

Explanation Annual Report

OELM-AR_EN.v4[05-2020]

At the conclusion of a twelve month cycle of 24 samples performance for each element is summarized with:

Analyte; the box is coloured in green when all the criteria are satisfactory.

Submissions; the number of results reported and the total number of samples.

Performance; cumulative performance score at the end of the cycle and the minimum score that is indicative of acceptable performance. A score lower than 48 is shown within a red box. The maximum possible score is 72.

Please note that the cumulative performance score is based on 24 submitted results and may not reflect the actual laboratory performance if participants change their method set during the cycle, submit less than 24 results or submit part of the results with different method set.

Trueness; your mean z-score of all samples and the mean z-score of all individual mean z-scores of all participants. Before the calculations, outliers* are removed from the set of 24 results (12 duplicated samples).

Precision; your intra-laboratory coefficient of variation and the median of the intra-laboratory coefficients of variation of all participants. The intra-laboratory coefficient of variation is calculated from the twelve duplicates in the 24 samples according to:

$$CV = \frac{\sqrt{\frac{\sum(\Delta)^2}{n}}}{\bar{x} \sqrt{2}} \times 100\%$$

CV = Coefficient of Variation

Δ = difference in the duplicate

n = number of duplicates

\bar{x} = mean of the results for all the couples of paired samples submitted. Minimum number of pairs requested is three.

Outliers* are removed from the set of 24 results (12 duplicated samples).

Recovery; is derived from the plot $y = ax + b$ between the added amount of analyte on the x-axis and the results reported by the laboratory on the y-axis. Recovery = 100% x slope (a). The endogenous amount is b.

Your recovery and the median of the recoveries of all participants are given. Recovery data are available when at least one non outlier* result for at least three different concentration levels has been reported.

Before the calculations, outliers* are removed from the set of 24 results (12 duplicated samples).

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Linearity; r (the correlation coefficient) of the recovery plot calculated from the spiked amounts and your results (and the median of the correlation coefficients of all participants). Linearity data are available when at least one non outlier* result for at least three different concentration levels has been reported.

Before the calculations, outliers* are removed from the set of 24 results (12 duplicated samples).

General; sub-column “N” is the number of participants that submitted results, and sub-column “CV” shows the inter-laboratory coefficient of variation according to the formula:

$$CV = \frac{\sqrt{\frac{\sum \sigma^2}{n}}}{\bar{x}}$$

CV = Coefficient of Variation

σ = robust SD of the respective 24 samples

n = number of samples ($n=24$)

\bar{x} = the mean of all robust means of the respective 24 samples

For each of these parameters if your performance is among the 5% of poorest performing laboratories the box is coloured amber. These flags help you to indentify the cause of poor performance: reproducibility, linearity, accuracy.

Additional graph When you click on a trace element in the first column of the table a graph will be displayed on the screen with the spiked concentrations on the x-axis and your results on the y-axis.

The line of equivalence is in black and the best line through your results is in blue. This graph is drawn when at least one non outlier* result for at least three different concentration levels has been reported by at least one lab. The individual results are indicated with squares.

The lab-specific line is only drawn when that lab submitted at least three non outlier* data of three different concentration levels

When none of the laboratories meets this criterion of at least three non outlier* results the matrix of the graph is not constructed at all.

When the graph is drawn, depending on what a lab submitted, there can be three pictures:

- when the lab submitted no data at all there will only be the matrix and the line of equivalence

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- when the lab submitted one or two data, there will be the matrix, the line of equivalence and the individual results (only squares, no line for that lab)
- when the lab submitted three or more non outlier* data, there will be the matrix, the line of equivalence, the individual results (squares) of that lab and the line and equation for that lab

If the blue line is parallel to the line of equivalence, recovery is about 100%. If the blue line is not parallel to the line of equivalence there is a concentration dependent bias.

Good reproducibility is shown when the squares of paired samples are close to each other.

If the squares do not fall on a straight line there is a linearity problem.

Red squares indicate that there were outliers* – implying that the method used was not robust.

Educational Samples

In case of Educational samples your results will not be included for all the items mentioned above.

Submissions, Performance and Trueness: the results of all samples (including the educational samples) have been taken into account. Maximum score will be 72 and number of samples is 24.

Precision, Recovery, Linearity and General: the results of the educational samples have not been taken into account for the calculation of these items.

Annual Letter (if applicable)

Below the table is a button “annual letter”. When you click on this button you will find a letter written by the scheme organisers including information on the annual report.

If applicable a comment concerning the annual report can be present.

***Outlier** are defined as results with z-score lower than -5 or higher than +5