



Proficiency Testing Program  
Organised by

Center for Laboratory Proficiency Testing

Department of Science Service, Ministry of Science and Technology, Bangkok, Thailand

Total hardness (as CaCO<sub>3</sub>) and Chlorides (as Cl) in water

PTEN – W08 – 1401

21 May 2014

SUMMARY SHEET

Laboratory Name: Technical Training and Support Service, Center for Scientific and Technological Equipment, Walailak University

Laboratory Code: W08 - 1401 - 176

Test (mg/L)	Sample	No. of result	Lab's results	Robust average (x*)	Standard deviation for proficiency assessment ( $\hat{\sigma}_p$ )	z-score
Total hardness (as CaCO <sub>3</sub> )	A	213	142	148.7	4.5	-1.49
	B	213	333	343.7	10.3	-1.04
Chlorides (as Cl)	A	191	-	47.24	3.78	-
	B	191	-	62.66	5.01	-

Note

1. Robust average (x\*) is the assigned value of the results reported by all the participants in this round, calculated by using Algorithm A (ISO 13528:2005).
2. Standard deviation for proficiency assessment ( $\hat{\sigma}_p$ ) is the target standard deviation by perception from previous rounds.
3. Each z-score marked with "A" is an outlier ( $|z| \geq 3$ ) therefore, laboratory which is marked with "A" shall investigate result. Laboratory is also encouraged to review result which has an absolute z-score value between two and three ( $2 < |z| < 3$ ) marked with "W".
4. This summary sheet should be read in conjunction with the final report.

Reported by

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Approved by

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