

PerkinElmer Pure Plus

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N9303726 Lot No: CL11-127ALY1
Element and Matrix: 1000 µg/mL Aluminum in 2% HNO₃
Starting Material: Aluminum Metal
Starting Material Lot No: 01171B
Density: 1.015 g/mL @ 20°C

Certification Date: NOV - - 2020
Expiration Date: MAY 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	1	Dy	<0.05	Li	<0.2	Pt	0.05	Tb	<0.03
As	0.7	Er	<0.03	Lu	<0.01	Rb	<0.08	Te	0.4
Au	0.1	Eu	<0.02	Mg	0.6	Re	<0.03	Th	<0.02
B	1	Fe	0.2	Mn	0.6	Rh	1	Ti	<0.2
Ba	0.3	Ga	<0.3	Mo	<0.5	Ru	<0.2	Tl	<0.2
Be	<0.8	Gd	<0.09	Na	4	Sb	<0.09	Tm	<0.01
Bi	<0.3	Ge	<0.5	Nb	<0.1	Sc	<0.2	U	<0.01
Ca	10	Hf	<0.03	Nd	0.05	Se	<8	V	<0.05
Cd	<0.2	Hg	0.4	Ni	<0.6	Si	100	W	0.3
Ce	<0.04	Ho	<0.02	P	<200	Sm	<0.04	Y	0.07
Co	0.2	In	<0.04	Pb	<0.03	Sn	0.2	Yb	<0.03
Cr	<0.5	Ir	<0.3	Pd	0.5	Sr	0.04	Zn	<0.7
Cs	<0.09	K	1	Pr	<0.02	Ta	<0.5	Zr	<0.2
Cu	2	La	<0.03						

Traceability Documentation for Solution Standard:

Certified Value: 1002 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3101a

* Classical Wet Assay: 1003 µg/mL

Method: Precipitation using 8 Hydroxy Quinoline. Filter, dry and weigh as Al(C₉H₆NO)₃.

* Instrumental Analysis using OPTIMA 7300 DV ICP Spectrometer: 1000 µg/mL
via NIST SRM #3101a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer:

Y. Parikh



PerkinElmer, Inc.

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PerkinElmer Pure Plus

PerkinElmer Number: N9303727
 Element and Matrix: 1000 µg/mL Arsenic in 2% HNO₃
 Starting Material: Arsenic Metal
 Starting Material Lot No: 12171B
 Density: 1.010 g/mL @ 20°C

Lot No: CL12-08ASY1
 Certification Date: DEC -- 2020
 Expiration Date: JUN 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.4	Dy	<0.01	Li	<0.2	Pt	<0.04	Tb	<0.01
Al	0.6	Er	<0.01	Lu	<0.01	Rb	<0.03	Te	<0.5
Au	<0.03	Eu	<0.01	Mg	0.2	Re	<0.08	Th	<0.01
B	<2	Fe	0.7	Mn	0.1	Rh	<0.07	Ti	<0.2
Ba	<0.06	Ga	<0.1	Mo	<0.1	Ru	<0.08	Tl	<0.2
Be	<0.05	Gd	<0.03	Na	2	Sb	<0.03	Tm	<0.01
Bi	<0.02	Ge	<0.4	Nb	0.2	Sc	<0.05	U	<0.03
Ca	3	Hf	<0.03	Nd	<0.01	Se	<10	V	0.05
Cd	<0.1	Hg	<0.3	Ni	<0.3	Si	<100	W	<0.2
Ce	0.1	Ho	<0.01	P	<300	Sm	<0.01	Y	<0.03
Co	<0.2	In	2	Pb	<0.3	Sn	1	Yb	<0.01
Cr	<0.4	Ir	<0.09	Pd	<0.07	Sr	<0.03	Zn	0.6
Cs	<0.02	K	4	Pr	<0.01	Ta	<0.2	Zr	<0.2
Cu	<0.3	La	0.01						


Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3103a
 * Classical Wet Assay: 1000 µg/mL
 Method: Precipitation using Silver Nitrate. Filter, dry, and weigh as Ag₃AsO₄.

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3103a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer:


 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9300181
 Element and Matrix: 1000 µg/mL Barium in 2% HNO₃
 Starting Material: Barium Nitrate
 Starting Material Lot No: 05161C
 Density: 1.011 g/mL @ 20°C

Lot No: 25-31BAY1
 Certification Date: **MAR - - 2021**
 Expiration Date: **SEP 30 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	<0.001	Dy	<0.001	Li	<0.001	Pt	<0.001	Tb	<0.001
Al	<0.004	Er	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.001
As	<0.001	Eu	<0.01	Mg	<0.001	Re	<0.001	Th	<0.001
Au	<0.001	Fe	<0.004	Mn	<0.001	Rh	<0.001	Ti	<0.001
B	<0.001	Ga	<0.001	Mo	<0.001	Ru	<0.001	Tl	<0.001
Be	<0.001	Gd	0.001	Na	0.005	Sb	<0.001	Tm	<0.001
Bi	<0.003	Ge	<0.002	Nb	<0.001	Sc	<0.001	U	<0.001
Ca	0.01	Hf	<0.001	Nd	<0.001	Se	<0.02	V	<0.001
Cd	<0.001	Hg	<0.001	Ni	<0.001	Si	<0.1	W	<0.001
Ce	<0.001	Ho	<0.001	P	<0.5	Sm	0.001	Y	0.007
Co	<0.001	In	<0.001	Pb	<0.001	Sn	<0.001	Yb	<0.001
Cr	<0.001	Ir	<0.001	Pd	<0.001	Sr	0.003	Zn	0.006
Cs	<0.001	K	0.002	Pr	<0.001	Ta	<0.001	Zr	<0.001
Cu	<0.001	La	0.009						

Traceability Documentation for Solution Standard:

Certified Value: 999 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3104a
 * Classical Wet Assay: 997 µg/mL
 Method: Precipitation using Sulfuric Acid. Filter, ignite, and weigh as BaSO₄.

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3104a

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N9303734 Lot No: CL11-132CDY1
Element and Matrix: 1000 µg/mL Cadmium in 2% HNO₃
Starting Material: Cadmium Oxide
Starting Material Lot No: 11151A

Density: 1.010 g/mL @ 20°C

Certification Date: **AUG -- 2020**

Expiration Date: **FEB 28 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.1	Dy	<0.04	Li	<0.3	Pt	<0.2	Tb	0.01
Al	2	Er	<0.05	Lu	<0.01	Rb	<0.09	Te	<2
As	<0.6	Eu	2	Mg	0.3	Re	<0.03	Th	<0.02
Au	<0.1	Fe	3	Mn	<1	Rh	<0.8	Ti	<0.09
B	0.9	Ga	<0.2	Mo	<0.2	Ru	<0.2	Tl	<0.2
Ba	<0.5	Gd	<0.1	Na	3	Sb	<0.04	Tm	<0.01
Be	<0.2	Ge	<1	Nb	<0.5	Sc	<0.2	U	<0.01
Bi	<0.01	Hf	<0.04	Nd	<0.05	Se	<0.5	V	<0.3
Ca	8	Hg	<0.3	Ni	<0.7	Si	<100	W	<0.3
Ce	<0.07	Ho	<0.01	P	<100	Sm	<0.01	Y	<0.05
Co	<0.1	In	0.8	Pb	<0.03	Sn	<0.2	Yb	<0.05
Cr	0.6	Ir	<0.2	Pd	<0.3	Sr	<0.04	Zn	3
Cs	<0.1	K	5	Pr	<0.05	Ta	<0.08	Zr	<0.5
Cu	<0.3	La	<0.07						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3108

* Classical Wet Assay: 998 µg/mL

Method: EDTA titration using Xylenol Orange as indicator. EDTA standardized against Pb(NO₃)₂
NIST SRM #928.

* Instrumental Analysis using OPTIMA 7300 DV ICP Spectrometer: 1001 µg/mL
via NIST SRM #3108

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parish



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PerkinElmer Pure Plus

PerkinElmer Number: N9303733
 Element and Matrix: 1000 µg/mL Calcium in 2% HNO₃
 Starting Material: Calcium Carbonate
 Starting Material Lot No: 10141C
 Density: 1.011 g/mL @ 20°C

Lot No: CL11-198CAY1
 Certification Date: JAN - - 2021
 Expiration Date: JUL 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.2	Dy	<0.01	Li	0.3	Pt	<0.08	Tb	<0.01
Al	2	Er	<0.01	Lu	<0.02	Rb	<0.02	Te	<2
As	0.6	Eu	<0.02	Mg	0.4	Re	<0.02	Th	<0.04
Au	<0.3	Fe	<2	Mn	<0.3	Rh	<0.04	Ti	2
B	<2	Ga	<0.06	Mo	<0.2	Ru	<0.6	Tl	<0.9
Ba	1	Gd	<0.01	Na	2	Sb	<0.3	Tm	<0.01
Be	<0.09	Ge	<0.5	Nb	<0.04	Sc	<0.4	U	<0.01
Bi	<0.01	Hf	<0.01	Nd	<0.01	Se	<20	V	<0.08
Cd	<0.09	Hg	<0.7	Ni	<0.7	Si	<100	W	<0.6
Ce	0.4	Ho	<0.01	P	<200	Sm	<0.01	Y	<0.02
Co	<0.2	In	<0.04	Pb	0.05	Sn	<0.1	Yb	<0.01
Cr	<0.8	Ir	<0.1	Pd	<0.4	Sr	10	Zn	<2
Cs	0.1	K	2	Pr	<0.01	Ta	<0.08	Zr	<0.2
Cu	<0.3	La	0.2						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3109a

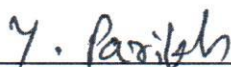
* Classical Wet Assay: 999 µg/mL

Method: EDTA titration using Hydroxy Naphthol Blue as indicator. EDTA standardized against Pb(NO₃)₂
 NIST SRM #928

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3109a

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Certifying Officer:


 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303736
 Element and Matrix: 1000 µg/mL Chromium in 2% HNO₃
 Starting Material: Chromium(III) Nitrate Nonahydrate
 Starting Material Lot No: 03161L
 Density: 1.013 g/mL @ 20°C

Lot No: CL11-141CRY1
 Certification Date: NOV - - 2020
 Expiration Date: MAY 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.6	Dy	<0.02	Li	<0.3	Pt	<0.03	Tb	<0.01
Al	4	Er	<0.01	Lu	<0.01	Rb	10	Te	<0.7
As	1	Eu	<0.01	Mg	10	Re	<0.07	Th	<0.01
Au	<0.4	Fe	30	Mn	0.5	Rh	2	Ti	1
B	<2	Ga	2	Mo	<2	Ru	20	Tl	<0.2
Ba	0.1	Gd	<0.03	Na	7	Sb	<0.7	Tm	<0.01
Be	0.07	Ge	<0.6	Nb	2	Sc	<0.7	U	<0.01
Bi	<0.05	Hf	0.04	Nd	<0.01	Se	<20	V	2
Ca	50	Hg	<0.07	Ni	0.5	Si	<100	W	<0.4
Cd	<0.2	Ho	<0.01	P	<400	Sm	<0.01	Y	<0.02
Ce	0.3	In	0.2	Pb	0.1	Sn	<0.8	Yb	0.04
Co	<0.2	Ir	<0.2	Pd	<0.2	Sr	<0.4	Zn	20
Cs	<0.03	K	4	Pr	0.01	Ta	<0.1	Zr	0.3
Cu	4	La	<0.04						

Traceability Documentation for Solution Standard:

Certified Value: 1003 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3112a
 * Classical Wet Assay: 1004 µg/mL
 Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as Cr₂O₃.

*Instrument Analysis using ICP Spectrometer: 1001 µg/mL
 via NIST SRM #3112a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303735
 Element and Matrix: 1000 µg/mL Cobalt in 2% HNO₃
 Starting Material: Cobalt Metal (powder)
 Starting Material Lot No: 10181G
 Density: 1.011 g/mL @ 20°C

Lot No: CL11-168COY1
 Certification Date: OCT - - 2020
 Expiration Date: APR 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.5	Dy	<0.01	Li	<0.5	Pt	<0.2	Tb	<0.01
Al	1	Er	<0.01	Lu	<0.01	Rb	<0.2	Te	<0.5
As	<20	Eu	<0.01	Mg	0.2	Re	<0.05	Th	<0.08
Au	<0.2	Fe	<0.8	Mn	<0.4	Rh	<0.09	Ti	0.1
B	<1	Ga	<0.09	Mo	<0.1	Ru	<0.2	Tl	<0.8
Ba	<0.01	Gd	<0.03	Na	<0.3	Sb	<0.06	Tm	<0.01
Be	0.1	Ge	0.4	Nb	<0.3	Sc	<0.08	U	<0.01
Bi	<0.6	Hf	<0.07	Nd	<0.01	Se	<4	V	<0.1
Ca	8	Hg	<0.3	Ni	2	Si	<200	W	<0.5
Cd	<0.3	Ho	<0.01	P	<400	Sm	<0.01	Y	<0.02
Ce	<0.01	In	<0.06	Pb	<0.3	Sn	<0.1	Yb	<0.01
Cr	0.2	Ir	<0.2	Pd	<0.3	Sr	<0.04	Zn	1
Cs	<0.2	K	3	Pr	<0.01	Ta	<0.7	Zr	<0.3
Cu	<0.2	La	<0.02						

Traceability Documentation for Solution Standard:

Certified Value: 1001 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3113

* Classical Wet Assay: 1003 µg/mL

Method: EDTA titration using Xylenol Orange as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM # 928.

*Instrument Analysis using ICP Spectrometer: 999 µg/mL
 via NIST SRM #3113

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N9303737 Lot No: CL11-136CUIY1
Element and Matrix: 1000 µg/mL Copper in 2% HNO₃
Starting Material: Copper Metal
Starting Material Lot No: 111411

Density: 1.011 g/mL @ 20°C

Certification Date: DEC -- 2020

Expiration Date: JUN 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.2	Dy	<0.01	Li	<0.2	Pt	<0.04	Tb	<0.01
Al	0.5	Er	<0.01	Lu	<0.01	Rb	<0.07	Te	<0.6
As	<0.3	Eu	<0.01	Mg	<0.3	Re	<0.01	Th	<0.03
Au	<0.3	Fe	<0.9	Mn	<0.6	Rh	40	Ti	<0.3
B	<0.8	Ga	<0.06	Mo	<0.2	Ru	0.7	Tl	<1
Ba	<0.08	Gd	<0.01	Na	<1	Sb	<0.2	Tm	<0.01
Be	<0.5	Ge	<0.6	Nb	<0.05	Sc	<0.2	U	<0.01
Bi	<0.02	Hf	<0.01	Nd	<0.01	Se	<10	V	<0.1
Ca	6	Hg	<4	Ni	<0.2	Si	<100	W	<0.1
Cd	<0.1	Ho	<0.01	P	<100	Sm	<0.01	Y	<0.04
Ce	0.03	In	<0.02	Pb	<0.03	Sn	<0.2	Yb	<0.01
Co	<0.3	Ir	<3	Pd	<0.7	Sr	<0.05	Zn	4
Cr	<1	K	2	Pr	<0.01	Ta	<0.1	Zr	<0.2
Cs	<0.05	La	<0.01						

Traceability Documentation for Solution Standard:

Certified Value: 1002 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3114

* Classical Wet Assay: 1002 µg/mL

Method: EDTA titration using PAN as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #9 28.

* Instrumental Analysis using OPTIMA 7300 DV ICP Spectrometer: 1001 µg/mL
via NIST SRM #3114

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh



PerkinElmer, Inc.

U.S.A. Tel: 1-203-925-4600
U.S.A. Toll Free: 1-800-762-4000

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PerkinElmer Pure Plus

PerkinElmer Number: N9303738
 Element and Matrix: 1000 µg/mL Iron in 2% HNO₃
 Starting Material: Iron Metal
 Starting Material Lot No: 10141F
 Density: 1.013 g/mL @ 20°C

Lot No: CL12-36FEY1
 Certification Date: MAY - - 2021
 Expiration Date: NOV 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.2	Cu	2	Li	<0.1	Pt	<0.02	Tb	<0.01
Al	0.6	Dy	<0.01	Lu	<0.01	Rb	0.04	Te	<0.1
As	0.5	Er	<0.01	Mg	0.4	Re	<0.04	Th	<0.01
Au	<0.2	Eu	<0.01	Mn	9	Rh	<0.1	Ti	<0.2
B	<0.1	Ga	0.1	Mo	0.4	Ru	0.06	Tl	<0.09
Ba	<0.07	Gd	<0.01	Na	1	Sb	1	Tm	<0.01
Be	<0.3	Ge	<0.3	Nb	<0.02	Sc	<0.07	U	<0.01
Bi	<0.01	Hf	<0.01	Nd	<0.03	Se	<0.3	V	<0.3
Ca	8	Hg	<0.2	Ni	2	Si	<100	W	0.3
Cd	<0.04	Ho	<0.01	P	<200	Sm	<0.01	Y	<0.09
Ce	<0.01	In	<0.03	Pb	0.02	Sn	<0.2	Yb	<0.01
Co	3	Ir	<0.04	Pd	<0.2	Sr	<0.06	Zn	2
Cr	1	K	1	Pr	<0.01	Ta	<0.2	Zr	<0.2
Cs	<0.04	La	<0.01						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3126a
 * Classical Wet Assay: 1001 µg/mL
 Method: Precipitation using Ammonium Hydroxide. Filter, ignite, and weigh as Fe₂O₃.

*Instrument Analysis using ICP Spectrometer: 999 µg/mL
 via NIST SRM #3126a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303748
 Element and Matrix: 1000 µg/mL Lead in 2% HNO₃
 Starting Material: Lead(II) Oxide
 Starting Material Lot No: 01851R
 Density: 1.010 g/mL @ 20°C

Lot No: CL12-64PBY1
 Certification Date: DEC -- 2020
 Expiration Date: JUN 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	1	Cu	<0.6	La	<0.04	Pt	<0.3	Tb	<0.01
Al	0.7	Dy	<0.01	Li	<0.6	Rb	<0.07	Te	<0.2
As	<0.9	Er	<0.01	Lu	<0.01	Re	<0.03	Th	<0.01
Au	<0.3	Eu	<0.01	Mg	1	Rh	5	Ti	<0.4
B	<0.8	Fe	3	Mn	<0.9	Ru	<0.3	Tl	0.3
Ba	0.07	Ga	<0.03	Mo	<0.2	Sb	<0.09	Tm	<0.01
Be	<2	Gd	<0.04	Na	4	Sc	<0.4	U	<0.01
Bi	10	Ge	<0.4	Nb	<0.3	Se	<8	V	<0.2
Ca	8	Hf	<0.01	Nd	<0.04	Si	<100	W	<0.6
Cd	<0.2	Hg	<0.2	Ni	<0.5	Sm	<0.01	Y	<0.07
Ce	<0.02	Ho	<0.01	P	<400	Sn	<0.07	Yb	<0.01
Co	<0.2	In	<0.04	Pd	<0.2	Sr	<0.1	Zn	0.7
Cr	<0.2	Ir	<0.04	Pr	<0.01	Ta	<0.08	Zr	<0.3
Cs	<0.03	K	4						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3128

* Classical Wet Assay: 1001 µg/mL

Method: EDTA titration using Xylenol Orange as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #928

*Instrument Analysis using ICP Spectrometer: 999 µg/mL

via NIST SRM #3128

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer TruQ

PerkinElmer Number: N9303781
 Element and Matrix: 1000 µg/mL Lithium in 2% HNO₃
 Starting Material: Lithium Carbonate
 Starting Material Lot No: 11151C
 Density: 1.015 g/mL @ 20°C

Lot No: 25-148LIY1
 Certification Date: MAY - - 2021
 Expiration Date: NOV 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	<0.001	Cu	<0.002	La	<0.001	Pt	<0.001	Tb	<0.001
Al	0.003	Dy	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.001
As	<0.001	Er	<0.001	Mg	<0.001	Re	<0.001	Th	<0.001
Au	<0.001	Eu	<0.001	Mn	<0.001	Rh	<0.001	Ti	<0.001
B	<0.02	Fe	<0.004	Mo	<0.001	Ru	<0.001	Tl	<0.001
Ba	0.006	Ga	<0.001	Na	0.02	Sb	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Nb	<0.001	Sc	<0.001	U	<0.001
Bi	<0.001	Ge	<0.002	Nd	<0.001	Se	<0.03	V	<0.001
Ca	0.01	Hf	<0.001	Ni	<0.001	Si	<0.4	W	<0.001
Cd	<0.001	Hg	<0.001	P	<0.5	Sm	<0.001	Y	<0.001
Ce	<0.001	Ho	<0.001	Pb	<0.001	Sn	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pd	<0.001	Sr	0.002	Zn	0.01
Cr	<0.001	Ir	<0.001	Pr	<0.001	Ta	<0.001	Zr	<0.001
Cs	<0.001	K	0.003						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ± 5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3129a
 * Classical Wet Assay: 1001 µg/mL
 Method: Evaporate to dryness. Fume with Sulfuric Acid. Ignite and weigh as Li₂SO₄

*Instrument Analysis using ICP Spectrometer: 999 µg/mL
 via NIST SRM #3129a

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303743
 Element and Matrix: 1000 µg/mL Magnesium in 2% HNO₃
 Starting Material: Magnesium Nitrate Hexahydrate
 Starting Material Lot No: 11151G
 Density: 1.013 g/mL @ 20°C

Lot No: CL12-62MGY1
 Certification Date: **JAN - - 2021**
 Expiration Date: **JUL 30 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.2	Cu	<0.2	La	0.02	Pt	<0.2	Tb	<0.02
Al	2	Dy	<0.04	Li	1	Rb	<0.08	Te	<0.7
As	<0.8	Er	<0.01	Lu	<0.01	Re	<0.01	Th	<0.01
Au	<0.7	Eu	<0.02	Mn	1	Rh	<0.02	Ti	2
B	2	Fe	1	Mo	<0.1	Ru	<0.5	Tl	<0.05
Ba	<0.1	Ga	<0.07	Na	30	Sb	<0.07	Tm	<0.03
Be	<0.2	Gd	<0.04	Nb	<0.04	Sc	0.3	U	<0.02
Bi	<0.03	Ge	<0.8	Nd	<0.01	Se	<6	V	0.2
Ca	40	Hf	<0.03	Ni	0.2	Si	<100	W	<0.07
Cd	<0.07	Hg	<0.1	P	<200	Sm	<0.03	Y	<0.03
Ce	0.04	Ho	<0.03	Pb	<0.3	Sn	<0.07	Yb	<0.01
Co	0.6	In	0.03	Pd	<0.2	Sr	<0.1	Zn	2
Cr	<1	Ir	<0.09	Pr	<0.01	Ta	<0.07	Zr	<0.1
Cs	0.08	K	4						

Traceability Documentation for Solution Standard:

Certified Value: 998 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3131a

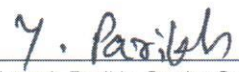
*** Classical Wet Assay:** 996 µg/mL

Method: EDTA titration using Eriochrome Black T as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #928.

***Instrument Analysis using ICP Spectrometer:** 1000 µg/mL
 via NIST SRM #3131a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer:


 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303744
 Element and Matrix: 1000 µg/mL Manganese in 2% HNO₃
 Starting Material: Manganese Metal
 Starting Material Lot No: 03181D
 Density: 1.011 g/mL @ 20°C

Lot No: CL11-204MNY1
 Certification Date: MAR - - 2021
 Expiration Date: SEP 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.3	Cu	1	La	0.03	Pt	<0.08	Tb	<0.01
Al	4	Dy	<0.01	Li	<0.3	Rb	<0.2	Te	<0.5
As	<0.2	Er	<0.01	Lu	<0.01	Re	<0.04	Th	<0.02
Au	<0.3	Eu	<0.02	Mg	60	Rh	<0.2	Ti	<0.3
B	8	Fe	3	Mo	<0.6	Ru	<0.3	Tl	<0.6
Ba	<0.04	Ga	<0.06	Na	6	Sb	<0.2	Tm	<0.01
Be	0.1	Gd	<0.01	Nb	<0.07	Sc	<0.2	U	0.01
Bi	<0.03	Ge	<3	Nd	<0.04	Se	<6	V	<0.03
Ca	20	Hf	<0.01	Ni	2	Si	<100	W	<0.2
Cd	<0.07	Hg	<0.4	P	<500	Sm	<0.04	Y	0.4
Ce	0.07	Ho	0.01	Pb	0.2	Sn	<0.04	Yb	<0.01
Co	3	In	<0.05	Pd	<0.08	Sr	2	Zn	2
Cr	<1	Ir	<0.05	Pr	0.02	Ta	<0.03	Zr	<0.2
Cs	<0.05	K	3						

Traceability Documentation for Solution Standard:

Certified Value: 1003 µg/mL ±5 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3132

* Classical Wet Assay: 1004 µg/mL

Method: EDTA titration using Eriochrome Black T as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #928.

*Instrument Analysis using ICP Spectrometer: 1002 µg/mL
 via NIST SRM #3132

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

Atomic Spectroscopy Standard



Certificate of Analysis

PerkinElmer Number: N9300253

Lot No: CL11-119HGY1

Element and Matrix: 10 µg/mL Mercury in 5% HNO₃

Starting Material: Mercury Metal

Starting Material Lot No: 03141E

Density: 1.024 g/mL @ 20°C

Certification Date: JUL - - 2020

Expiration Date: JAN 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.2	Cu	2	Li	<0.3	Pt	<0.2	Tb	<0.01
Al	<0.9	Dy	<0.02	Lu	<0.01	Rb	<0.2	Te	<0.7
As	0.4	Er	<0.02	Mg	2	Re	<0.03	Th	<0.03
Au	<0.1	Eu	<0.02	Mn	<0.3	Rh	<0.03	Ti	<0.2
B	<0.4	Fe	<0.7	Mo	<0.2	Ru	<0.4	Tl	<0.8
Ba	<0.2	Ga	<0.07	Na	<1	Sb	<0.08	Tm	<0.01
Be	<0.5	Gd	<0.01	Nb	<0.2	Sc	<0.2	U	<0.01
Bi	<0.07	Ge	<0.7	Nd	<0.08	Se	<10	V	0.1
Ca	<0.2	Hf	<0.04	Ni	<0.6	Si	<50	W	<0.3
Cd	<0.08	Ho	<0.01	P	<100	Sm	<0.03	Y	<0.03
Ce	<0.02	In	<0.06	Pb	<0.2	Sn	<0.08	Yb	<0.02
Co	<0.1	Ir	<0.05	Pd	<0.1	Sr	0.1	Zn	0.8
Cr	0.2	K	4	Pr	<0.01	Ta	<0.04	Zr	<0.08
Cs	<0.04	La	<0.02						

Traceability Documentation for Solution Standard:

Certified Value: 10.0 µg/mL ±0.1 µg/mL (refer to side 2)

Certified Value is Traceable to: NIST SRM #3133

* Classical Wet Assay: 10.0 µg/mL

Method: This value was derived from dilution calculations of a Titrimetry analysis result of a Mercury concentrate. The concentrate was analyzed by Ammonium Thiocyanate titration using Ferric Nitrate as indicator.

* Instrumental Analysis using OPTIMA 7300 DV ICP Spectrometer: 10.0 µg/mL
via NIST SRM #3133

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±1% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh



PerkinElmer, Inc.

U.S.A. Tel: 1-203-925-4600
U.S.A. Toll Free: 1-800-762-4000

Visit www.perkinelmer.com/lasoffices for a complete listing of our global offices.

PerkinElmer Pure

PerkinElmer Number: N9303784
 Element and Matrix: 1000 µg/mL Molybdenum in H₂O
 Starting Material: Ammonium Molybdate(VI) Tetrahydrate
 Starting Material Lot No: 03201B
 Density: 1.000 g/mL @ 20°C

Lot No: 25-55MOY1
 Certification Date: JAN -- 2021
 Expiration Date: JUL 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	<0.003	Cu	0.003	La	<0.001	Pt	<0.001	Tb	<0.001
Al	0.003	Dy	<0.001	Li	<0.001	Rb	<0.001	Te	0.004
As	0.03	Er	<0.001	Lu	<0.001	Re	0.004	Th	<0.001
Au	<0.001	Eu	<0.001	Mg	<0.001	Rh	<0.001	Ti	0.005
B	<0.002	Fe	<0.005	Mn	0.006	Ru	0.008	Tl	<0.001
Ba	0.007	Ga	<0.001	Na	<0.01	Sb	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Nb	<0.001	Sc	<0.001	U	<0.001
Bi	<0.001	Ge	0.001	Nd	<0.001	Se	<0.001	V	<0.001
Ca	0.03	Hf	<0.001	Ni	<0.001	Si	<0.05	W	0.07
Cd	<0.02	Hg	<0.001	P	<0.1	Sm	<0.001	Y	<0.001
Ce	0.002	Ho	<0.001	Pb	<0.001	Sn	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pd	0.02	Sr	0.002	Zn	<0.01
Cr	0.004	Ir	<0.001	Pr	0.002	Ta	<0.001	Zr	<0.001
Cs	<0.001	K	0.03						

Traceability Documentation for Solution Standard:

Certified Value: 1001 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3134
 * Classical Wet Assay: 1001 µg/mL
 Method: Precipitation using 8-Hydroxy Quinoline. Filter, dry, and weigh as MoO₂(C₉H₆NO)₂.

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3134

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303747
 Element and Matrix: 1000 µg/mL Nickel in 2% HNO₃
 Starting Material: Nickel Metal
 Starting Material Lot No: 07181F
 Density: 1.011 g/mL @ 20°C

Lot No: CL12-43NIY1
 Certification Date: NOV -- 2020
 Expiration Date: MAY 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.06	Cu	<0.7	La	<0.04	Pt	<0.2	Tb	<0.01
Al	0.9	Dy	<0.01	Li	<0.3	Rb	<0.3	Te	<0.5
As	2	Er	<0.01	Lu	<0.01	Re	0.2	Th	<0.02
Au	<0.09	Eu	<0.01	Mg	<0.4	Rh	<0.5	Ti	<0.4
B	<2	Fe	3	Mn	<0.3	Ru	<0.2	Tl	<0.7
Ba	0.02	Ga	<0.02	Mo	<0.6	Sb	1	Tm	<0.01
Be	<0.4	Gd	<0.01	Na	0.7	Sc	<0.6	U	<0.01
Bi	<0.03	Ge	<0.7	Nb	<0.02	Se	<30	V	<0.3
Ca	3	Hf	<0.01	Nd	<0.05	Si	<100	W	<0.1
Cd	<0.2	Hg	<0.8	P	<500	Sm	<0.02	Y	<0.02
Ce	0.06	Ho	<0.01	Pb	<0.01	Sn	<0.2	Yb	<0.01
Co	5	In	<0.02	Pd	<0.1	Sr	<0.1	Zn	1
Cr	0.9	Ir	0.6	Pr	<0.02	Ta	<0.05	Zr	<0.08
Cs	<0.04	K	2						

Traceability Documentation for Solution Standard:

Certified Value: 998 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3136
 * Classical Wet Assay: 997 µg/mL
 Method: EDTA titration using Murexide as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #92
 8

*Instrument Analysis using ICP Spectrometer: 998 µg/mL
 via NIST SRM #3136

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9303789
 Element and Matrix: 1000 µg/mL Palladium in 10% HCl
 Starting Material: Palladium Metal
 Starting Material Lot No: 04191D
 Density: 1.021 g/mL @ 20°C

Lot No: 25-17PDY1
 Certification Date: FEB - - 2021
 Expiration Date: AUG 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	0.001	Cu	0.001	La	<0.001	Pt	<0.001	Tb	<0.001
Al	0.004	Dy	<0.001	Li	<0.001	Rb	<0.001	Te	<0.001
As	<0.003	Er	<0.001	Lu	<0.001	Re	<0.001	Th	<0.001
Au	0.02	Eu	<0.001	Mg	0.001	Rh	0.002	Ti	<0.001
B	<0.001	Fe	0.2	Mn	0.001	Ru	<0.001	Tl	0.002
Ba	<0.001	Ga	<0.001	Mo	0.005	Sb	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Na	0.009	Sc	<0.001	U	<0.001
Bi	<0.001	Ge	<0.001	Nb	<0.001	Se	<0.006	V	<0.001
Ca	0.06	Hf	<0.001	Nd	<0.001	Si	<0.2	W	<0.001
Cd	<0.001	Hg	0.005	Ni	0.03	Sm	<0.001	Y	<0.001
Ce	<0.001	Ho	<0.001	P	<0.5	Sn	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pb	0.001	Sr	<0.001	Zn	0.03
Cr	0.02	Ir	<0.001	Pr	<0.001	Ta	<0.001	Zr	<0.001
Cs	<0.001	K	0.008						

Traceability Documentation for Solution Standard:

Certified Value: 998 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3138
 * Classical Wet Assay: 998 µg/mL
 Method: Precipitation using Glyoxime. Filter, dry, and weigh as Pd(C₄H₇O₂N₂)₂

*Instrument Analysis using ICP Spectrometer: 998 µg/mL
 via NIST SRM #3138

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9303791
 Element and Matrix: 1000 µg/mL Platinum in 10% HCl
 Starting Material: Platinum Metal
 Starting Material Lot No: 06201F
 Density: 1.021 g/mL @ 20°C

Lot No: 25-85PTY1
 Certification Date: **APR - - 2021**
 Expiration Date: **OCT 30 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	0.001	Cu	<0.001	La	<0.001	Pr	<0.001	Tb	<0.001
Al	0.006	Dy	<0.001	Li	0.2	Rb	<0.001	Te	<0.001
As	<0.001	Er	<0.001	Lu	<0.001	Re	<0.001	Th	<0.001
Au	0.03	Eu	<0.001	Mg	<0.001	Rh	0.008	Ti	<0.005
B	<0.005	Fe	0.1	Mn	<0.001	Ru	<0.001	Tl	0.006
Ba	<0.001	Ga	<0.001	Mo	0.003	Sb	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Na	0.1	Sc	<0.001	U	<0.001
Bi	0.002	Ge	<0.001	Nb	<0.001	Se	0.008	V	0.002
Ca	0.04	Hf	<0.001	Nd	<0.001	Si	<0.1	W	<0.001
Cd	<0.001	Hg	0.004	Ni	0.02	Sm	<0.001	Y	<0.001
Ce	<0.001	Ho	<0.001	P	<0.1	Sn	0.004	Yb	<0.001
Co	<0.001	In	<0.001	Pb	0.009	Sr	<0.001	Zn	0.007
Cr	0.03	Ir	0.001	Pd	0.009	Ta	<0.001	Zr	<0.001
Cs	<0.001	K	<0.5						

Traceability Documentation for Solution Standard:

Certified Value: 1002 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3140
 * Classical Wet Assay: 1005 µg/mL
 Method: Precipitation using Ammonium Chloride. Filter, ignite, and weigh as Platinum metal.

*Instrument Analysis using ICP Spectrometer: 999 µg/mL
 via NIST SRM #3140

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9300171
 Element and Matrix: 1000 µg/mL Silver in 2% HNO₃
 Starting Material: Silver nitrate
 Starting Material Lot No: 11191B
 Density: 1.010 g/mL @ 20°C

Lot No: 25-57AGY1
 Certification Date: AUG - - 2021
 Expiration Date: FEB 28 2023

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Al	0.005	Dy	<0.001	Li	<0.001	Pt	<0.001	Tb	<0.001
As	<0.001	Er	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.002
Au	<0.001	Eu	<0.001	Mg	0.001	Re	<0.001	Th	<0.001
B	0.001	Fe	0.004	Mn	<0.001	Rh	0.01	Ti	<0.001
Ba	0.001	Ga	<0.001	Mo	0.004	Ru	<0.001	Tl	<0.005
Be	<0.001	Gd	<0.001	Na	0.02	Sb	<0.001	Tm	<0.001
Bi	<0.001	Ge	<0.001	Nb	<0.001	Sc	<0.001	U	<0.001
Ca	0.02	Hf	<0.001	Nd	<0.001	Se	<0.006	V	<0.001
Cd	<0.001	Hg	<0.001	Ni	<0.001	Si	<0.1	W	<0.001
Ce	<0.001	Ho	<0.001	P	<0.1	Sm	<0.001	Y	<0.001
Co	<0.001	In	<0.001	Pb	<0.001	Sn	0.002	Yb	<0.001
Cr	<0.001	Ir	<0.001	Pd	0.02	Sr	<0.001	Zn	0.09
Cs	<0.001	K	0.006	Pr	<0.001	Ta	<0.001	Zr	0.1
Cu	<0.001	La	<0.001						

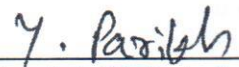
Traceability Documentation for Solution Standard:

Certified Value: 1001 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3151
 * Classical Wet Assay: 1000 µg/mL
 Method: Precipitation using Hydrochloric Acid. Filter, dry, and weigh as AgCl.

*Instrument Analysis using ICP Spectrometer: 1002 µg/mL
 via NIST SRM #3151

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer:


 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9300170
 Element and Matrix: 1000 µg/mL Thallium in 2% HNO₃
 Starting Material: Thallium(I) Nitrate
 Starting Material Lot No: 03191C
 Density: 1.010 g/mL @ 20°C

Lot No: 25-29TLY1
 Certification Date: **MAY - - 2021**
 Expiration Date: **NOV 30 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	0.002	Cu	<0.001	La	<0.001	Pr	<0.001	Ta	<0.001
Al	<0.002	Dy	<0.001	Li	<0.002	Pt	<0.001	Tb	<0.001
As	<0.001	Er	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.001
Au	<0.001	Eu	<0.001	Mg	<0.001	Re	<0.001	Th	<0.001
B	<0.001	Fe	0.003	Mn	<0.001	Rh	<0.001	Ti	<0.001
Ba	<0.001	Ga	<0.001	Mo	<0.001	Ru	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Na	0.007	Sb	<0.001	U	<0.001
Bi	<0.001	Ge	<0.001	Nb	<0.001	Sc	<0.001	V	<0.001
Ca	0.007	Hf	<0.001	Nd	<0.001	Se	<0.001	W	<0.001
Cd	<0.001	Hg	<0.001	Ni	<0.001	Si	<0.05	Y	<0.001
Ce	<0.001	Ho	<0.001	P	<0.1	Sm	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pb	<0.001	Sn	<0.001	Zn	0.005
Cr	0.001	Ir	<0.001	Pd	<0.001	Sr	<0.001	Zr	<0.001
Cs	<0.001	K	0.04						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3158
 * Classical Wet Assay: 1001 µg/mL
 Method: Precipitation using Potassium Chromate. Filter, dry, and weigh as Ti₂CrO₄

*Instrument Analysis using ICP Spectrometer: 999 µg/mL
 via NIST SRM #3158

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9303808
 Element and Matrix: 1000 µg/mL Vanadium in 2% HNO₃
 Starting Material: Ammonium Metavanadate(V)
 Starting Material Lot No: 01181C
 Density: 1.012 g/mL @ 20°C

Lot No: 25-30VY1
 Certification Date: **SEP - - 2020**
 Expiration Date: **MAR 30 2022**

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	<0.001	Cu	<0.001	La	<0.001	Pr	<0.001	Ta	<0.001
Al	0.003	Dy	<0.001	Li	<0.001	Pt	<0.001	Tb	<0.001
As	<0.001	Er	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.001
Au	<0.001	Eu	<0.001	Mg	0.004	Re	<0.001	Th	<0.001
B	<0.003	Fe	0.06	Mn	0.003	Rh	<0.001	Ti	<0.002
Ba	0.001	Ga	<0.001	Mo	0.003	Ru	<0.001	Tl	0.02
Be	<0.001	Gd	<0.001	Na	0.02	Sb	<0.001	Tm	<0.001
Bi	<0.001	Ge	<0.001	Nb	<0.001	Sc	<0.001	U	<0.001
Ca	0.03	Hf	<0.001	Nd	<0.001	Se	<0.08	W	<0.001
Cd	<0.001	Hg	<0.001	Ni	0.002	Si	<0.1	Y	<0.001
Ce	<0.001	Ho	<0.001	P	<0.2	Sm	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pb	0.003	Sn	<0.001	Zn	0.003
Cr	0.006	Ir	<0.001	Pd	<0.001	Sr	<0.001	Zr	0.001
Cs	0.004	K	0.02						

Traceability Documentation for Solution Standard:

Certified Value: 999 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3165
 * Classical Wet Assay: 997 µg/mL
 Method: Evaporate to dryness. Fume with Nitric acid. Ignite and weigh as V₂O₅.

*Instrument Analysis using ICP Spectrometer: 1001 µg/mL
 via NIST SRM #3165

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure Plus

PerkinElmer Number: N9303758
 Element and Matrix: 1000 µg/mL Zinc in 2% HNO₃
 Starting Material: Zinc Metal
 Starting Material Lot No: 09161G
 Density: 1.011 g/mL @ 20°C

Lot No: CL11-196ZNY1
 Certification Date: OCT - - 2020
 Expiration Date: APR 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L	Element	µg/L
Ag	<0.4	Cu	<0.2	La	<0.03	Pr	<0.01	Ta	<0.05
Al	2	Dy	<0.01	Li	0.2	Pt	<0.2	Tb	<0.01
As	<0.1	Er	<0.01	Lu	<0.01	Rb	<0.09	Te	0.6
Au	<0.05	Eu	<0.01	Mg	<0.3	Re	<0.05	Th	<0.02
B	<0.3	Fe	<0.2	Mn	0.7	Rh	<0.6	Ti	0.3
Ba	<0.06	Ga	0.2	Mo	<0.3	Ru	<0.3	Tl	<0.5
Be	<0.2	Gd	<0.03	Na	4	Sb	<0.3	Tm	<0.01
Bi	0.06	Ge	0.01	Nb	<0.07	Sc	<0.3	U	<0.01
Ca	<4	Hf	<0.01	Nd	<0.01	Se	<10	V	<0.1
Cd	3	Hg	<0.2	Ni	0.2	Si	<100	W	<0.2
Ce	<0.02	Ho	<0.01	P	<200	Sm	<0.01	Y	<0.02
Co	<0.2	In	<0.08	Pb	1	Sn	0.2	Yb	<0.01
Cr	<0.5	Ir	<0.2	Pd	<0.2	Sr	<0.04	Zr	0.04
Cs	<0.08	K	0.5						

Traceability Documentation for Solution Standard:

Certified Value: 1000 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3168a
 * Classical Wet Assay: 999 µg/mL
 Method: EDTA titration using Eriochrome Black-T as indicator. EDTA standardized against Pb(NO₃)₂ NIST SRM #928.

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3168a

We guarantee that our PerkinElmer Pure Plus Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist

PerkinElmer Pure

PerkinElmer Number: N9300207
 Element and Matrix: 1000 µg/mL Antimony in H₂O/0.6% Tart.Acid/Tr.HNO₃
 Starting Material: Antimony Metal
 Starting Material Lot No: 05171E
 Density: 1.001 g/mL @ 20°C

Lot No: 25-80SBY1
 Certification Date: APR - - 2021
 Expiration Date: OCT 30 2022

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	<0.001	Cu	<0.001	La	0.02	Pr	<0.001	Tb	<0.001
Al	0.006	Dy	0.002	Li	<0.001	Pt	<0.001	Te	<0.001
As	<0.001	Er	<0.001	Lu	<0.001	Rb	<0.001	Th	<0.001
Au	<0.001	Eu	<0.001	Mg	0.001	Re	<0.001	Ti	<0.001
B	<0.003	Fe	0.006	Mn	<0.001	Rh	<0.001	Tl	<0.001
Ba	0.002	Ga	<0.001	Mo	<0.001	Ru	<0.001	Tm	<0.001
Be	<0.001	Gd	<0.001	Na	0.006	Sc	<0.001	U	<0.001
Bi	<0.001	Ge	<0.001	Nb	<0.001	Se	<0.01	V	<0.001
Ca	0.01	Hf	<0.001	Nd	<0.001	Si	<0.2	W	<0.001
Cd	<0.001	Hg	<0.001	Ni	<0.001	Sm	<0.001	Y	<0.001
Ce	<0.001	Ho	<0.001	P	<0.2	Sn	<0.001	Yb	<0.001
Co	<0.001	In	<0.001	Pb	<0.001	Sr	<0.001	Zn	0.005
Cr	<0.001	Ir	<0.001	Pd	<0.001	Ta	<0.001	Zr	<0.001
Cs	<0.001	K	0.02						

Traceability Documentation for Solution Standard:

Certified Value: 999 µg/mL ±5 µg/mL (refer to side 2)
 Certified Value is Traceable to: NIST SRM #3102a
 * Classical Wet Assay: 997 µg/mL
 Method: Evaporate to dryness. Fume with Nitric Acid. Ignite and weigh as Sb₂O₄.

*Instrument Analysis using ICP Spectrometer: 1000 µg/mL
 via NIST SRM #3102a

We guarantee that our PerkinElmer Pure Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
 Yogesh Parikh, Senior Spectroscopist