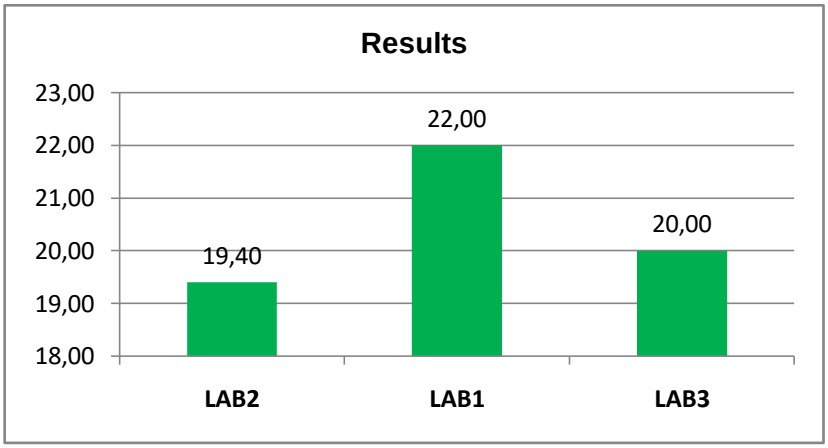
Labsert Laboratuvar Hizmetleri ve Teknolojileri
Address: Mahmudiye M. Bahceler C. Matiat Is Merkezi 5/34 Akdeniz - Mersin - Turkiye
Phone: +90850 3034076 / E-Mail: info@labsert.com

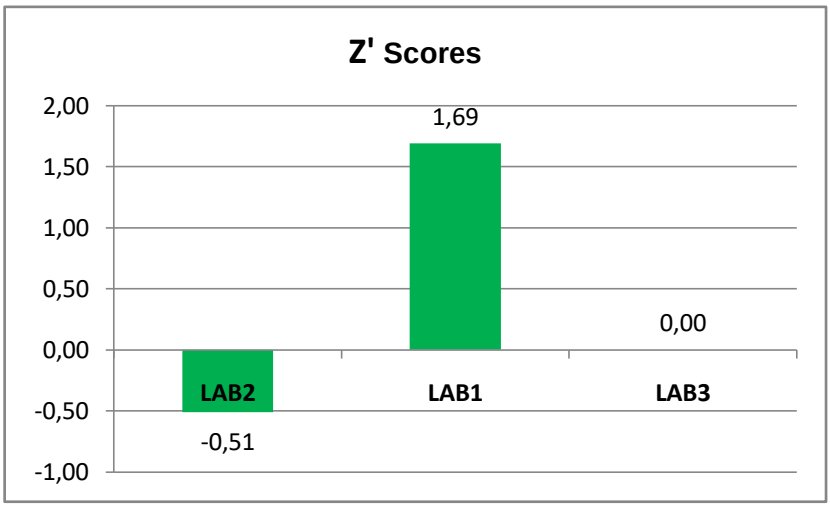
Participant: xxx
Interlaboratory Comparison: Effluent Water: Chloride
Participant Code: LAB2

ROUND: xxx
(Final Report)

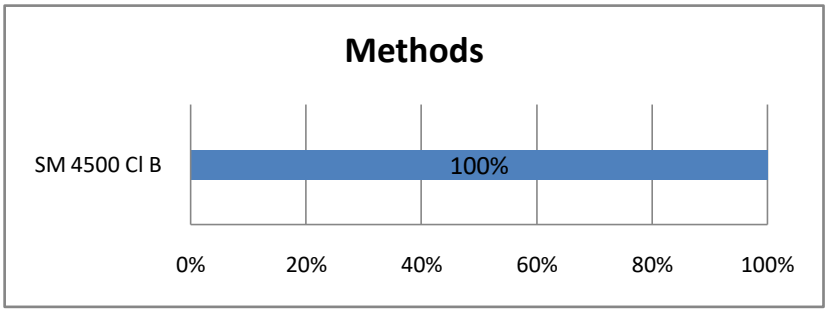
Participant Method:	SM 4500 Cl B
Sample Code (Report No)	xxx
Your Result (mg/l)	19,40
Lab Uncertainity (mg/l)	N/A
Z' score	-0,51
Performance Rating	GOOD
Assigned Value	20,00
Uncertainity of Assigned Value	0,59



Total No. of	3
Results No. of	3
Results In Stats No.	3
Historic Results	0
No. of Results excl. Outliers	0
Overall Mean	20,47
Overall Median	20,00
Median Absolute S.D	1,022
Overall RSD %	5,111
Std Error of the Mean	0,590



Methods Information		
Lab Code	Results	Methods
LAB2	19,40	SM 4500 Cl B
LAB1	22,00	SM 4500 Cl B
LAB3	20,00	SM 4500 Cl B



Key:
Good = Result has a Z' score of < 1
OK = Result has a Z' score of ≥ 1 and < 2
Warning = Result has a Z' score of ≥ 2 and < 3
Action = Z' ≥ 3 (Recommend investigation)
WD = Withdrawn
N/A = Not Applicable

Date: 29.9.2021		
Coordinator: Koray Cengiz General Manager info@labsert.com	*This report was published according to ISO 17043 requirements.*	**Prepared by:** Seda Sag Quality Engineer info@labsert.com

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1. Sample Details : **Effluent Water Coded as xxx**

The sample from the residential area in Turkey was used. Spike method can be applied in order to determine additional parameters in samples. Participants should start analyzes within 24 hours. If samples must be kept during this period, they should be kept at 4 - 8 oC in an environment not exposed to light. Before starting the analysis, the bottle should be mixed with some shaking to re-homogenize the sample. Samples are sent as ready for analysis. Participants will perform analyzes in accordance with their own methods.

2. Privacy Policy:

All information about participants and results are saved in our own digital records. Any part of this report is never shared with other participants or 3. part share holders with participant name. Representation of Lab ID codes are just known by Labsert.

3. Objections:

Participants can appeal the entire test program or the test results. The objection period is 3 working days following the publication of the report. Objections can be made by e-mail or postal mail.

4. Compatibility:

This report was published to show the results have Z' score of < 1, Z'score of ≥ 1 and < 2 and Z'score of > 2 according to ISO 17043 scopes. Within the scope of this comparison test, statistical calculations, homogeneity and stability tests were applied and the results were presented in this report In accordance with ISO 13528. Assigned value is calculated from overall median of the total results and standard deviation (S.D) is calculated as overall median standard deviation according to participant number (p<4).

5. Assigned Value:

First, the Grubbs outlier test is applied to participant results. For the final results, the median value calculated over the presented results is considered as assigned value.

6. Standard Deviation of Test Program:

First, the Grubbs outlier test is applied to participant results. For the final results, the median standard deviation calculated over the presented results is considered as standard deviation of the test program.

7. Uncertainity of Assigned Value:

The standard uncertainties of assigned values determined as described in Article 5 are obtained by calculating the standard error of the participants' means (u = s/SQRT (n)) for each parameter.

8. Z' Scores:

If the number of participants in the comparison tests organized by Labsert "Z-Test" is <4, the Z'-score calculation is used for the performance evaluations of the participants. The Z'-Score calculation, whose formula is given below, can be also used when the assigned value uncertainty cannot be neglected. The meaning of negletion is given belo with the formula.

$U_x \leq 0{,}3 * \sigma$

If the formula given above can be matched for U_x value and the number of participants is more than 6, then Z score can be considered with the formula below.

$$Z = (x - x')/\sigma$$

As we described above, Z' score calculation is used for the laboratory comparison tests that we provide with the number of participants <4 instead of Z score.

$$Z' = (x - x')/\sqrt{\sigma^2 - u_x^2}$$

x: Participant Result
σ: Standard Deviation of Test
x': Assigned Value
U: Uncertainity of Assigned Value

9. Reports

As a result of the comparison test, a single final report is prepared for all participants separately for each parameter. This report is the final report. The calculations are done using an Excel spreadsheet or dedicated software.

Z-Test
A part of Labsert

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10. Homogeneity Test:

Parameter: Chloride

Sample Code: xxx

Sample Num.	Result	Dublicated Result	Mean of Homogeneity:	21,585
1	21,50	21,54	**Median Absolute S.D (σ):**	1,022
2	21,56	21,63	**0,3 * σ:**	0,307
3	21,50	21,44	**Sx :**	0,096
4	21,54	21,61	**Sw :**	0,046
5	21,46	21,39	**Ss :**	0,090
6	21,61	21,56	**Ss ≤ 0,3 * σ**	Passed
7	21,63	21,69		
8	21,69	21,63		
9	21,63	21,74		
10	21,65	21,69		

Homogeneity results are calculated and evaluated as "Passed" or "Not Passed" in accordance with ISO 13528

$$s_w = \sqrt{\frac{\sum w_t^2}{2g}}$$

s = within-sample standard deviation;
wt = duplicate-difference of test samples

$$s_x = \sqrt{\frac{\sum (x_t - \bar{x})^2}{g-1}}$$

Sx = standard deviation of mean of test samples;
Xt = mean of duplicates of one test sample;
X = overall mean of analysis results;
g = number of test samples

$$s_s = \sqrt{s_x^2 - \frac{s_w^2}{2}}$$

Ss = between-sample standard deviation;
Sx = standard deviation of the sample means;
Sw = within-sample standard deviation

10. Stability Test:

Parameter: Chloride

Sample Code: xxx

Sample Num.	Result	MS	MH	DIF	CS	DIF ≤ CS
1 (t_0)	21,50	21,72	21,585	0,131	0,307	Passed
2 (t_0)	21,63					
3 (t_e)	22,02					

MS: Mean value of stability results

MH: Mean value of homogeneity results

DIF = | MH - MS |

CS = 0,3 * σ

For the stability test, replicated samples were analysed at t_0 (before the date of shipment of samples) and t_e (deadline of submission of results).