



License ID 1955606  
 Client ID 001-NBK-02363  
 User Metrohm

Program version viva 3.0 - 69  
 2024-06-28 08:52:35 UTC+2

**Method parameters**

Method . . . . . AB445 – Maintenance - Electrochemical cleaning  
 Method saving date . . . . . 2024-06-28 08:50:22 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 . . . . . off

**Application note**

Note! Electrolyte alkaline is used for the electrochemical cleaning of the electrodes.  
 Repetition of the cleaning measurement will stop when the relative standard deviation of the current at +0.9 V for the last two curves is less than 3%, or after 10 replications.

**Sample data variables**

Name	Type	Assignment	Fixed value	Comment	Monitoring
ID1	Text	ID1	on	ElectrochemicSample identification 1	off
ID2	Text	ID2	off	Sample identification 2	off
ID3	Text	ID3	off	Sample identification 3	off

Name . . . . . **ID1**  
 Type . . . . . Text  
 Assignment . . . . . on, . . . . . ID1  
 Fixed value . . . . . on, . . . . . Electrochemical cleaning  
 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

Name . . . . . **ID3**



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

**Command comment**

AB-445/1: MVA-25 - Electrochemical cleaning of electrodes

**CALL Empty measuring vessel**

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

**LQH Dose cleaning alkaline**

**General/Hardware**

Dosing device

Dosing unit . . . . . Electrolyte alkaline

**Parameters**

Function . . . . . Dosing  
 Port . . . . . 3  
 Volume . . . . . 5 mL  
 Rate . . . . . maximum mL/min

**CALL COND Condition electrodes**

Call text . . . . . Condition electrodes

Track name . . . . . VA track

Stop criteria

Evaluation quantity . . . . . on  
 Voltammetry command . . . . . Sweep DP  
 Substance . . . . . I@900mV  
 Standard deviation . . . . . 3 %  
 Number of runs . . . . . on  
 Number of runs . . . . . 10  
 Action . . . . . Cancel command  
 Run time . . . . . off  
 Condition . . . . . off

**CALL VA Cleaning measurement**

Call text . . . . . Cleaning measurement

Track name . . . . . VA track

Condition . . . . . off

**CALL Rinse measuring vessel**



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Call text	Track name	Sample type	Condition
Rinsing cycles	Rinsing Cycles	off Sample	off

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**VA TRACK VA track**

Return immediately . . . . . off

**DP Sweep DP**

**General/Hardware**

**Device**

Device name . . . . . 884\_1

Device type . . . . . 884 Professional VA

**Sensors/Electrodes**

Working electrode . . . . . RDE

Sensor type . . . . . RDE/SSE

Reference electrode . . . . . Reference electrode

Auxiliary electrode . . . . . Auxiliary electrode

Electrode check . . . . . off

**Stirrer**

Stirring rate . . . . . 2000 min<sup>-1</sup>

Hydrodynamic measurement . . . . . off

**Pretreatment**

Stirring time . . . . . 5.0 s

**Cyclovoltammetric pretreatment**

Start potential . . . . . -1.2 V

Vertex potential . . . . . -0.100 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 . . . . . -0.1 V

End potential . . . . . 1 V

Potential step . . . . . 0.006 V



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Potential step time . . . . . 0.1 s  
 Sweep rate . . . . . 0.060 V/s  
 Pulse amplitude . . . . . 0.05 V  
 Pulse time . . . . . 0.04 s  
 Measuring time . . . . . 0.02 s  
 Sweep duration . . . . . 18.33 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 . . . . . 2 mA  
 Lowest range . . . . . 20 µA  
 Automatically select optimum current measuring range . . . . . on

**TRACK**

**Rinsing Cycles**

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

**STIR & PURGE**

**Stirrer ON**

Device

Device name . . . . . 884\_1  
 Device type . . . . . 884 Professional VA

Stir

Stirring rate . . . . . 2000 min<sup>-1</sup>  
 Switch on . . . . . on  
 Switch off . . . . . off  
 Duration . . . . . off

Purge

Switch on . . . . . off  
 Switch off . . . . . on  
 Duration . . . . . 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**



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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 Drain**

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

**PUMP Pump - Drain**

Device  
 Device name . . . . . 858 Sample Processor  
 Device type . . . . . 858.0020 Professional Sample Processor  
 Pumps  
 Tower . . . . . 1  
 Pump(s) . . . . . 1  
 Action  
 Switch on . . . . . off  
 Switch off . . . . . off  
 Duration . . . . . on  
 Time . . . . . 15 s

**TRACK Rinse**

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

**PUMP Pump - Rinse**

Device  
 Device name . . . . . 858 Sample Processor  
 Device type . . . . . 858.0020 Professional Sample Processor  
 Pumps  
 Tower . . . . . 1  
 Pump(s) . . . . . 2  
 Action  
 Switch on . . . . . off  
 Switch off . . . . . off  
 Duration . . . . . on  
 Time . . . . . 4 s

**TRACK Shut off**

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



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**PUMP****Pumps OFF**

## Device

Device name . . . . . 858 Sample Processor  
 Device type . . . . . 858.0020 Professional Sample Processor

## Pumps

Tower . . . . . 1  
 Pump(s) . . . . . 1+2

## Action

Switch on . . . . . off  
 Switch off . . . . . on  
 Duration . . . . . off  
 Time . . . . . 8.0 s

**STIR & PURGE****Stir & Purge OFF**

## Device

Device name . . . . . 884\_1  
 Device type . . . . . 884 Professional VA

## Stir

Stirring rate . . . . . 2000 min<sup>-1</sup>  
 Switch on . . . . . off  
 Switch off . . . . . on  
 Duration . . . . . off

## Purge

Switch on . . . . . off  
 Switch off . . . . . on  
 Duration . . . . . off

**LQH****DU Electrolyte alkaline****General/Hardware**

## Dosing device

Dosing unit . . . . . Electrolyte alkaline

**Parameters**

Function . . . . . Fill  
 Port . . . . . 2  
 Rate . . . . . maximum mL/min

**EXIT****Exit track****CALL****Exit shut off**

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

**ERROR****Error track**



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**CALL Error shut off**

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

**Evaluation parameters**

**General**

**Sweep DP**

**Data processing**

Smoothing . . . . . 1  
 Reversed peaks . . . . . off

**Curve evaluation**

Fixed point evaluation . . . . . off

**Substances**

**Sweep DP**

**Substances - Recognition**

Substance	Active	Characteristic potential	Tolerance	Min. width	Max. width	Min. measured quantity
I@900mV	on	0.9 V	0.05 V	0.01 V	0.5 V	200 pA

**Sweep DP**

**Substances - Baseline**

Substance	Baseline type	Start base point	End base point
I@900mV	Measured value	Automatically	Automatically

**Sweep DP**

**Calibration curves**

**Results**

**Substance concentration in the sample**

**Sweep DP**

Substance	Decimal places	Assignment
I@900mV	3	none

**Results**

**Additional results**



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Result	Places	Prefix	Unit
Peak potential	3		V
Height	2	#	A
RSD of the heights of all replications	1		%
Measured value	2	#	A
RSD of the measured values 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		
Standardized measured value	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		%

**User-defined results**

Result type	Result name	Formula	Unit	Decimal places	Assignment	Description
Single result	Current @900mV	= 'RS.Sweep DP. I@900mV.VAR{1}. MVAL.MNV' * 1000000	µA	2	RS01	
Single result	RSD Conditioning	= 'Condition electrodes.SDV'	%	2	RS02	

**Database**

Name database . . . . . viva