



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

Program version viva 2.1 - 60  
2020-07-08 11:37:48 UTC+2

## Method parameters

Method . . . . . Suppressor determination (CVS, DT),  
automated 919  
Method saving date . . . . . 2020-07-08 07:40:11 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

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  
Fixed value . . . . . off.  
Check at start . . . . . on  
Comment . . . . . Sample identification 2



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Name . . . . . **ID3**  
Type . . . . . Text  
Assignment . . . . . on. . . . . ID3  
Fixed value . . . . . off.  
Check at start . . . . . on  
Comment . . . . . Sample identification 3

Name . . . . . **Sample type**  
Type . . . . . Text  
Assignment . . . . . on. . . . . Sample type  
Fixed value . . . . . off.  
Check at start . . . . . on  
Comment . . . . . Sample type

Name . . . . . **Sample position**  
Type . . . . . Number  
Assignment . . . . . on. . . . . Sample position  
Fixed value . . . . . off.  
Check at start . . . . . on  
Comment . . . . . Sample position number  
Variable monitoring . . . . . off  
Lower limit . . . . .  
Upper limit . . . . .  
Message . . . . .  
Display message . . . . . on  
Record message . . . . . on  
Message by e-mail . . . . . off  
E-mail template . . . . .  
Subject . . . . . Message from viva - method 'Suppressor determination (CVS, DT), automated' - command 'Main track'  
Acoustic signal . . . . . off  
Action . . . . . off  
Cancel determination . . . . . on  
Cancel determination and series . . . . . off

**Command comment**

AB-402: MVA-20 - Determination of suppressor by DT

**CALL**

**CALL PREP Sample**

Call text	Track name	Sample type	Condition
CALL PREP Sample	Sample from rackoff	Sample	off

**CALL**

**CALL ADD VMS**



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Call text	Track name	Sample type	Condition
ADD VMS	ADD VMS	off Sample	off

**CALL  
COND**

**CALL COND**

Call text . . . . . Conditioning in VMS  
Track name . . . . . VA track  
Stop criteria  
Evaluation quantity . . . . . on  
Voltammetry command . . . . . CVS  
Substance . . . . . Suppressor  
Standard deviation . . . . . 0.5 %  
Number of runs . . . . . on  
Number of runs . . . . . 20  
Action . . . . . Cancel command  
Run time . . . . . off  
Condition . . . . . off

**CALL VMS**

**CALL VMS**

Call text . . . . . Measure VMS  
Track name . . . . . VA track  
Condition . . . . . off

**CALL**

**Sample or standard?**

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

**VA TRACK**

**VA track**

Return immediately . . . . . off

**CVS**

**CVS**

**General/Hardware**

**Device**

Device name . . . . . not defined



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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<sup>-1</sup>

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

Sweep duration . . . . . 109.08 s

**Post-treatment**

Cleaning

Cleaning potential . . . . . off V

Cleaning time . . . . . 0.0 s

Standby potential



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Standby potential . . . . . off V

**Potentiostat**

Current measuring range

Highest range . . . . . 224 mA

Lowest range . . . . . 20 µA

**TRACK**

**DT Determination**

Return immediately . . . . . off

Delete old data . . . . . off

**LOOP**

**Sample addition**

Stop criteria

Max. run number . . . . . off

Maximum run time . . . . . off

Signal assessment for DT . . . . . on

Voltammetry command . . . . . CVS

Substance . . . . . Suppressor

Signal ratio Q/Q(0) . . . . . 0.45

Condition . . . . . off

**ADD  
SAMPLE  
DT**

**ADD SAMPLE DT**

Addition increments

Number . . . . . 1

Addition volume 1 . . . . . 0.010 mL

Addition

Add manually . . . . . off

Add with dosing device . . . . . on

Dosing unit . . . . . 2 mL Standard or sample

Dosing rate . . . . . 2.0 mL/min

Filling rate . . . . . maximum mL/min

**CALL VA**

**CALL SAMPLE**

Call text . . . . . Measure sample

Track name . . . . . VA track

Condition . . . . . off

**TRACK**

**DT Calibration**

Return immediately . . . . . off

Delete old data . . . . . off

**LOOP**

**Standard addition**

Stop criteria

Max. run number . . . . . off

Maximum run time . . . . . off

Signal assessment for DT . . . . . on

Voltammetry command . . . . . CVS

Substance . . . . . Suppressor

Signal ratio Q/Q(0) . . . . . 0.45



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Condition . . . . . off

**ADD STD ADD STANDARD DT**

Standard

Solution . . . . . Standard or sample

Addition increments

Number . . . . . 1

Addition volume 1 . . . . . 0.010 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

**TRACK ADD VMS**

Return immediately . . . . . off

Delete old data . . . . . off

**ADD AUX Add VMS**

Auxiliary solution

Solution . . . . . VMS

Volume . . . . . 100 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 Sample from rack**

Return immediately . . . . . off

Delete old data . . . . . off

**CALL Empty measuring vessel**

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

**CALL Next sample**



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

#### LOOP

##### LOOP Prep sample

###### Stop criteria

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

#### PREP

##### PREP Standard or sample

###### 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

##### Next sample

Return immediately . . . . . off  
Delete old data . . . . . off

#### 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



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## 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

## 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

## 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 Rinse

Return immediately . . . . . off

Delete old data . . . . . off

## PUMP PUMP Rinse

### Device





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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 . . . . . 18 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  
END Series end track**

**MOVE MOVE to rinsing vial**

**Device**

Device name . . . . . not defined

Device type . . . . . 919.0020 IC Autosampler plus

**Target**

Tower . . . . . 1

Move . . . . . Rack position

Number . . . . . = 'SD.Sample position' +1

**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



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**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

**EMPTY EMPTY standard or sample**

Dosing device

Dosing unit . . . . . 2 mL Standard or sample

**LIFT Needle → Shift position**

Device

Device name . . . . . not defined

Device type . . . . . 858.0020 Professional Sample Processor

Target

Tower . . . . . 1

Lift position . . . . . Shift position mm

Parameters

Lift rate . . . . . 25 mm/s

**CALL Final rinsing**

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

**EXIT Exit 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



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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 Standard or sample**

**General/Hardware**

**Dosing device**

Dosing unit . . . . . 2 mL Standard or sample

**Parameters**

Function . . . . . Fill  
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**



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## 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
Suppressor	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
Suppressor	Horizontal	0.8 V	-0.05 V

## Standards

### Standards

Name Standard or sample

Suppressor 10 mL/L

## Calibration

### General

Calibration method . . . . . DT

Blank value correction with evaluation quantity . . . . . off

### CVS

#### Calibration curves

Substance	Evaluation quantity	Curve type for standard	Weighting
Suppressor	Area	Nonlinear regression	on
Begin of evaluation standard	Curve type for sample	Begin of evaluation sample	Evaluation ratio
1.10	Nonlinear regression	1.10	0.5

## Results



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### Substance concentration in the sample

#### CVS

Substance	Decimal places	Assignment
Suppressor	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		
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