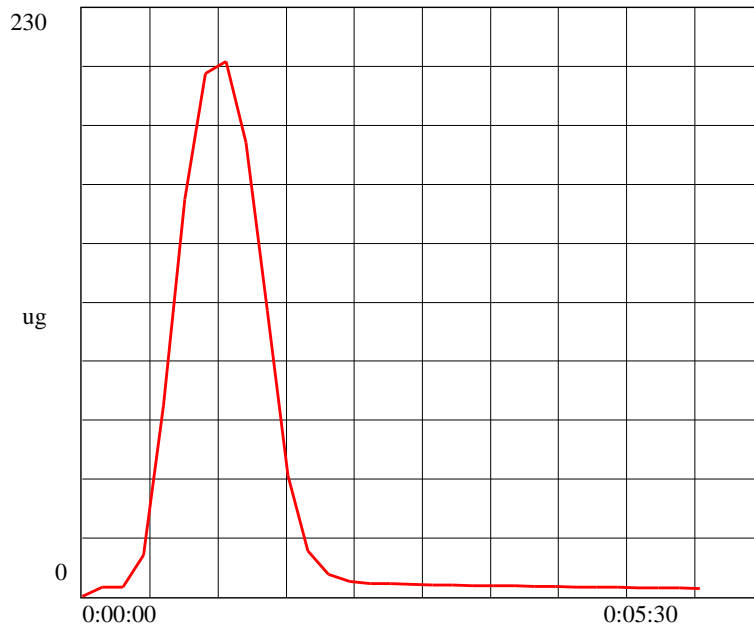


<< Titration result >>

Sample No.	: 06-02	Date	: 2019/03/12 17:54:43
Model	: MKC-710(MCU-710)	Time	: 00:05:00
Serial No.	: 20270615		
Operator	: ADMIN		
Method name	: Evaporation(Sample)		
Anolyte Reagent Name	: Anolyte	Anolyte Life Value	: 85 mg
Catholyte Reagent Name	: Catholyte	Catholyte Life Value	: 74 mg
Not Drift Stop	: --	Control gain	: 5.0
t(stir)	: 0 s	t(wait)	: 15 s
t(max)	: 300 s	Cell type	: 1-Comp.
Option	: ADP-	Oven temp.	: 170 Deg.C
Pre-Treat	: 3	Back purge	: 180 s
Cell purge	: 0 s	Sample purge	: ---- s
Calc.No.	: 2		
Sample name	: Water STD Oven 1%		
Sample ID	:	Size(Size) *	: 0.1026 g
Size(Wt1) *	: 0.1026 g	Size(Wt2) *	: 0.0000 g
Blank ( Blank )	: 57.4000 ug	Revision Coef. ( FA )	: 1.00000
Dissolve Samp. ( Wt0 )	: ---- g	Conc.of Solvent ( A )	: ---- ppm
Dissolve Solvent ( B )	: ---- g		
Samp.Volume ( V1 )	: ---- mL	Samp.Dens. ( Dens )	: ---- g/mL
Samp.Gas Volume ( V2 )	: ---- L	Samp.Gas Temp. ( Temp. )	: -- Deg.C
Recalculation comment	:		
[Result]			
Conc.	: 0.9907 %		
Moisture	: 1016.5 ug	Drift	: 0.08 ug/s
Detection temp.	: -- Deg.C		

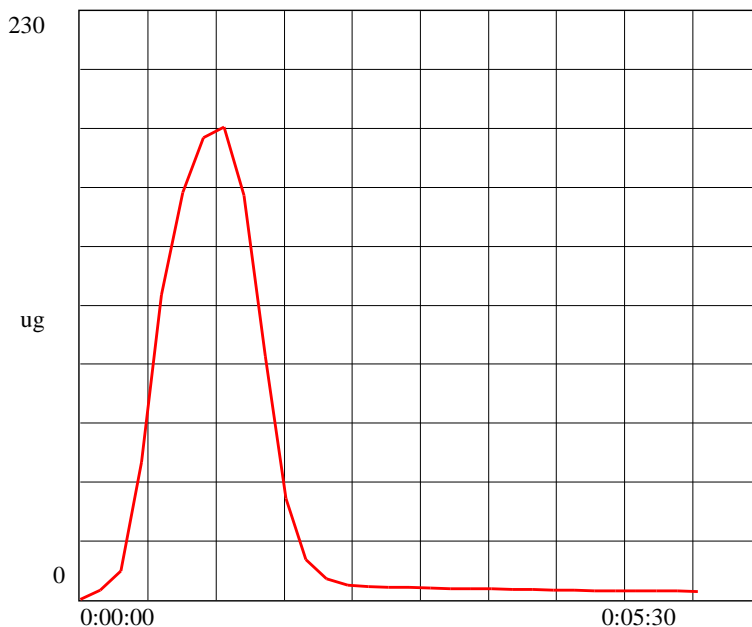
[Titration Curve]



<< Titration result >>

Sample No.	: 06-03	Date	: 2019/03/12 18:05:23
Model	: MKC-710(MCU-710)	Time	: 00:05:00
Serial No.	: 20270615		
Operator	: ADMIN		
Method name	: Evaporation(Sample)		
Anolyte Reagent Name	: Anolyte	Anolyte Life Value	: 86 mg
Catholyte Reagent Name	: Catholyte	Catholyte Life Value	: 74 mg
Not Drift Stop	: --	Control gain	: 5.0
t(stir)	: 0 s	t(wait)	: 15 s
t(max)	: 300 s	Cell type	: 1-Comp.
Option	: ADP-	Oven temp.	: 170 Deg.C
Pre-Treat	: 3	Back purge	: 180 s
Cell purge	: 0 s	Sample purge	: ---- s
Calc.No.	: 2		
Sample name	: Water STD Oven 1%		
Sample ID	:	Size(Size) *	: 0.1021 g
Size(Wt1) *	: 0.1021 g	Size(Wt2) *	: 0.0000 g
Blank ( Blank )	: 57.4000 ug	Revision Coef. ( FA )	: 1.00000
Dissolve Samp. ( Wt0 )	: ---- g	Conc.of Solvent ( A )	: ---- ppm
Dissolve Solvent ( B )	: ---- g		
Samp.Volume ( V1 )	: ---- mL	Samp.Dens. ( Dens )	: ---- g/mL
Samp.Gas Volume ( V2 )	: ---- L	Samp.Gas Temp. ( Temp. )	: -- Deg.C
Recalculation comment	:		
[Result]			
Conc.	: 0.9989 %		
Moisture	: 1019.9 ug	Drift	: 0.06 ug/s
Detection temp.	: -- Deg.C		

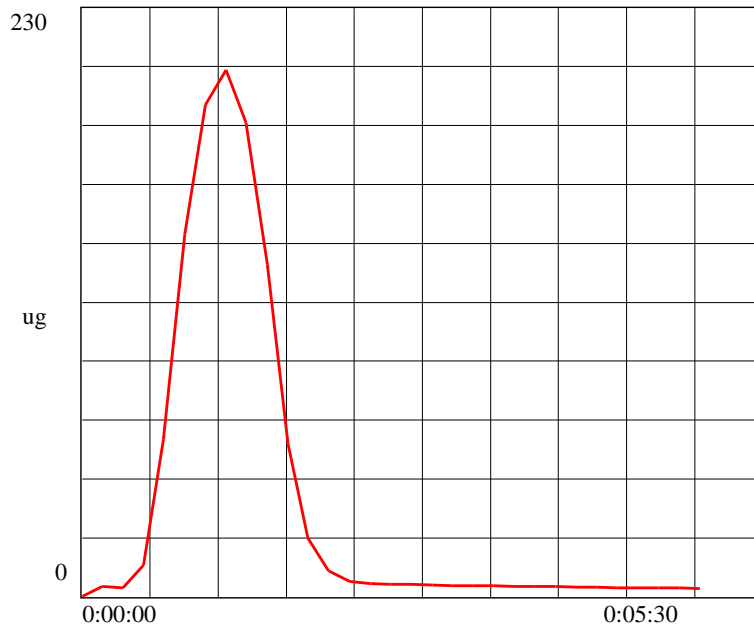
[Titration Curve]



<< Titration result >>

Sample No.	: 06-04	Date	: 2019/03/12 18:22:16
Model	: MKC-710(MCU-710)	Time	: 00:05:00
Serial No.	: 20270615		
Operator	: ADMIN		
Method name	: Evaporation(Sample)		
Anolyte Reagent Name	: Anolyte	Anolyte Life Value	: 87 mg
Catholyte Reagent Name	: Catholyte	Catholyte Life Value	: 74 mg
Not Drift Stop	: --	Control gain	: 5.0
t(stir)	: 0 s	t(wait)	: 15 s
t(max)	: 300 s	Cell type	: 1-Comp.
Option	: ADP-	Oven temp.	: 170 Deg.C
Pre-Treat	: 3	Back purge	: 180 s
Cell purge	: 0 s	Sample purge	: ---- s
Calc.No.	: 2		
Sample name	: Water STD Oven 1%		
Sample ID	:	Size(Size) *	: 0.1021 g
Size(Wt1) *	: 0.1021 g	Size(Wt2) *	: 0.0000 g
Blank ( Blank )	: 57.4000 ug	Revision Coef. ( FA )	: 1.00000
Dissolve Samp. ( Wt0 )	: ---- g	Conc.of Solvent ( A )	: ---- ppm
Dissolve Solvent ( B )	: ---- g		
Samp.Volume ( V1 )	: ---- mL	Samp.Dens. ( Dens )	: ---- g/mL
Samp.Gas Volume ( V2 )	: ---- L	Samp.Gas Temp. ( Temp. )	: -- Deg.C
Recalculation comment	:		
[Result]			
Conc.	: 1.0018 %		
Moisture	: 1022.8 ug	Drift	: 0.05 ug/s
Detection temp.	: -- Deg.C		

[Titration Curve]







# Certificate of Analysis

## Apura<sup>®</sup> Certified Reference Material

<b>Producer:</b>	Merck KGaA, Frankfurter Str. 250, 64293 Darmstadt, Germany.
<b>Accreditation:</b>	Merck KGaA, Darmstadt, Germany is accredited as calibration laboratory according to <b>DIN EN ISO/IEC 17025</b> .
<b>Description of CRM:</b>	<b>Water Standard Oven</b> certified reference material for coulometric Karl Fischer Titration in combination with the Karl Fischer Oven technique
<b>Ord. No.:</b>	1.88054.0005
<b>Lot No.:</b>	FN1330754
<b>Composition:</b>	potassium sulfate / sodium wolframate dihydrate
<b>Certified value and uncertainty:</b>	<b>0.99% ± 0.02 %</b> (9.9 mg/g ± 0.2 mg/g) water content with expanded uncertainty <b>U<sub>CRM</sub></b>
<b>Traceability:</b>	The certified value of this reference material is directly traceable to SI-Unit (kg).
<b>Method of Analysis:</b>	The water content is determined by coulometric Karl Fischer oven method at 170°C and an extraction time of 600s on 10 samples according to ISO 760. The measurement value is additionally checked by thermogravimetry as independent procedure.
<b>Storage:</b>	+15°C to +25°C tightly closed in the original container
<b>Application and correct use:</b>	This certified reference material is intended for use as a standard for checking the accuracy of coulometric and volumetric water determinations using a Karl Fischer oven and thermobalances according to ISO 9001 chapter 7.1.5 "Monitoring and measuring resources".  For the daily verification we recommend to accept a deviation of ± 0.03 % (± 0.3 mg/g) from the certified value.
<b>Date of release:</b>	2016/09/16
<b>Minimum shelf life:</b>	2019/10/31

*A. Yildirim*

Dipl.-Ing. Ayfer Yildirim  
(Laboratory manager)

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EMD Millipore Corp. · 290 Concord Road, Billerica, MA 01821, USA: +1-781-533-6000



**Expanded uncertainty  $U_{CRM}$ :**

The expanded uncertainty  $U_{CRM}$  is calculated as  $U_{CRM}=k \cdot u_{CRM}$ , where  $k=2$  is the coverage factor for a 95 % coverage probability and  $u_{CRM}$  is the combined standard uncertainty in accordance to ISO Guide 34.

$$u_{CRM} = \sqrt{u^2_{\text{Characterisation}} + u^2_{\text{Homogeneity}} + u^2_{\text{Stability}}}$$

The combined standard uncertainty  $u_{CRM}$  is obtained from the standard uncertainties of the characterisation, the homogeneity and the stability.

**$u_{\text{Characterisation}}$**  is the uncertainty in accordance with DIN EN ISO/IEC 17025 which includes the contributions of the primary reference material and the measuring system.

$u_{\text{Characterisation}}$  in the certified value is calculated in accordance to EA-4/02 and GUM.

$u_{\text{Characterisation}}$  is 0.01 % (0.1 mg/g) (calculated as  $u_{\text{Characterisation}} = k \cdot u_{\text{Characterisation}}$  with  $k=2$ )

**$u_{\text{Homogeneity}}$**  is the between-bottle variation in accordance with ISO Guide 34. The assessment of homogeneity is performed by analysis of a representative number of systematically chosen sample units.

**$u_{\text{Stability}}$**  is the uncertainty obtained from short-term and long-term stability in accordance with ISO Guide 34. The stability studies are the basis for the quantification of the minimum shelf life of this water standard for the unopened ampoule.

**Instructions for correct use**

- The oven standard can be used in a temperature range of 150°C and 400°C.
- A minimum heating time (extraction time) of 300sec is recommended.
- The weigh-in quantity for the KF oven technique is usually in the range of 80 mg to 300 mg.
- Setting parameters for the oven like minimum temperature and heating time as well as optimum sample size of the standard substance could vary depending on the used instrument.