



License ID 459712
Client ID 001-NBK-02361
User Metrohm

Program version viva 2.1 - 60
2020-07-08 11:36:05 UTC+2

Method parameters

Method Leveler determination (CVS, RC) auto 919
method 2
Method saving date 2020-07-08 07:17:06 UTC+2
Method version 1
Method group Main group
Method status original
Method saved by (full name) Metrohm International Headquarters
Method saved by (short name) Metrohm

START

Main track

General

Workplace view

Current view on

Track view for live window

Live display 1 Main track

Live display 2 Main track

Electrode check on

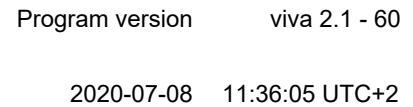
Application note

Sample data variables

Name	Type	Assignment	Fixed value	Comment	Monitoring
ID1	Text	ID1		Sample identification 1	off
ID2	Text	ID2		Sample identification 2	off
ID3	Text	ID3		Sample identification 3	off
Sample type	Text	Sample type		Sample type	off
Sample position	Number	Sample position		Sample position number	off
Sample amount	Number	Sample amount		Sample amount	off
Sample amount unit	Text	Sample amount unit		Sample amount unit	off

Name ID1
Type Text
Assignment on, ID1
Fixed value off.
Check at start on
Comment Sample identification 1

Name ID2
Type Text
Assignment on, ID2



Name Sample amount

AB 402: MVA-20 - Determination of leveler by RC with sample dilution

Call text	Track name	Sample type	Condition
Drain	Drain	off Sample	off

Call text	Track name	Sample type	Condition
CALL PREP Standard	PREP Standard	on Standard	off

Call text	Track name	Sample type	Condition
Add VMS	Electrolyte VMS	off Sample	off
Add suppressor	Electrolyte suppressor	off Sample	off
Add brightener	Electrolyte brightener	off Sample	off

Call text	Conditioning
Track name	VA track
Stop criteria	



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Evaluation quantity on
Voltammetry command CVS
Substance Leveler
Standard deviation 2 %
Number of runs on
Number of runs 20
Action Cancel command
Run time off
Condition off

**CALL
ELECTROL
YTE**

CALL ELECTROLYTE

Call text Measure electrolyte
Track name VA track
Condition off

CALL

Sample or standard?

Call text	Track name	Sample type	Condition
RC Determination	RC Determination	on Sample	off
RC Calibration	RC Calibration	on Standard	off

CALL

CALL Final rinsing

Call text	Track name	Sample type	Condition
Rinsing cycle	Rinsing cycle	off Sample	off

TRACK

RC Determination

Return immediately off
Delete old data off

CALL

Sample addition

Call text	Track name	Sample type	Condition
Add sample automatically	Add sample automatically	off Sample	off

CALL

CALL

Call text	Track name	Sample type	Condition
Additional suppressor	Sample suppressor	off Sample	off
Additional brightener	Sample brightener	off Sample	off

CALL SAMPLE

Call text Measure sample



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CALL VA Track name VA track

Condition off

CALL CALL Rinse needle

Call text	Track name	Sample type	Condition
Rinse needle	Go to rinsing position	off Sample	off

TRACK RC Calibration

Return immediately off

Delete old data off

LOOP LOOP

Stop criteria

Max. run number on

Max. run number 5

Maximum run time off

Signal assessment for DT off

Condition off

ADD STD ADD STD

Standard

Solution Standard or sample

Addition increments

Number 1

Addition volume 1 0.05 mL

Addition

Add manually off

Already added off

Add with dosing device on

Dosing rate 2.0 mL/min

Filling rate maximum mL/min

CALL VA CALL STANDARD

Call text Measure standard

Track name VA track

Condition off

CALL Clean DU standard

Call text	Track name	Sample type	Condition
Clean DU standard	Clean DU standard	off Standard	off

VA track



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VA TRACK Return immediately off

CVS

CVS

General/Hardware

Device

Device name not defined
Device type 884 Professional VA

Sensors/Electrodes

Working electrode RDE
Sensor type RDE/SSE
Reference electrode Reference electrode
Auxiliary electrode Auxiliary electrode
Electrode check on

Stirrer

Stirring rate 2500 min⁻¹
Hydrodynamic measurement on

Pretreatment

Stirring time 5.0 s

Cyclovoltammetric pretreatment

Start potential 0.2 V
Vertex potential 1.625 V
Sweep rate 1 V/s
Cycles off
Duration - s

Potentiostatic pretreatment

Potential 1 off V
Waiting time 1 0.0 s
Potential 2 off V
Waiting time 2 0.0 s
Potential 3 off V
Waiting time 3 0.0 s
Potential 4 off V
Waiting time 4 0.0 s
Potential 5 off V
Waiting time 5 0.0 s
Equilibration time 5.0 s

Sweep

Start potential 1.625 V
1st vertex potential -0.175 V
2nd vertex potential 1.625 V
Potential step 0.006 V
Potential step time 0.060 s
Sweep rate 0.100 V/s
Preparation cycles 1
Measuring cycles 2



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Sweep duration 109.08 s

Post-treatment

Cleaning

Cleaning potential off V

Cleaning time 0.0 s

Standby potential

Standby potential off V

Potentiostat

Current measuring range

Highest range 224 mA

Lowest range 20 µA

TRACK

PREP Standard

Return immediately off

Delete old data off

MOVE

Move to standard

Device

Device name not defined

Device type 919.0020 IC Autosampler plus

Target

Tower 1

Move Sample position

Beaker test

Display message on

Cancel determination off

Cancel determination and series off

Parameters

Shift rate 20 %/s

Shift direction auto

Swing rate 55 %/s

LIFT

Needle → Work position

Device

Device name not defined

Device type 919.0020 IC Autosampler plus

Target

Tower 1

Lift position Work position mm

Parameters

Lift rate 25 mm/s

LOOP

LOOP PREP Standard

Stop criteria

Max. run number on

Max. run number 2

Maximum run time off



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Signal assessment for DT off
Condition off

PREP PREP Standard

Dosing device

Dosing unit 2 mL Standard or sample

CALL Rinsing cycle

Call text	Track name	Sample type		Condition
Rinsing cycle	Rinsing cycle	off	Sample	off

CALL CALL Empty

Call text	Track name	Sample type		Condition
Empty measuring vessel	Drain	off	Sample	off

TRACK Add sample automatically

Return immediately off
Delete old data off

CALL CALL Next sample

Call text	Track name	Sample type		Condition
Next sample	Next sample	off	Sample	off

CALL Transfer sample

Call text	Track name	Sample type		Condition
Peristaltic pump ON	Peristaltic pump	off	Sample	off

ADD SAMPLE ADD SAMPLE

Addition

Add manually off
Already added on
Add with dosing device off

TRACK Go to rinsing position

Return immediately off
Delete old data off

CALL Empty measuring vessel

Call text	Track name	Sample type		Condition
Drain	Drain	off	Sample	off



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MOVE MOVE To rinsing position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Move Rack position
Number = 'SD.Sample position' + 14

Beaker test

Display message on
Cancel determination off
Cancel determination and series off

Parameters

Shift rate 20 °/s
Shift direction auto
Swing rate 55 °/s

LIFT Needle → Work position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Lift position Work position mm

Parameters

Lift rate 25 mm/s

CALL Transfer rinsing solution

Call text	Track name	Sample type	Condition
Peristaltic pump ON	Peristaltic pump off	Sample	off

TRACK Clean DU standard

Return immediately off
Delete old data off

MOVE MOVE to rinsing position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Move Rack position
Number = 'SD.Sample position' + 14

Beaker test

Display message on



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Cancel determination off
Cancel determination and series off

Parameters

Shift rate 20 °/s
Shift direction auto
Swing rate 55 °/s

LIFT Needle → work position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Lift position Work position mm

Parameters

Lift rate 25 mm/s

PREP PREP with water

Dosing device

Dosing unit 2 mL Standard or sample

LIFT Needle → Shift position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Lift position Shift position mm

Parameters

Lift rate 25 mm/s

PUMP Peristaltic pump 30 s

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Pumps

Tower 1
Pump(s) Peristaltic
Rate 10

Action

Switch on off
Switch off off
Duration on
Time 30 s

TRACK Next sample

Return immediately off
Delete old data off



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MOVE MOVE To sample position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Move Sample position

Beaker test

Display message on
Cancel determination off
Cancel determination and series off

Parameters

Shift rate 20 °/s
Shift direction auto
Swing rate 55 °/s

LIFT Needle → Work position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Lift position Work position mm

Parameters

Lift rate 25 mm/s

TRACK Electrolyte VMS

Return immediately off
Delete old data off

ADD AUX ADD VMS

Auxiliary solution

Solution VMS
Volume 23.5 mL
Include volume in calculation on

Addition

Add manually off
Already added off
Add with dosing device on
Dosing rate maximum mL/min
Filling rate maximum mL/min

TRACK Electrolyte suppressor

Return immediately off
Delete old data off

ADD AUX ADD Suppressor

Auxiliary solution



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Solution Suppressor concentrate
Volume 0.5 mL
Include volume in calculation on
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

TRACK Electrolyte brightener

Return immediately off
Delete old data off

ADD AUX ADD Brightener

Auxiliary solution

Solution Brightener concentrate
Volume 1 mL
Include volume in calculation on
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

TRACK Sample suppressor

Return immediately off
Delete old data off

ADD AUX ADD Suppressor

Auxiliary solution

Solution Suppressor concentrate
Volume 0.1 mL
Include volume in calculation on
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

TRACK Sample brightener

Return immediately off
Delete old data off

ADD AUX ADD Brightener

Auxiliary solution



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Solution Brightener concentrate
Volume 0.2 mL
Include volume in calculation on
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

TRACK

Rinsing cycle

Return immediately off
Delete old data off

LOOP

LOOP Rinsing

Stop criteria

Max. run number on
Max. run number 2
Maximum run time off
Signal assessment for DT off
Condition off

CALL

CALL Drain

Call text	Track name	Sample type	Condition
Drain	Drain	off Sample	off

CALL

CALL Rinse

Call text	Track name	Sample type	Condition
Rinse	Rinse	off Sample	off

TRACK

Peristaltic pump

Return immediately off
Delete old data off

PUMP

Peristaltic pump ON

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Pumps

Tower 1
Pump(s) Peristaltic
Rate 10

Action

Switch on off
Switch off off



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Duration on
Time 120 s

TRACK Rinse
Return immediately off
Delete old data off

PUMP PUMP Rinse
Device
Device name not defined
Device type 919.0020 IC Autosampler plus
Pumps
Tower 1
Pump(s) 2
Action
Switch on off
Switch off off
Duration on
Time 9 s

TRACK Drain
Return immediately off
Delete old data off

PUMP PUMP Drain
Device
Device name not defined
Device type 919.0020 IC Autosampler plus
Pumps
Tower 1
Pump(s) 1
Action
Switch on off
Switch off off
Duration on
Time 50 s

SERIES START Series start track

RACK RACK INIT
Device
Device name not defined
Device type 919.0020 IC Autosampler plus
Rack test on
Test rack 6.2041.490

EXIT Exit track



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PUMP

PUMPS OFF

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Pumps

Tower 1
Pump(s) 1+2

Action

Switch on off
Switch off on
Duration off
Time 8.0 s

LIFT

Needle → Shift position

Device

Device name not defined
Device type 919.0020 IC Autosampler plus

Target

Tower 1
Lift position Shift position mm

Parameters

Lift rate 25 mm/s

LQH

FILL VMS

General/Hardware

Dosing device

Dosing unit 50 mL VMS

Parameters

Function Fill
Port 2
Rate maximum mL/min

LQH

FILL Suppressor

General/Hardware

Dosing device

Dosing unit 2 mL Suppressor

Parameters

Function Fill
Port 2
Rate maximum mL/min

LQH

FILL Brightener

General/Hardware

Dosing device

Dosing unit 2 mL Brightener

Parameters

Function Fill



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Port 2
Rate maximum mL/min

ERROR Error track

PUMP PUMPS OFF

Device
Device name not defined
Device type 919.0020 IC Autosampler plus
Pumps
Tower 1
Pump(s) 1+2
Action
Switch on off
Switch off on
Duration off
Time 8.0 s

Evaluation parameters

General

CVS

Data processing

Smoothing 1
Reversed peaks off

Curve evaluation

Fixed point evaluation off

Substances

CVS

Substances - Recognition

Substance	Active	Characteristic potential	Tolerance	Min. width	Max. width	Min. measured quantity	Sweep direction
Leveler	on	0.2 V	0.2 V	0.01 V	1 V	200 pA	anodic

CVS

Substances - Baseline

Substance	Baseline type	Start base point	End base point
Leveler	Horizontal	0.8 V	-0.05 V

Standards

Standards



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Name Standard or sample

Leveler 1000 mL/L

Calibration

General

Calibration method RC
Blank value correction with evaluation off
quantity

CVS

Calibration curves

Substance	Evaluation quantity	Curve type for standard	Weighting
Leveler	Area	Linear interpolation	on
Begin of evaluation standard			
1.1			

Results

Substance concentration in the sample

CVS

Substance	Decimal places	Assignment
Leveler	2	RS01

Results

Additional results

Result	Places	Prefix	Unit
Peak potential	3		V
Height	2	#	A
RSD of the heights of all replications	1		%
Area	2	#	C
RSD of the areas of all replications	1		%
Start base point	3		
End base point	3		
Standardized area	3		
Standardized height	3		
Total volume	3	#	L
Zero-order coefficient	3		



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Result	Places	Prefix	Unit
First-order coefficient	3		
Second-order coefficient	3		
Fourth-order coefficient	3		
Coefficient of determination	5		
Substance concentration in measuring vessel	2	#	
RSD of the substance concentration in measuring vessel	1		%
Amount of substance	2	#	
RSD of the substance concentration in the sample	1		%
Effective addition volume of the standard solution for the evaluation ratio	2	#	L
RSD of the effective addition volume of the standard solution for the evaluation ratio	1		%
Calibration factor DT	2	#	
RSD of the calibration factor DT	1		%
Effective addition volume of the sample solution for the evaluation ratio	2	#	L
RSD of the effective addition volume of the sample solution for the evaluation ratio	1		%

Database

Name database viva