21NRM04 BiometCAP

Deliverable D4: Reporting procedure for industrial gas analysers and a template for the submission of the performance evaluation results

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Deliverable Cover Sheet

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1 Summary

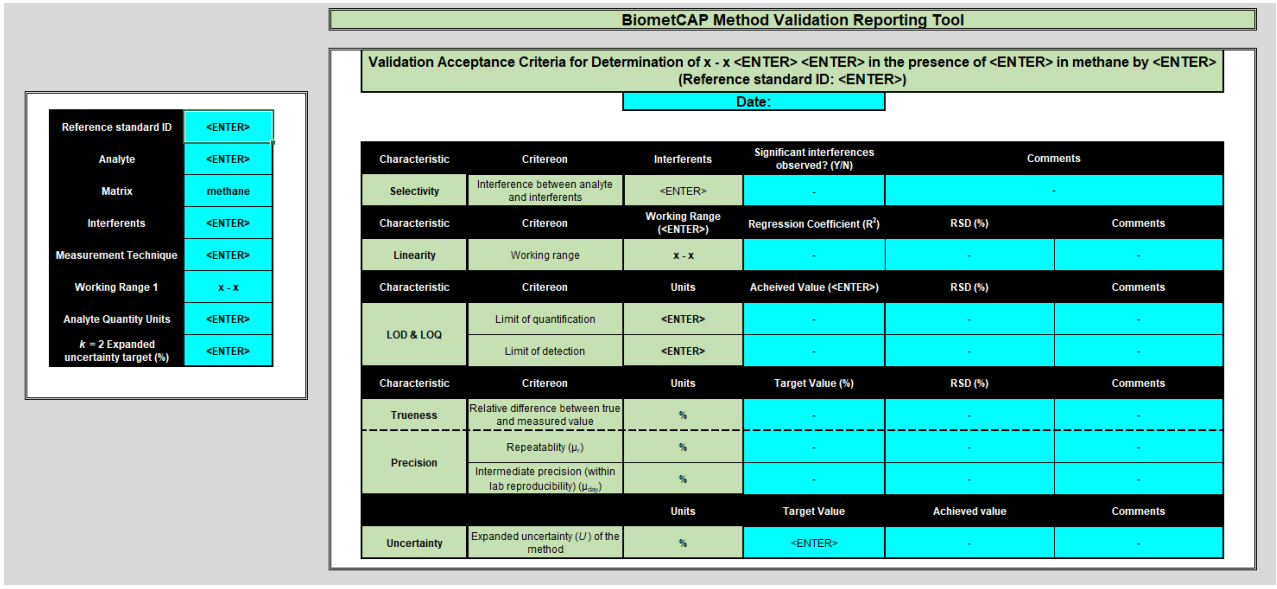
This document describes a reporting procedure for industrial gas analysers. It is intended for use alongside the associated excel template for the submission of the performance evaluation results.

2 Reporting procedure

Navigate to “reporting tool” tab of the spreadsheet associated with this document. Enter the required information in cell D6:D13. For each performance characteristic, enter the required information and evaluation results in columns J:M.

A screenshot of the excel template is provided in Figure 1.

Figure 1: Reporting template data entry page



Reference standard ID	<ENTER>
Analyte	<ENTER>
Matrix	methane
Interferents	<ENTER>
Measurement Technique	<ENTER>
Working Range 1	x - x
Analyte Quantity Units	<ENTER>
k = 2 Expanded uncertainty target (%)	<ENTER>

BiometCAP Method Validation Reporting Tool

Validation Acceptance Criteria for Determination of x - x <ENTER> <ENTER> in the presence of <ENTER> in methane by <ENTER> (Reference standard ID: <ENTER>)

Date:

Characteristic	Critereon	Interferents	Significant interferences observed? (Y/N)	Comments	
Selectivity	Interference between analyte and interferents	<ENTER>	-	-	
Characteristic	**Critereon**	**Working Range (<ENTER>)**	**Regression Coefficient (R^2)**	**RSD (%)**	**Comments**
Linearity	Working range	x - x	-	-	-
Characteristic	**Critereon**	**Units**	**Acheived Value (<ENTER>)**	**RSD (%)**	**Comments**
LOD & LOQ	Limit of quantification	<ENTER>	-	-	-
	Limit of detection	<ENTER>	-	-	-
Characteristic	**Critereon**	**Units**	**Target Value (%)**	**RSD (%)**	**Comments**
Trueness	Relative difference between true and measured value	%	-	-	-
Precision	Repeatablity (μ_r)	%	-	-	-
	Intermediate precision (within lab reproducibility) (μ_{lab})	%	-	-	-
		Units	**Target Value**	**Achieved value**	**Comments**
Uncertainty	Expanded uncertainty (*U*) of the method	%	<ENTER>	-	-

Background information on performance characteristics is provided in Table 1.

Table 1: Information on reporting parameters for reporting template

Reporting parameter	Critereon	Definition	How to perform calculation	Section in BiometCAP protocol	Section in Eurachem guide
Selectivity	Interference	the ability of the method to determine particular analytes in mixtures or matrices without interferences from other components of similar behaviour	First, research must be performed to understand how the detector works, the types of compounds that would be detected by the method, and the types of compounds that are expected to be present in the sample. Using this knowledge, the appropriate mixture should be run using the method to compare retention times and detector sensitivity.	4.6.2	6.1
Linearity	Working range	The amount fraction range in which measurements can be performed. This will depend on the set up of the analytical equipment such as sample loop and detector sensitivity.	Measure blank plus 6-10 amount fractions across the entire intended working range using either PRMS of a dynamic standard. Plot response (y-axis) against amount fraction (x-axis). Visually examine the upper and lower boundaries, and for an initial estimate of the linear range.	4.6.4	6.2
	Regression coefficient over the working range (Linearity)	When plotting the calibration curve how well does it fit a straight line. This is important when measuring a sample that falls between two points of a calibration curve.	Plot the calibration curve in excel and determine the R^2 using trendline function. If the linearity is poor, reduce the working range of the method and define this as the "linear range"		
LOD & LOQ	LOD (Limit of Detection)	the lowest content of analyte that can be detected by the method at a specified level of confidence (clear visible signal rather than blank/zero)	Produce low level amount fraction that is expected to be close to the LOD and perform measurmeent multiple times. Calculate LOD as 3 x s'_0 (following flow chart)	4.6.3	6.3
	LOQ (Limit of Quantification)	The minimum amount fraction at which a measurement result with assigned uncertainty can be made with confidence an acceptable degree of confidence.	Produce low level amount fraction that is expected to be close to the LOD and perform measuerment multiple times. It is recommended that the LOD + u_{LOQ} is less than threshold amount fraction. Calculate LOD as 10 x s'_0 (following flow chart). In this case k_Q = 10 (which is commonly used), but the value can be changed by the supervisor		
Trueness (bias)	Relative difference	A quantitative measure of the trueness for the method - indicating the difference between a reference value (such as traceable Primary Reference Material) and result provided by method	Produce one PRM and measure it at an amount fraction close to the threshold value that is being targeted for this method. Use Xlgenline to determine the difference between the measurement amount fraction level and the gravimetric amount fraction	4.7.1	6.5
Precision	Repeatability	Measure of the variability in results when measurements are performed in a single laboratory over a short timescale.	Perform repeated measurement of the PRM at least six times in succession and calculate the relative standard deviation.	4.7.2	6.6
	Intermediate precision	Measure of the variability in results when measurements are made in a single laboratory but under conditions that are more variable than repeatability conditions (e.g. on different days)	Perform measurement of the PRM at least three times using the same method and instrument but change parameters such as the analyst, day and/or timescale. Use "ANOVA:single factor" function in excel to determine the between groups variation		
Uncertainty	Expanded uncertainty (k = 2)	The total uncertainty the method including bias, repeatability and intermediate precision.	The total uncertainty for the measurement is calculated using the standard GC data template.	4.8	6.7
Validation report		Final report that shall be published along with the developed method to provide details about the method, how it was validated, outcome of validation process and approved signatory	Use this validation reporting template	4.9	Annex A