

Proficiency Testing Program  
Organised by  
Center for Laboratory Proficiency Testing,  
Department of Science Service,  
Ministry of Higher Education, Science, Research and Innovation, Thailand  
Total hardness (as CaCO<sub>3</sub>) and Chlorides (as Cl) in water  
PTEN - W08 - 2001  
9 March 2020  
SUMMARY SHEET

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

Laboratory Code : W08 - 2001 - 204

Test Items (mg/L)	Sample	Number of results	Assigned value ( $X_{pt}$ )	Standard deviation for proficiency assessment ( $\sigma_{pt}$ )	Lab's result		z-score
					Value	MU	
Total hardness (as CaCO <sub>3</sub> )	A	254	215.9	6.5	217	2.5	0.17
	B	254	74.4	3.7	75.1	2.0	0.19
Chlorides (as Cl)	A	233	118.1	7.1	-	-	-
	B	233	115.6	6.9	-	-	-

**Note**

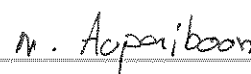
1. Assigned values ( $X_{pt}$ ) are the robust averages of the participant results in this round, calculated by using Algorithm A (ISO 13528: 2015).
2. Standard deviations for proficiency assessment ( $\sigma_{pt}$ ) are the target standard deviations by perception from expert judgement.
3. MU is measurement uncertainty at 95% confidence level.
4. Each z-score marked with "A" is an outlier ( $|z| \geq 3.0$ ). 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 ( $2.0 < |z| < 3.0$ ) or marked with "W".
5. This summary sheet should be read in conjunction with the final report.

Reported by



(Miss Sukanya Pondet)  
Program Coordinator

Approved by



(Mrs. Wannee Aupaiboon)  
Head of Center for Laboratory Proficiency Testing  
Department of Science Service