Determination of butanol in commercial-grade acetone using calibration curve method (12.07.07)

Object: commercial-grade acetone. Analyte: butanol. Internal standard: isopentanol

Deriving the calibration line

For deriving the calibration line calibration standard solutions were prepared in pure (Merck HPLC grade) acetone to which the weighed amount of the internal standard solution was transferred (m_{Is}graph, about 1.5%).

After adding the amount of internal standard, the solution of butanol was added gradually (concentration of the butanol solution $c_{BuOH\_initial}$ was about 0.5%). The vial was weighed before each addition and mixed with magnetic stirrer to ensure homogenity of the solution.

Ratios of the concentrations of standard solutions were calculated according to the following formula: $x_n=c_{n\_BuOH}/c_{n\_Is}$ Percentage concentrations of the internal standard and butanol were calculated according to the formaulas given below:

$c_{n\_Is}=c_{n\text{-}1s}*(m_{n\_before\text{-}m}empty)/(m_{n\_before\text{-}m}n\_added\text{-}m_{empty})$;
$c_{n\_BuOH}=(m_{n\_added}*c_{BuOH\_initial}/100+c_{BuOH\_n\text{-}1}*(m_{n\_before\text{-}m}empty)/100)/(m_{n\_before+m}n\_added\text{-}m_{em}$ pty)*100;
The calibration line was plotted S_{BuOH}/S_{Is} vs $x_n=c_{n\_BuOH}/c_{n\_Is,}$ where S_{BuOH} and S_{Is} are peak areas of butanol and internal standard respectively. The numerical values of peak areas used were calculated by integrator of the chromatograph.

Analysis of the sample

Weighed amount of the internal standard solution m_{Is_rep} (with the same percentage concentration as was used for preparing calibartion standard solutions) was added to certain amount of commercial-grade acetone $m_{ac.}$ Addition of internal standard solution reduces the concentration of butanol, therefore the final concentration of butanol in the commercial grade acetone was calculated as follows:
$C_{sample}=c_{BuOH}*(m_{ac+m}Is)/m_{ac}$

c_{BuOH} stands for the content of butanol in acetone obtained directly from the calibration line to which the internal standard solution had been added.

The drift in weighing is larger than usual because of the volatility of acetone.

Model Equation:

{Concentration of butanol in the commercial-grade acetone analysed}

$C_{sample}=c_{BuOH}*(m_{ac}+m_{Is})/m_{ac}$;

{Concentration of BuOH in the commercial-grade acetone calculated from the calibration line to which the solution

of internal standard has been added}

$c_{BuOH}=c_{Is}*x$;

{ mass of acetone taken for analysis

here and below the drift component of weighing acetone or acetone solutions is mainly due to the volatility of acetone and was determined experimentally

}

$m_{ac}=m_{ac\_rep}+m_{ac\_drift}+m_{ac\_round}$;

{The weight of internal standard added to the commercial-grade acetone taken for analysis}

$m_{Is}=m_{Is\_rep}+m_{Is\_drift}+m_{Is\_round}$;

{Ratio of the concentrations of butanol and internal standard in the sample obtained from the calibration line}

$x=(y-b_0)/b_1$;

{Ratio of the peak areas of butanol and internal standard obtained from the chromatogram of the sample}

$y=y_{rep}+y_{nonopt}$;

{The regression equations for finding the slope (b_1) and intercept (b_0) of the calibration line: $y = b_0 + b_1 * x$}

$\Sigma xy=x1*y1+x2*y2+x3*y3+x4*y4+x5*y5+x6*y6$;

$Avgx=(x1+x2+x3+x4+x5+x6)/6$;

$Avgy=(y1+y2+y3+y4+y5+y6)/6$;

$\Sigma xx=x1*x1+x2*x2+x3*x3+x4*x4+x5*x5+x6*x6$;

$b_1=(\Sigma xy-6*Avgx*Avgy)/(\Sigma xx-6*Avgx*Avgx)$;

$b_0=Avgy-b_1*Avgx$;

{Uncertainty of the ratios of peak areas}

$y1=y1_{nonopt}+y1_{rep}$;

$y2=y2_{nonopt}+y2_{rep}$;

$y3=y3_{nonopt}+y3_{rep}$;

$y4=y4_{nonopt}+y4_{rep}$;

$y5=y5_{nonopt}+y5_{rep}$;

$y6=y6_{nonopt}+y6_{rep}$;

{Addition of the internal standard solution to acetone standard solution and

calculation of the initial concentration of the internal standard}

$c_{Is}=m_{Is}/(m_{Is}+m_{ac})*c_{Is\_initial}$;

{Percentage concentration of internal standard in calibration standard solutions}

$c_{1\_Is}=c_{Is\_graph}*(m_{1\_before}-m_{empty})/(m_{1\_before}+m_{1\_added}-m_{empty})$;

$c_{2\_Is}=c_{1\_Is}*(m_{2\_before}-m_{empty})/(m_{2\_before}+m_{2\_added}-m_{empty})$;

$c_{3\_Is}=c_{2\_Is}*(m_{3\_before}-m_{empty})/(m_{3\_before}+m_{3\_added}-m_{empty})$;

$c_{4\_Is}=c_{3\_Is}*(m_{4\_before}-m_{empty})/(m_{4\_before}+m_{4\_added}-m_{empty})$;

$c_{5\_Is}=c_{4\_Is}*(m_{5\_before}-m_{empty})/(m_{5\_before}+m_{5\_added}-m_{empty})$;

$c_{6\_Is}=c_{5\_Is}*(m_{6\_before}-m_{empty})/(m_{6\_before}+m_{6\_added}-m_{empty})$;

{Percentage concentration of butanol in calibration standard solutions. The calibration standard solutions were prepared

by adding butanol solution (initial concentration $c_{BuOH\_initial}$) to the same vial}

$c_{1\_BuOH}=(m_{1\_added}*c_{BuOH\_initial}/100)/(m_{1\_before}+m_{1\_added}-m_{empty})*100$;

$c_{2\_BuOH}=(m_{2\_added}*c_{BuOH\_initial}/100+c_{1\_BuOH}*(m_{2\_before}-m_{empty})/100)/(m_{2\_before}+m_{2\_added}-m_{empty})*100;$

$c_{3\_BuOH}=(m_{3\_added}*c_{BuOH\_initial}/100+c_{2\_BuOH}*(m_{3\_before}-m_{empty})/100)/(m_{3\_before}+m_{3\_added}-m_{empty})*100;$

$c_{4\_BuOH}=(m_{4\_added}*c_{BuOH\_initial}/100+c_{3\_BuOH}*(m_{4\_before}-m_{empty})/100)/(m_{4\_before}+m_{4\_added}-m_{empty})*100;$

$c_{5\_BuOH}=(m_{5\_added}*c_{BuOH\_initial}/100+c_{4\_BuOH}*(m_{5\_before}-m_{empty})/100)/(m_{5\_before}+m_{5\_added}-m_{empty})*100;$

$c_{6\_BuOH}=(m_{6\_added}*c_{BuOH\_initial}/100+c_{5\_BuOH}*(m_{6\_before}-m_{empty})/100)/(m_{6\_before}+m_{6\_added}-m_{empty})*100;$

{Calculation of the x-components of calibration standard solutions}

$x1=c_{1\_BuOH}/c_{1\_Is};$

$x2=c_{2\_BuOH}/c_{2\_Is};$

$x3=c_{3\_BuOH}/c_{3\_Is};$

$x4=c_{4\_BuOH}/c_{4\_Is};$

$x5=c_{5\_BuOH}/c_{5\_Is};$

$x6=c_{6\_BuOH}/c_{6\_Is};$

{Concentration of internal standard in the acetone standard solution. .

The internal standard solution (initial concentration $c_{Is\_initial}$) was added to the acetone solution}

$c_{Is\_graph}=m_{Is\_graph}/(m_{Is\_graph}+m_{ac\_graph})*c_{Is\_initial};$

$m_{Is\_graph}=m_{Is\_graph\_rep}+m_{Is\_graph\_drift}+m_{Is\_graph\_round};$

$m_{ac\_graph}=m_{ac\_graph\_rep}+m_{ac\_graph\_drift}+m_{ac\_graph\_round};$

{Concentration of initial internal standard solution}

$c_{Is\_initial}=(m_{isopent}/(m_{isopent}+m_{acetone}))*100;$

{Concentration of initial butanol solution. This solution is used for the preparation of calibration standard solutions}

$c_{BuOH\_initial}=(m_{BuOH\_initial}/(m_{BuOH\_initial}+m_{ac\_BuOH}))*100;$

{Uncertainties of the weights of butanol solution added to calibration standard solutions}

$m_{1\_added}=m_{1\_added\_rep}+m_{1\_added\_drift}+m_{1\_added\_round};$

$m_{2\_added}=m_{2\_added\_rep}+m_{2\_added\_drift}+m_{2\_added\_round};$

$m_{3\_added}=m_{3\_added\_rep}+m_{3\_added\_drift}+m_{3\_added\_round};$

$m_{4\_added}=m_{4\_added\_rep}+m_{4\_added\_drift}+m_{4\_added\_round};$

$m_{5\_added}=m_{5\_added\_rep}+m_{5\_added\_drift}+m_{5\_added\_round};$

$m_{6\_added}=m_{6\_added\_rep}+m_{6\_added\_drift}+m_{6\_added\_round};$

{Uncertainty components of the weight of initial butanol solution}

$m_{BuOH\_initial}=m_{BuOH\_initial\_rep}*P+m_{BuOH\_initial\_drift}+m_{BuOH\_initial\_round};$

$m_{ac\_BuOH}=m_{ac\_BuOH\_rep}+m_{ac\_BuOH\_drift}+m_{ac\_BuOH\_round};$

{Purity of butanol}

P;

{Uncertainty of the weight of empty vial}

$m_{empty}=m_{empty\_rep}+m_{empty\_drift}+m_{empty\_round}$;

{Uncertainties of the weight of calibration standard solutions before adding next amount of butanol}

$m_{1\_before}=m_{1\_before\_rep}+m_{1\_before\_drift}+m_{1\_before\_round}$;

$m_{2\_before}=m_{2\_before\_rep}+m_{2\_before\_drift}+m_{2\_before\_round}$;

$m_{3\_before}=m_{3\_before\_rep}+m_{3\_before\_drift}+m_{3\_before\_round}$;

$m_{4\_before}=m_{4\_before\_rep}+m_{4\_before\_drift}+m_{4\_before\_round}$;

$m_{5\_before}=m_{5\_before\_rep}+m_{5\_before\_drift}+m_{5\_before\_round}$;

$m_{6\_before}=m_{6\_before\_rep}+m_{6\_before\_drift}+m_{6\_before\_round}$;

{Uncertainty components of the weight of initial internal standard solution}

$m_{isopent}=m_{isopent\_rep}+m_{isopent\_drift}+m_{isopent\_round}$;

$m_{acetone}=m_{acetone\_rep}+m_{acetone\_drift}+m_{acetone\_round}$;

List of Quantities:

Quantity	Unit	Definition
C_{sample}	%	Concentration of butanol in the commercial-grade acetone analysed
c_{BuOH}	%	BuOH concentration in acetone calculated from the calibration line to which the solution of the internal standard has been added (will be defined as "sample" below)
m_{ac}	g	The weight of acetone taken for the analysis
m_{ls}	g	The weight of the internal standard added to the acetone taken for the analysis
c_{ls}	%	Concentration of the internal standard in the sample after adding the internal standard
x	%	Ratio of the concentrations of BuOH and internal standard in the sample
m_{ac_rep}	g	Value and the repeatability uncertainty component of the weight of acetone taken for the analysis
m_{ac_drift}	g	Drift uncertainty component of the weight of acetone taken for the analysis
m_{ac_round}	g	Rounding uncertainty component of the weight of acetone taken for the analysis
m_{ls_rep}	g	Value and the repeatability uncertainty component of the weight of internal standard added to the acetone taken for analysis
m_{ls_drift}	g	Drift uncertainty component of the weight of internal standard added to the acetone taken for analysis
m_{ls_round}	g	Rounding uncertainty component of the weight of internal standard added to the acetone taken for analysis
y		Ratio of the peak areas of BuOH and internal standard in the sample
b_0		Intercept of the calibration line
b_1		Slope of the calibration line

Quantity	Unit	Definition
y_{rep}		Value and the repeatability uncertainty component of the ratio of the areas of the peaks of BuOH and internal standard
y_{nonopt}		Nonoptimality resulting from the parametres of the integrators
Σxy		Interim quantity for regression statistics calculation
x1	%	Concentration of the 1. calibration standard solution
y1		Ratio of the peak areas of BuOH and internal standard in the 1. calibration standard solution
x2	%	Concentration of the 2. calibration standard solution
y2		Ratio of the peak areas of BuOH and internal standard in the 2. calibration standard solution
x3	%	Concentration of the 3. calibration standard solution
y3		Ratio of the peak areas of BuOH and internal standard in the 3. calibration standard solution
x4	%	Concentration of the 4. calibration standard solution
y4		Ratio of the peak areas of BuOH and internal standard in the 4. calibration standard solution
x5	%	Concentration of the 5. calibration standard solution
y5		Ratio of the peak areas of BuOH and internal standard in the 5. calibration standard solution
x6	%	Concentration of the 6. calibration standard solution
y6		Ratio of the peak areas of BuOH and internal standard in the 6. calibration standard solution
Avgx		Interim quantity for regression statistics calculation
Avgy		Interim quantity for regression statistics calculation
Σxx		Interim quantity for regression statistics calculation
$y1_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 1. calibration standard solution
$y1_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 1. calibration standard solution
$y2_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 2. calibration standard solution
$y2_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 2. calibration standard solution
$y3_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 3. calibration standard solution
$y3_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 3. calibration standard solution
$y4_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 4. calibration standard solution
$y4_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 4. calibration standard solution
$y5_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 5. calibration standard solution

Quantity	Unit	Definition
$y5_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 5. calibration standard solution
$y6_{nonopt}$		Value and the integration parameter nonoptimality uncertainty component of the ratio of peak areas of the 6. calibration standard solution
$y6_{rep}$		Repeatability uncertainty component of the ratio of peak areas of BuOH and internal standard of the 6. calibration standard solution
$c_{Is\_initial}$	%	Initial concentration of the internal standard solution
c_{1_Is}	%	Concentration of internal standard in the 1. calibration standard solution
c_{Is_graph}	%	Concentration of internal standard in acetone standard solution before the 1. addition of BuOH solution
m_{1_before}	g	Weight of the vial before the 1. addition of BuOH solution
m_{empty}	g	Weight of the empty vial
m_{1_added}	g	Weight of the butanol solution added to the 1. calibration standard solution
c_{2_Is}	%	Concentration of internal standard in the 2. calibration standard solution
m_{2_before}	g	Weight of the vial before the 2. addition of BuOH solution
m_{2_added}	g	Weight of the butanol solution added to the 2. calibration standard solution
c_{3_Is}	%	Concentration of internal standard in the 3. calibration standard solution
m_{3_before}	g	Weight of the vial before the 3. addition of BuOH solution
m_{3_added}	g	Weight of the butanol solution added to the 3. calibration standard solution
c_{4_Is}	%	Concentration of internal standard in the 4. calibration standard solution
m_{4_before}	g	Weight of the vial before the 4. addition of BuOH solution
m_{4_added}	g	Weight of the butanol solution added to the 4. calibration standard solution
c_{5_Is}	%	Concentration of internal standard in the 5. calibration standard solution
m_{5_before}	g	Weight of the vial before the 5. addition of BuOH solution
m_{5_added}	g	Weight of the butanol solution added to the 5. calibration standard solution
c_{6_Is}	%	Concentration of internal standard in the 6. calibration standard solution
m_{6_before}	g	Weight of the vial before the 6. addition of BuOH solution
m_{6_added}	g	Weight of the butanol solution added to the 6. calibration standard solution
c_{1_BuOH}	%	Concentration of butanol in the 1. calibration standard solution
$c_{BuOH\_initial}$	%	Concentration of butanol in the butanol solution added to acetone standard solution
c_{2_BuOH}	%	Concentration of butanol in the 2. calibration standard solution
c_{3_BuOH}	%	Concentration of butanol in the 3. calibration standard solution
c_{4_BuOH}	%	Concentration of butanol in the 4. calibration standard solution
c_{5_BuOH}	%	Concentration of butanol in the 5. calibration standard solution

Quantity	Unit	Definition
c_{6_BuOH}	%	Concentration of butanol in the 6. calibration standard solution
m_{Is_graph}	g	Weight of internal standard added for the preparation of initial acetone standard solution
m_{ac_graph}	g	Weight of acetone taken for the preparation of initial acetone standard solution
$m_{Is\_graph\_rep}$	g	Value and repeatability uncertainty component of the weight of internal standard solution taken for the preparation of initial acetone standard solution
$m_{Is\_graph\_drift}$	g	Drift uncertainty component of the weight of internal standard solution taken for the preparation of initial acetone standard solution
$m_{Is\_graph\_round}$	g	Rounding uncertainty component of the weight of internal standard solution taken for the preparation of initial acetone standard solution
$m_{ac\_graph\_rep}$	g	Value and repeatability uncertainty component of the weight of acetone taken for the preparation of initial acetone standard solution
$m_{ac\_graph\_drift}$	g	Drift uncertainty component of the weight of acetone taken for the preparation of initial acetone standard solution
$m_{ac\_graph\_round}$	g	Rounding uncertainty component of the weight of acetone taken for the preparation of initial acetone standard solution
$m_{isopent}$	g	Weight of internal standard in the initial internal standard solution
$m_{acetone}$	g	Weight of acetone in the initial internal standard solution
$m_{BuOH\_initial}$	g	Weight of butanol in the initial butanol solution
m_{ac_BuOH}	g	Weight of acetone in the initial butanol solution
$m_{1\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 1.calibration standard solution
$m_{1\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 1. calibration standard solution
$m_{1\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 1. calibration standard solution
$m_{2\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 2.calibration standard solution
$m_{2\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 2. calibration standard solution
$m_{2\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 2. calibration standard solution
$m_{3\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 3.calibration standard solution
$m_{3\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 3. calibration standard solution
$m_{3\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 3. calibration standard solution
$m_{4\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 4.calibration standard solution
$m_{4\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 4. calibration standard solution

Quantity	Unit	Definition
$m_{4\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 4. calibration standard solution
$m_{5\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 5.calibration standard solution
$m_{5\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 5. calibration standard solution
$m_{5\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 5. calibration standard solution
$m_{6\_added\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol solution added to the 6.calibration standard solution
$m_{6\_added\_drift}$	g	Drift uncertainty component of the weight of butanol solution added to the 6. calibration standard solution
$m_{6\_added\_round}$	g	Rounding uncertainty component of the weight of butanol solution added to the 6. calibration standard solution
$m_{BuOH\_initial\_rep}$	g	Value and repeatability uncertainty component of the weight of butanol taken for the preparation of the initial butanol solution
P		Purity of butanol
$m_{BuOH\_initial\_drift}$	g	Drift uncertainty component of the weight of butanol taken for the preparation of the initial butanol solution
$m_{BuOH\_initial\_round}$	g	Rounding uncertainty component of the weight of butanol taken for the preparation of the initial butanol solution
$m_{ac\_BuOH\_rep}$	g	Value and repeatability uncertainty component of the weight of acetone taken for the preparation of initial butanol solution
$m_{ac\_BuOH\_drift}$	g	Drift uncertainty component of the weight of acetone taken for the preparation of the initial butanol solution
$m_{ac\_BuOH\_round}$	g	Rounding uncertainty component of the weight of acetone taken for the preparation of the initial butanol solution
m_{empty_rep}	g	Value and repeatability uncertainty component of the weight of the empty vial
m_{empty_drift}	g	Drift uncertainty component of the weight of empty vial
m_{empty_round}	g	Rounding uncertainty component of the weight of empty vial
$m_{1\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{1\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{1\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution
$m_{2\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{2\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{2\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution

Quantity	Unit	Definition
$m_{3\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{3\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{3\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution
$m_{4\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{4\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{4\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution
$m_{5\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{5\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{5\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution
$m_{6\_before\_rep}$	g	Value and repeatability uncertainty component of the weight of the vial before adding the butanol solution
$m_{6\_before\_drift}$	g	Drift uncertainty component of the weight of the vial before adding the butanol solution
$m_{6\_before\_round}$	g	Rounding uncertainty component of the weight of the vial before adding the butanol solution
$m_{isopent\_rep}$	g	Value and repeatability uncertainty component of the weight of internal standard taken for the preparation of initial internal standard solution
$m_{isopent\_drift}$	g	Drift uncertainty component of the weight of internal standard taken for the preparation of initial internal standard solution
$m_{isopent\_round}$	g	Rounding uncertainty component of the weight of internal standard taken for the preparation of initial internal standard solution
$m_{acetone\_rep}$	g	Value and repeatability uncertainty component of the weight of acetone taken for the preparation of initial internal standard solution
$m_{acetone\_drift}$	g	Drift uncertainty component of the weight of acetone taken for the preparation of initial internal standard solution
$m_{acetone\_round}$	g	Rounding uncrtainty component of the weight of acetone taken for the preparation of initial internal standard solution

C_{sample}: Result

c_{BuOH}: Interim Result

m_{ac}: Interim Result

m_{Is}: Interim Result

c_{Is}: Interim Result

x: Interim Result

m_{ac_rep}: Type B normal distribution
Value: 1.0073 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

m_{ac_drift}: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

m_{ac_round}: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

m_{ls_rep}: Type B normal distribution
Value: 0.0259 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

m_{ls_drift}: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

m_{ls_round}: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

y: Interim Result

b_0: Interim Result

b_1: Interim Result

y_{rep}: Type B normal distribution
Value: 2.1718
Expanded Uncertainty: .021718
Coverage Factor: 1

y_{nonopt}: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.0326
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

Σxy: Interim Result

x1: Interim Result

y1: Interim Result

x2: Interim Result

y2: Interim Result

x3: Interim Result

y3: Interim Result

x4: Interim Result

y4: Interim Result

x5: Interim Result

y5: Interim Result

x6: Interim Result

y6: Interim Result

Avgx: Interim Result

Avgy: Interim Result

Σxx: Interim Result

$y1_{nonopt}$: Type B normal distribution
Value: 0.623216
Expanded Uncertainty: 0.00934
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y1_{rep}$: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.00623216
Coverage Factor: 1

$y2_{nonopt}$: Type B normal distribution
Value: 1.154337
Expanded Uncertainty: 0.01731
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y2_{rep}$: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.01154
Coverage Factor: 1

$y3_{nonopt}$: Type B normal distribution
Value: 1.725065
Expanded Uncertainty: 0.02587
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks

using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y3_{rep}$: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.01725
Coverage Factor: 1

$y4_{nonopt}$: Type B normal distribution
Value: 2.357379
Expanded Uncertainty: 0.035361
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y4_{rep}$: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.02357
Coverage Factor: 1

$y5_{nonopt}$: Type B normal distribution
Value: 2.934562
Expanded Uncertainty: 0.044018
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y5_{rep}$: Type B normal distribution
Value: 0
Expanded Uncertainty: 0.02934562
Coverage Factor: 1

$y6_{nonopt}$: Type B normal distribution
Value: 3.531785
Expanded Uncertainty: 0.052977
Coverage Factor: 1

The uncertainty due to "non-optimality" of peak integration includes the uncertainty that arises from less than optimal settings of peak integration parameters and possibly peak overlab (this does not apply to this example: all peaks were well resolved). This contriboution was estimated by integrating the peaks using different peak integrator settings and calculating the peak area ratios. The variability of the area reatios was used as the estimate of non-optimality uncertainty. With our integrator the standard uncertainty due to non-optimality was estimated as 1.5% of the peak area.

$y6_{rep}$:	Type B normal distribution Value: 0 Expanded Uncertainty: 0.03531785 Coverage Factor: 1
$c_{ls\_initial}$:	Interim Result
c_{1_ls}:	Interim Result
c_{ls_graph}:	Interim Result
m_{1_before}:	Interim Result
m_{empty}:	Interim Result
m_{1_added}:	Interim Result
c_{2_ls}:	Interim Result
m_{2_before}:	Interim Result
m_{2_added}:	Interim Result
c_{3_ls}:	Interim Result
m_{3_before}:	Interim Result
m_{3_added}:	Interim Result
c_{4_ls}:	Interim Result
m_{4_before}:	Interim Result
m_{4_added}:	Interim Result
c_{5_ls}:	Interim Result
m_{5_before}:	Interim Result
m_{5_added}:	Interim Result
c_{6_ls}:	Interim Result
m_{6_before}:	Interim Result
m_{6_added}:	Interim Result
c_{1_BuOH}:	Interim Result
$c_{BuOH\_initial}$:	Interim Result
c_{2_BuOH}:	Interim Result
c_{3_BuOH}:	Interim Result
c_{4_BuOH}:	Interim Result
c_{5_BuOH}:	Interim Result
c_{6_BuOH}:	Interim Result
m_{ls_graph}:	Interim Result
m_{ac_graph}:	Interim Result
$m_{ls\_graph\_rep}$:	Type B normal distribution Value: 0.0404 g Expanded Uncertainty: 0.00004472 g Coverage Factor: 1

$m_{ls\_graph\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{ls\_graph\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{ac\_graph\_rep}$: Type B normal distribution
Value: 1.6816 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{ac\_graph\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{ac\_graph\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{isopent}$: Interim Result

$m_{acetone}$: Interim Result

$m_{BuOH\_initial}$: Interim Result

m_{ac_BuOH}: Interim Result

$m_{1\_added\_rep}$: Type B normal distribution
Value: 0.0164 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{1\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{1\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{2\_added\_rep}$: Type B normal distribution
Value: 0.0166 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{2\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{2\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{3\_added\_rep}$: Type B normal distribution
Value: 0.0151 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{3\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{3\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{4\_added\_rep}$: Type B normal distribution
Value: 0.0164 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{4\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{4\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{5\_added\_rep}$: Type B normal distribution
Value: 0.0158 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{5\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{5\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{6\_added\_rep}$: Type B normal distribution
Value: 0.0172 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{6\_added\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{6\_added\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{BuOH\_initial\_rep}$: Type B normal distribution
Value: 0.0149 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

P:
Type B normal distribution
Value: 0.98
Expanded Uncertainty: 0.004
Coverage Factor: 1

$m_{BuOH\_initial\_drift}$:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{BuOH\_initial\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{ac\_BuOH\_rep}$:
Type B normal distribution
Value: 5.005 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{ac\_BuOH\_drift}$:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{ac\_BuOH\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

m_{empty_rep}:
Type B normal distribution
Value: 22.8039 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

m_{empty_drift}:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

m_{empty_round}:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{1\_before\_rep}$:
Type B normal distribution
Value: 24.4882 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{1\_before\_drift}$:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{1\_before\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{2\_before\_rep}$:
Type B normal distribution
Value: 24.4922 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{2\_before\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{2\_before\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{3\_before\_rep}$: Type B normal distribution
Value: 24.5064 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{3\_before\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{3\_before\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{4\_before\_rep}$: Type B normal distribution
Value: 24.5182 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{4\_before\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{4\_before\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{5\_before\_rep}$: Type B normal distribution
Value: 24.5305 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{5\_before\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{5\_before\_round}$: Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{6\_before\_rep}$: Type B normal distribution
Value: 24.5449 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{6\_before\_drift}$: Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{6\_before\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{isopent\_rep}$:
Type B normal distribution
Value: 0.0178 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{isopent\_drift}$:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{isopent\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

$m_{acetone\_rep}$:
Type B normal distribution
Value: 6.4809 g
Expanded Uncertainty: 0.00004472 g
Coverage Factor: 1

$m_{acetone\_drift}$:
Type B normal distribution
Value: 0 g
Expanded Uncertainty: 0.0001798 g
Coverage Factor: 1

$m_{acetone\_round}$:
Type B rectangular distribution
Value: 0 g
Halfwidth of Limits: 0.00005 g

Uncertainty Budget:

Quantity	Value	Standard Uncertainty	Distribution	Sensitivity Coefficient	Uncertainty Contribution	Index
m_{ac_rep}	1.0073000 g	0.0000447 g	normal	-0.011	$-510 \cdot 10^{-9}$ %	0.0 %
m_{ac_drift}	0.0 g	0.000180 g	normal	-0.011	$-2.0 \cdot 10^{-6}$ %	0.0 %
m_{ac_round}	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.011	$-330 \cdot 10^{-9}$ %	0.0 %
m_{ls_rep}	0.0259000 g	0.0000447 g	normal	0.44	$20 \cdot 10^{-6}$ %	0.4 %
m_{ls_drift}	0.0 g	0.000180 g	normal	0.44	$79 \cdot 10^{-6}$ %	7.1 %
m_{ls_round}	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.44	$13 \cdot 10^{-6}$ %	0.2 %
y_{rep}	2.1718	0.0217	normal	0.0053	0.00011 %	14.8 %
y_{nonopt}	0.0	0.0326	normal	0.0053	0.00017 %	33.2 %
$y1_{nonopt}$	0.62322	0.00934	normal	-0.00073	$-6.8 \cdot 10^{-6}$ %	0.0 %
$y1_{rep}$	0.0	0.00623	normal	-0.00073	$-4.5 \cdot 10^{-6}$ %	0.0 %
$y2_{nonopt}$	1.1543	0.0173	normal	-0.00079	$-14 \cdot 10^{-6}$ %	0.2 %
$y2_{rep}$	0.0	0.0115	normal	-0.00079	$-9.1 \cdot 10^{-6}$ %	0.0 %
$y3_{nonopt}$	1.7251	0.0259	normal	-0.00084	$-22 \cdot 10^{-6}$ %	0.5 %
$y3_{rep}$	0.0	0.0172	normal	-0.00084	$-15 \cdot 10^{-6}$ %	0.2 %
$y4_{nonopt}$	2.3574	0.0354	normal	-0.00091	$-32 \cdot 10^{-6}$ %	1.2 %
$y4_{rep}$	0.0	0.0236	normal	-0.00091	$-21 \cdot 10^{-6}$ %	0.5 %
$y5_{nonopt}$	2.9346	0.0440	normal	-0.00096	$-42 \cdot 10^{-6}$ %	2.0 %
$y5_{rep}$	0.0	0.0293	normal	-0.00096	$-28 \cdot 10^{-6}$ %	0.9 %
$y6_{nonopt}$	3.5318	0.0530	normal	-0.0010	$-55 \cdot 10^{-6}$ %	3.4 %
$y6_{rep}$	0.0	0.0353	normal	-0.0010	$-36 \cdot 10^{-6}$ %	1.5 %
$m_{ls\_graph\_rep}$	0.0404000 g	0.0000447 g	normal	-0.28	$-12 \cdot 10^{-6}$ %	0.2 %
$m_{ls\_graph\_drift}$	0.0 g	0.000180 g	normal	-0.28	$-50 \cdot 10^{-6}$ %	2.8 %
$m_{ls\_graph\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.28	$-8.0 \cdot 10^{-6}$ %	0.0 %
$m_{ac\_graph\_rep}$	1.6816000 g	0.0000447 g	normal	0.0066	$300 \cdot 10^{-9}$ %	0.0 %
$m_{ac\_graph\_drift}$	0.0 g	0.000180 g	normal	0.0066	$1.2 \cdot 10^{-6}$ %	0.0 %
$m_{ac\_graph\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.0066	$190 \cdot 10^{-9}$ %	0.0 %
$m_{1\_added\_rep}$	0.0164000 g	0.0000447 g	normal	0.19	$8.7 \cdot 10^{-6}$ %	0.0 %
$m_{1\_added\_drift}$	0.0 g	0.000180 g	normal	0.19	$35 \cdot 10^{-6}$ %	1.4 %
$m_{1\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.19	$5.6 \cdot 10^{-6}$ %	0.0 %
$m_{2\_added\_rep}$	0.0166000 g	0.0000447 g	normal	0.17	$7.5 \cdot 10^{-6}$ %	0.0 %
$m_{2\_added\_drift}$	0.0 g	0.000180 g	normal	0.17	$30 \cdot 10^{-6}$ %	1.0 %
$m_{2\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.17	$4.8 \cdot 10^{-6}$ %	0.0 %
$m_{3\_added\_rep}$	0.0151000 g	0.0000447 g	normal	0.14	$6.2 \cdot 10^{-6}$ %	0.0 %
$m_{3\_added\_drift}$	0.0 g	0.000180 g	normal	0.14	$25 \cdot 10^{-6}$ %	0.7 %
$m_{3\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.14	$4.0 \cdot 10^{-6}$ %	0.0 %
$m_{4\_added\_rep}$	0.0164000 g	0.0000447 g	normal	0.11	$4.8 \cdot 10^{-6}$ %	0.0 %

Quantity	Value	Standard Uncertainty	Distribution	Sensitivity Coefficient	Uncertainty Contribution	Index
$m_{4\_added\_drift}$	0.0 g	0.000180 g	normal	0.11	$19 \cdot 10^{-6}$ %	0.4 %
$m_{4\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.11	$3.1 \cdot 10^{-6}$ %	0.0 %
$m_{5\_added\_rep}$	0.0158000 g	0.0000447 g	normal	0.073	$3.3 \cdot 10^{-6}$ %	0.0 %
$m_{5\_added\_drift}$	0.0 g	0.000180 g	normal	0.073	$13 \cdot 10^{-6}$ %	0.2 %
$m_{5\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.073	$2.1 \cdot 10^{-6}$ %	0.0 %
$m_{6\_added\_rep}$	0.0172000 g	0.0000447 g	normal	0.038	$1.7 \cdot 10^{-6}$ %	0.0 %
$m_{6\_added\_drift}$	0.0 g	0.000180 g	normal	0.038	$6.8 \cdot 10^{-6}$ %	0.0 %
$m_{6\_added\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.038	$1.1 \cdot 10^{-6}$ %	0.0 %
$m_{BuOH\_initial\_rep}$	0.0149000 g	0.0000447 g	normal	0.76	$34 \cdot 10^{-6}$ %	1.3 %
P	0.98000	0.00400	normal	0.012	$46 \cdot 10^{-6}$ %	2.4 %
$m_{BuOH\_initial\_drift}$	0.0 g	0.000180 g	normal	0.78	0.00014 %	22.2 %
$m_{BuOH\_initial\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.78	$22 \cdot 10^{-6}$ %	0.6 %
$m_{ac\_BuOH\_rep}$	5.0050000 g	0.0000447 g	normal	-0.0023	$-100 \cdot 10^{-9}$ %	0.0 %
$m_{ac\_BuOH\_drift}$	0.0 g	0.000180 g	normal	-0.0023	$-410 \cdot 10^{-9}$ %	0.0 %
$m_{ac\_BuOH\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.0023	$-66 \cdot 10^{-9}$ %	0.0 %
m_{empty_rep}	22.8039000 g	0.0000447 g	normal	0.0068	$310 \cdot 10^{-9}$ %	0.0 %
m_{empty_drift}	0.0 g	0.000180 g	normal	0.0068	$1.2 \cdot 10^{-6}$ %	0.0 %
m_{empty_round}	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.0068	$200 \cdot 10^{-9}$ %	0.0 %
$m_{1\_before\_rep}$	24.4882000 g	0.0000447 g	normal	-0.0019	$-85 \cdot 10^{-9}$ %	0.0 %
$m_{1\_before\_drift}$	0.0 g	0.000180 g	normal	-0.0019	$-340 \cdot 10^{-9}$ %	0.0 %
$m_{1\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.0019	$-55 \cdot 10^{-9}$ %	0.0 %
$m_{2\_before\_rep}$	24.4922000 g	0.0000447 g	normal	-0.0016	$-74 \cdot 10^{-9}$ %	0.0 %
$m_{2\_before\_drift}$	0.0 g	0.000180 g	normal	-0.0016	$-300 \cdot 10^{-9}$ %	0.0 %
$m_{2\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.0016	$-48 \cdot 10^{-9}$ %	0.0 %
$m_{3\_before\_rep}$	24.5064000 g	0.0000447 g	normal	-0.0012	$-55 \cdot 10^{-9}$ %	0.0 %
$m_{3\_before\_drift}$	0.0 g	0.000180 g	normal	-0.0012	$-220 \cdot 10^{-9}$ %	0.0 %
$m_{3\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.0012	$-35 \cdot 10^{-9}$ %	0.0 %
$m_{4\_before\_rep}$	24.5182000 g	0.0000447 g	normal	-0.0010	$-46 \cdot 10^{-9}$ %	0.0 %
$m_{4\_before\_drift}$	0.0 g	0.000180 g	normal	-0.0010	$-180 \cdot 10^{-9}$ %	0.0 %
$m_{4\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.0010	$-29 \cdot 10^{-9}$ %	0.0 %
$m_{5\_before\_rep}$	24.5305000 g	0.0000447 g	normal	-0.00067	$-30 \cdot 10^{-9}$ %	0.0 %
$m_{5\_before\_drift}$	0.0 g	0.000180 g	normal	-0.00067	$-120 \cdot 10^{-9}$ %	0.0 %
$m_{5\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.00067	$-19 \cdot 10^{-9}$ %	0.0 %
$m_{6\_before\_rep}$	24.5449000 g	0.0000447 g	normal	-0.00037	$-17 \cdot 10^{-9}$ %	0.0 %
$m_{6\_before\_drift}$	0.0 g	0.000180 g	normal	-0.00037	$-67 \cdot 10^{-9}$ %	0.0 %
$m_{6\_before\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	-0.00037	$-11 \cdot 10^{-9}$ %	0.0 %
$m_{isopent\_rep}$	0.0178000 g	0.0000447 g	normal	not valid!	$850 \cdot 10^{-24}$ %	0.0 %

Quantity	Value	Standard Uncertainty	Distribution	Sensitivity Coefficient	Uncertainty Contribution	Index
$m_{isopent\_drift}$	0.0 g	0.000180 g	normal	0.0	0.0 %	0.0 %
$m_{isopent\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	0.0	0.0 %	0.0 %
$m_{acetone\_rep}$	6.4809000 g	0.0000447 g	normal	0.0	0.0 %	0.0 %
$m_{acetone\_drift}$	0.0 g	0.000180 g	normal	0.0	0.0 %	0.0 %
$m_{acetone\_round}$	0.0 g	$28.9 \cdot 10^{-6}$ g	rectangular	not valid!	0.0 %	0.0 %
C_{sample}	0.011410 %	0.000297 %				

Result: Quantity: C_{sample}
Value: 0.01141 %
Expanded Uncertainty: ±0.00059 %
Coverage Factor: 2.00
Coverage: manual