used as the assigned values for performance evaluation, this Final Report on APLAC T095 is issued. This Final Report gives a comprehensive overview of participants' results and detailed discussions on methods of analysis used by participants.