



284 Sheffield Street, Mountainside, NJ 07092 Phone: 908 789 8900 Fax: 908 789 8922

### Prep Standard - Chemical Standard Summary

**Order ID :** O1233

**Test :** Corrosivity, Ignitability, Paint Filter, Percent Solids, Reactive Cyanide, Reactive Sulfide

**Prepbatch ID :** PB150286, PB150350,

**Sequence ID/Qc Batch ID:** LB123748, LB123751, LB123753, LB123756, LB123757,

**Standard ID :**

WP100011, WP100234, WP100712, WP100714, WP100715, WP100716, WP100717, WP100718, WP100719, WP100720, W  
P100721, WP100722, WP98732, WP99212, WP99896,

**Chemical ID :**

M5260, M5376, W2263, W2355, W2492, W2563, W2606, W2668, W2724, W2806, W2845, W2887, W2888, W2895, W2898, W  
2924, W2940, W2941, W2977, W2980, W2981,

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
607	PYRIDINE-BARBITURIC ACID	<a href="#">WP100011</a>	11/25/2022	04/17/2023	Iwona Zarych	WETCHEM_SCALE_5 (WCS-5)	None	Sohil Jodhani
<u>FROM</u>	145.00000ml of W2606 + 15.00000gram of W2492 + 15.00000ml of M5376 + 75.00000ml of W2355 = Final Quantity: 250.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3371	Cyanide LCS Spike Solution, 5PPM	<a href="#">WP100234</a>	12/13/2022	05/15/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 12/20/2022
<u>FROM</u>	1.00000ml of W2895 + 199.00000ml of WP99896 = Final Quantity: 200.000 ml							

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3456	Cyanide Intermediate Working Std, 5PPM	<a href="#">WP100712</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<u>FROM</u>	0.25000ml of W2898 + 49.75000ml of WP99896 = Final Quantity: 50.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
4	Calibration standard 500 ppb	<a href="#">WP100714</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<b><u>FROM</u></b> 45.00000ml of WP99896 + 5.00000ml of WP100712 = Final Quantity: 50.000 ml								

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
3761	Calibration-CCV CN Standard 250 ppb	<a href="#">WP100715</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<b><u>FROM</u></b> 2.50000ml of WP100712 + 47.50000ml of WP99896 = Final Quantity: 50.000 ml								

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
6	Calibration Standard 100 ppb	<a href="#">WP100716</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<u>FROM</u>	1.00000ml of WP100712 + 49.00000ml of WP99896 = Final Quantity: 50.000 ml							

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
7	Calibration Standard 50 ppb	<a href="#">WP100717</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<u>FROM</u>	0.50000ml of WP100712 + 49.50000ml of WP99896 = Final Quantity: 50.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
8	Calibration Standard 10 ppb	<a href="#">WP100718</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<u>FROM</u>	1.00000ml of WP100714 + 49.00000ml of WP99896 = Final Quantity: 50.000 ml							

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
9	Calibration Standard 5 ppb	<a href="#">WP100719</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_PIPETTE_3 (WC)	Sohil Jodhani 01/20/2023
<u>FROM</u>	0.50000ml of WP100714 + 49.50000ml of WP99896 = Final Quantity: 50.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
167	0 ppb CN calibration std	<a href="#">WP100720</a>	01/20/2023	01/21/2023	Iwona Zarych	None	None	Sohil Jodhani 01/20/2023
<b><u>FROM</u></b> 50.00000ml of WP99896 = Final Quantity: 50.000 ml								

# CHEMTECH

284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900

## Wet Chemistry STANDARD PREPARATION LOG

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
2168	RCN ICV STD, 100 PPB	<a href="#">WP100721</a>	01/20/2023	01/21/2023	Iwona Zarych	None	WETCHEM_F IPETTE_3 (WC)	Sohil Jodhani  01/20/2023

**FROM** 1.00000ml of WP100234 + 49.00000ml of WP99896 = Final Quantity: 50.000 ml

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
1582	Chloramine T solution, 0.014M	<a href="#">WP100722</a>	01/20/2023	01/21/2023	Iwona Zarych	WETCHEM_S CALE_5 (WC SC-5)	None	Sohil Jodhani  01/20/2023

**FROM** 0.08000gram of W2263 + 20.00000ml of W2606 = Final Quantity: 20.000 ml

**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
160	0.5M ZINC ACETATE	<a href="#">WP98732</a>	08/30/2022	02/04/2023	Iwona Zarych	WETCHEM_SCALE_5 (WC-5)	WETCHEM_PIPETTE_3 (WC)	Jignesh Parikh 09/06/2022
<b><u>FROM</u></b>	0.88900L of W2606 + 1.00000ml of M5260 + 110.00000gram of W2563 = Final Quantity: 1000.000 ml							

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
539	CN BUFFER	<a href="#">WP99212</a>	09/30/2022	03/30/2023	Iwona Zarych	WETCHEM_SCALE_5 (WCS-5)	None	Sohil Jodhani 10/18/2022
<u>FROM</u>	138.00000gram of W2668 + 862.00000ml of W2606 = Final Quantity: 1000.000 ml							



**284, Sheffield Street, Mountainside NJ 07092 (908) 789 - 8900**

<u>Recipe ID</u>	<u>NAME</u>	<u>NO.</u>	<u>Prep Date</u>	<u>Expiration Date</u>	<u>Prepared By</u>	<u>ScaleID</u>	<u>PipetteID</u>	<u>Supervised By</u>
11	Sodium hydroxide absorbing solution 0.25 N	<a href="#">WP99896</a>	11/15/2022	05/15/2023	Jignesh Parikh	WETCHEM_SCALE_4 (WCS-4)	None	Iwona Zarych 11/15/2022
<b><u>FROM</u></b> 21.00000L of W2606 + 210.00000gram of W2845 = Final Quantity: 21.000 L								

**CHEMICAL RECEIPT LOG BOOK**

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22E1662006	02/04/2023	08/16/2022 / Al-Terek	08/16/2022 / Al-Terek	M5260

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L)	22E1662006	05/14/2023	11/22/2022 / jaswal	04/11/2022 / Al-Terek	M5376

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	JTE494-6 / CHLORAMINE-T BAKER 250GM	0000162244	03/31/2023	07/27/2017 / apatel	07/27/2017 / apatel	W2263

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
SIGMA ALDRICH	270970-1L / Pyridine 1L	SHBJ2146	04/17/2023	05/22/2018 / AMANDEEP	04/17/2018 / apatel	W2355

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	EM-BX0035-3 / Barbituric Acid, 100 gms	L017156232813	02/19/2024	02/19/2019 / apatel	02/19/2019 / apatel	W2492

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	J4296-1 / ZINC ACETATE,DIHYD,CRYS,AC S,500G	0000215661	03/14/2024	05/19/2021 / ketankumar	07/12/2019 / apatel	W2563

**CHEMICAL RECEIPT LOG BOOK**

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	10/24/2024	10/24/2019 / apatel	10/24/2019 / apatel	W2606

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	J3818-5 / SODIUM PHOSPHATE, MONOBAS/HYD, CRYST, ACS, 2.5 KG	0000225799	12/03/2025	04/05/2021 / Alexander	02/10/2020 / apatel	W2668

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	EMD-FX0410-5 / FORMALDEHYDE SOLUTION 450ML	60045	06/22/2025	08/12/2022 / ketankumar	06/22/2020 / apatel	W2724

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL13850-1 / Buffer Solution, PH2 (500ml)	4102M06	02/28/2023	03/16/2021 / apatel	03/15/2021 / apatel	W2806

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	PC19510-7 / Sodium Hydroxide Pellets 12 Kg	21C2456604	01/31/2024	03/30/2022 / JIGNESH	06/24/2021 / apatel	W2845

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL14455-3 / buffer solution pH 7 yellow	211F16	11/30/2023	01/04/2022 / jignesh	12/29/2021 / JIGNESH	W2887

**CHEMICAL RECEIPT LOG BOOK**

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	1601-1 / PH 10.01 BUFFER,COLOR CD 475ML	2110E30	04/30/2023	06/15/2022 / jignesh	12/29/2021 / JIGNESH	W2888

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supelco	90157 / Cyanide Standard, 1000ppm from Supelco	BCCD9263	10/31/2023	01/06/2022 / apatel	01/06/2022 / apatel	W2895

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Supelco	90157 / Cyanide Standard, 1000ppm from Supelco	HC03107133	06/30/2023	01/24/2022 / apatel	01/24/2022 / apatel	W2898

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL35830-4 / IODINE SOLUTION .025N 1L	M046-10	09/02/2023	07/05/2022 / ketankumar	07/05/2022 / ketankumar	W2924

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
RICCA CHEMICAL COMPANY	1615-16 / pH 12.00 Buffer	4206h39	12/31/2023	09/01/2022 / jignesh	07/29/2022 / JIGNESH	W2940

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL69870-8 / SODIUM THIOSULFATE,0.025N,4LITRE	M075-30	04/01/2023	10/31/2022 / Rubina	08/08/2022 / ketankumar	W2941



284 Sheffield Street, Mountainside, NJ 07092 Phone: 908 789 8900 Fax: 908 789 8922

### CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL70850-8 / Starch Solution, 4L	4210G90	10/31/2024	11/15/2022 / lwona	11/15/2022 / lwona	W2977

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	AL14055-3 / PH 4 BUFFER SOLUTION	2206A61	05/31/2024	12/12/2022 / jignesh	12/05/2022 / jignesh	W2980

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
PCI Scientific Supply, Inc.	566002 / BUFFER PH 7.00 GREEN 1PINT PK6	4203B62	02/29/2024	12/12/2022 / jignesh	12/05/2022 / jignesh	W2981



# Certificate of Analysis

1.00132.0100 Barbituric acid for analysis EMSURE®  
Batch L017156232

	Spec. Values		Batch Values	
Assay (acidimetric)	≥ 99	%	99.3	%
Identity (IR-spectrum)	passes test		passes test	
Chloride (Cl)	≤ 40	ppm	≤ 40	ppm
Heavy metals (as Pb)	≤ 50	ppm	≤ 50	ppm
Fe (Iron)	≤ 10	ppm	≤ 10	ppm
Sulfated ash	≤ 0.1	%	≤ 0.1	%
Loss on Drying (105°C)	≤ 0.1	%	≤ 0.1	%
Suitability as reagent (for cyanide determination)	passes test		passes test	

Date of release (DD.MM.YYYY) 03.01.2018  
Minimum shelf life (DD.MM.YYYY) 31.01.2023

Ioannis Chartomatsidis  
Responsible laboratory manager quality control

This document has been produced electronically and is valid without a signature.



# Certificate of Analysis

1.19533.0500 Cyanide standard solution traceable to SRM from NIST  $K_2[Zn(CN)_4]$  in  $H_2O$   
1000 mg/l CN Certipur®  
Batch HC03107133

## Batch Values

Concentration	$\beta$ (CN <sup>-</sup> )	1002	mg/l
---------------	----------------------------	------	------

Determination method: Argentometric titration.

The content of this solution was determined with silver nitrate standard solution (article number 1.09081) standardized against volumetric standard sodium chloride (article number 1.02406). The expanded measurement uncertainty is  $\pm 0.7\%$  ( $k=2$  coverage factor for 95% coverage probability). The certified value is traceable to primary standard NIST SRM 999c (NIST: National Institute of Standards and Technology, USA) by means of volumetric standard sodium chloride, measured in the accredited calibration laboratory of Merck KGaA, Darmstadt, Germany in accordance to DIN EN ISO/IEC 17025.

Date of release (DD.MM.YYYY) 02.07.2020

Minimum shelf life (DD.MM.YYYY) 30.06.2023

Ayfer Yildirim

Responsible laboratory manager quality control

This document has been produced electronically and is valid without a signature.



## Sodium Hydroxide (Pellets)

**Material:** 0583  
**Grade:** ACS GRADE  
**Batch Number:** 21C2456604

Chemical Formula: NaOH  
Molecular Weight: 40  
CAS #: 1310-73-2  
Appearance:

Manufacture Date: 01/06/2021  
Expiration Date: 01/31/2024

Storage: Room Temperature

Pellets

TEST	SPECIFICATION	ANALYSIS	DISPOSITION
Calcium	<= 0.005 %	<0.005 %	PASS
Chloride	<= 0.005 %	<0.005 %	PASS
Heavy Metals	<= 0.002 %	<0.002 %	PASS
Iron	<= 0.001 %	<0.001 %	PASS
Magnesium	<= 0.002 %	<0.002 %	PASS
Mercury	<= 0.1 ppm	<0.1 ppm	PASS
Nickel	<= 0.001 %	<0.001 %	PASS
Nitrogen Compounds	<= 0.001 %	<0.001 %	PASS
Phosphate	<= 0.001 %	<0.001 %	PASS
Potassium	<= 0.02 %	<0.02 %	PASS
Purity	>= 97.0 %	98.7 %	PASS
Sodium Carbonate	<= 1.0 %	0.5 %	PASS
Sulfate	<= 0.003 %	<0.003 %	PASS

Internal ID #: 603

### Signature

We certify that this batch conforms to the specifications listed.

This document has been electronically produced and is valid without a signature.

Leona Edwardson, Quality Control Sr. Manager - Solon  
VWR Chemicals, LLC.  
28600 Fountain Parkway, Solon OH 44139 USA

### Additional Information

Analysis may have been rounded to significant digits in specification limits.

Product meets analytical specifications of the grades listed.





## Sodium Hydroxide (Pellets)

**Material:** 0583  
**Grade:** ACS GRADE  
**Batch Number:** 21C2456604

Chemical Formula: NaOH  
Molecular Weight: 40  
CAS #: 1310-73-2  
Appearance:

Manufacture Date: 01/06/2021  
Expiration Date: 01/31/2024

Storage: Room Temperature

Pellets

Spec Set: 0583ACS

Internal ID #: 603

### Signature

We certify that this batch conforms to the specifications listed.

This document has been electronically produced and is valid without a signature.

Leona Edwardson, Quality Control Sr. Manager - Solon  
VWR Chemicals, LLC.  
28600 Fountain Parkway, Solon OH 44139 USA

### Additional Information

Analysis may have been rounded to significant digits in specification limits.

Product meets analytical specifications of the grades listed.

**SIGMA-ALDRICH®**

sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: [www.sigmaaldrich.com](http://www.sigmaaldrich.com)Email USA: [techserv@sial.com](mailto:techserv@sial.com)Outside USA: [eurtechserv@sial.com](mailto:eurtechserv@sial.com)

## Certificate of Analysis

Product Name:

Pyridine - anhydrous, 99.8%

Product Number:

270970

Batch Number:

SHBJ2146

Brand:

SIAL

CAS Number:

110-86-1

MDL Number:

MFCD00011732

Formula:

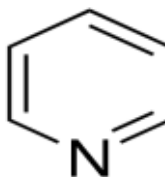
C<sub>5</sub>H<sub>5</sub>N

Formula Weight:

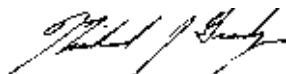
79.10 g/mol

Quality Release Date:

30 MAY 2017



Test	Specification	Result
Appearance (Color)	Colorless	Colorless
Appearance (Form)	Liquid	Liquid
Infrared Spectrum	Conforms to Structure	Conforms
Purity (GC)	≥ 99.75 %	99.99 %
Water (by Karl Fischer)	≤ 0.003 %	0.002 %
Residue on Evaporation	≤ 0.0005 %	< 0.0001 %



Michael Grady, Manager

Quality Control

Sheboygan Falls, WI US

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

# Certificate of Analysis

W2806 Recived by AP on 03/16/21

**Buffer, Reference Standard, pH 2.00 ± 0.01 at 25°C**

**Lot Number:** 4102M06

**Product Number:** 1493

**Manufacture Date:** FEB 26, 2021

**Expiration Date:** FEB 2023

The certified value for this product is confirmed in independent testing by a second qualified chemist.

The NIST traceable pH value is certified to ±0.01 at 25 °C only. All other pH values at their corresponding temperatures are accurate to ± 0.05.

°C	10	15	20	25	30	35	40	45	50
pH	1.93	1.98	1.98	2.00	2.01	2.03	2.03	2.04	2.04

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Chloride	7447-40-7	ACS
Hydrochloric Acid	7647-01-0	ACS

Test	Specification	Result	NIST SRM#
Appearance	Colorless liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	1.990-2.010	1.999	185i, 186-I-g, 186-II-g
pH at 25°C (Method: SQCP027, SQCP033)	0.02	0.02	
Uncertainty			

pH measurements were performed in our Batesville, IN laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.02) and are certified traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by k=2, corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1493-1	4 L natural poly	24 months
1493-16	500 mL natural poly	24 months
1493-1CT	4 L Cubitainer®	24 months
1493-2.5	10 L Cubitainer®	24 months
1493-32	1 L natural poly	24 months
1493-5	20 L Cubitainer®	24 months

**Recommended Storage:** 15°C - 30°C (59°F - 86°F)



Jon Russell (02/26/2021)

Quality Control Supervisor

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."



This test report shall not be reproduced, except in full, without the written approval of Ricca Chemical Company.

Zinc Acetate, Dihydrate, Crystal  
BAKER ANALYZED® A.C.S. Reagent



Material No.: 4296-01  
Batch No.: 0000215661  
Manufactured Date: 2017/03/16  
Retest Date: 2024/03/14  
Revision No: 1

## Certificate of Analysis

Meets ACS Reagent Chemical Requirements,

Test	Specification	Result
ACS – Assay ((CH <sub>3</sub> COO) <sub>2</sub> Zn · 2H <sub>2</sub> O)	99.0 – 101.0 %	100.0
ACS – Insoluble Matter	<= 0.005 %	< 0.001
ACS – pH of 5% Solution at 25°C	6.0 – 7.0	6.6
ACS – Sulfate (SO <sub>4</sub> )	<= 0.002 %	< 0.001
ACS – Calcium (Ca)	<= 0.005 %	< 0.001
ACS – Lead (Pb)	<= 0.002 %	< 0.001
ACS – Magnesium (Mg)	<= 0.005 %	< 0.001
ACS – Potassium (K)	<= 0.01 %	< 0.01
ACS – Sodium (Na)	<= 0.05 %	0.01
Chloride (Cl)	<= 5 ppm	< 3
Trace Impurities – Iron (Fe)	<= 5 ppm	< 3

For Laboratory, Research or Manufacturing Use

Country of Origin: US  
Packaging Site: Paris Mfg Ctr & DC



Phillipsburg, NJ 9001:2015, FSSC22000  
Paris, KY 9001:2008  
Mexico City, Mexico 9001:2008  
Gliwice, Poland 9001:2015, 13485:2012  
Selangor, Malaysia 9001:2008  
Dehradun, India, 9001:2008, 14001:2004, 13485:2003  
Mumbai, India, 9001:2015, 17025:2005  
Panoli, India 9001:2015

*James Ethier*  
Jamie Ethier  
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700  
Avantor Performance Materials, LLC  
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone: 610.386.1700



## Certificate of Analysis

Date of Release: 2/26/2020

Name: Formaldehyde Solution  
GR ACS  
Meets ACS Specifications

Item No: FX0410 all size codes

Lot / Batch No: 60045

Country of Origin: USA

Characteristic	Requirement		Results	Units
	Min.	Max.		
Assay	36.5	38.0	36.71	%
Chloride (Cl)		5	<5	ppm
Color (APHA)		10	<10	
Form			Passes test	
Heavy metals (as Pb)		5	<5	ppm
Iron (Fe)		5	0.6	ppm
Residue after ignition		0.005	<0.0050	%
Sulfate (SO <sub>4</sub> )		0.002	<0.0020	%
Titration acid		0.006	<0.0060	meq/g

Heather Sinn,

-----  
Quality Control Manager

This document has been produced electronically and is valid without a signature.

EMD Millipore Corporation, an affiliate of Merck KGaA, Darmstadt, Germany  
290 Concord Road  
Billerica, MA 01821  
U.S.A

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

Chloramine-T, Trihydrate  
BAKER



Material No.: E494-06  
Batch No.: 0000162244  
Manufactured Date: 2016/04/01  
Retest Date: 2023/03/31

## Certificate of Analysis

Test	Specification	Result
Active Chlorine	$\geq 11\%$	12

For Laboratory, Research or Manufacturing Use

Country of Origin: US  
Packaging Site: Paris Mfg Ctr & DC



Phillipsburg, NJ 9001:2008, 14001:2004, FSSC 22000  
Paris, KY 9001:2008  
Mexico City, Mexico 9001:2008  
Deventer, The Netherlands 9001:2008, 14001:2004, 13485:2003  
Gliwice, Poland 9001:2008, 13485:2012  
Selangor, Malaysia 9001:2008  
Dehradun, India, 9001:2008, 14001:2004, 13485:2003  
Mumbai, India, 9001:2008  
Panoli, India 9001:2008

A handwritten signature in blue ink that reads 'Jamie Ethier'.  
Jamie Ethier  
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.573.2600  
Avantor Performance Materials, LLC.

3477 Corporate Parkway. Center Valley, PA 18034. U.S.A. Phone: 610.573.2600 . Fax: 610.573.2610

Hydrochloric Acid, 36.5–38.0%  
BAKER INSTRA–ANALYZED® Reagent  
For Trace Metal Analysis



M5365 M5366 M5367  
M5368 M5369 M5370

Material No.: 9530–33  
Batch No.: 22E1662006  
Manufactured Date: 2022–04–11  
Retest Date: 2027–04–10  
Revision No.: 0

## Certificate of Analysis

Test	Specification	Result
ACS – Assay (as HCl) (by acid–base titrn)	36.5 – 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS – Specific Gravity at 60°/60°F	1.185 – 1.192	1.190
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS – Free Chlorine (as Cl <sub>2</sub> )	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO <sub>4</sub> )	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO <sub>4</sub> )	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO <sub>3</sub> )	≤ 0.8 ppm	0.3 ppm
Ammonium (NH <sub>4</sub> )	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	< 0.2 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	37.0 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	1 ppb

>>> Continued on page 2 >>>



Test	Specification	Result
Trace Impurities – Lead (Pb)	≤ 1.0 ppb	< 0.5 ppb
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	1.0 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 3.0 ppb
Trace Impurities – Nickel (Ni)	≤ 4.0 ppb	< 0.3 ppb
Trace Impurities – Niobium (Nb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 2.0 ppb
Trace Impurities – Selenium (Se), For Information Only		1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 0.4 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	1.9 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (Tl)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	< 0.8 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.3 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

>>> Continued on page 3 >>>

Hydrochloric Acid, 36.5–38.0%  
BAKER INSTRA–ANALYZED® Reagent  
For Trace Metal Analysis



Material No.: 9530–33  
Batch No.: 22E1662006

Test	Specification	Result
------	---------------	--------

For Laboratory, Research, or Manufacturing Use  
Product Information (not specifications):  
Appearance (clear, fuming liquid)  
Meets ACS Specifications  
Storage Condition: Store below 25 °C.

Country of Origin: USA  
Packaging Site: Phillipsburg Mfg Ctr & DC

  
Jamie Ethier  
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC

100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone 610.386.1700

Hydrochloric Acid, 36.5–38.0%  
BAKER INSTRA–ANALYZED® Reagent  
For Trace Metal Analysis



Material No.: 9530–33  
Batch No.: 22E1662006  
Manufactured Date: 2022–04–11  
Retest Date: 2027–04–10  
Revision No.: 0

## Certificate of Analysis

Test	Specification	Result
ACS – Assay (as HCl) (by acid–base titrn)	36.5 – 38.0 %	37.6 %
ACS – Color (APHA)	≤ 10	5
ACS – Residue after Ignition	≤ 3 ppm	< 1 ppm
ACS – Specific Gravity at 60°/60°F	1.185 – 1.192	1.190
ACS – Bromide (Br)	≤ 0.005 %	< 0.005 %
ACS – Extractable Organic Substances	≤ 5 ppm	< 1 ppm
ACS – Free Chlorine (as Cl <sub>2</sub> )	≤ 0.5 ppm	< 0.5 ppm
Phosphate (PO <sub>4</sub> )	≤ 0.05 ppm	< 0.03 ppm
Sulfate (SO <sub>4</sub> )	≤ 0.5 ppm	< 0.3 ppm
Sulfite (SO <sub>3</sub> )	≤ 0.8 ppm	0.3 ppm
Ammonium (NH <sub>4</sub> )	≤ 3 ppm	< 1 ppm
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.003 ppm
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	< 0.2 ppb
Arsenic and Antimony (as As)	≤ 5.0 ppb	< 3.0 ppb
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	< 1.0 ppb
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0 ppb
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Calcium (Ca)	≤ 50.0 ppb	37.0 ppb
Trace Impurities – Chromium (Cr)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Cobalt (Co)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Copper (Cu)	≤ 1.0 ppb	< 0.1 ppb
Trace Impurities – Gallium (Ga)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0 ppb
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.2 ppb
Heavy Metals (as Pb)	≤ 100 ppb	< 50 ppb
Trace Impurities – Iron (Fe)	≤ 15 ppb	1 ppb

>>> Continued on page 2 >>>

Hydrochloric Acid, 36.5–38.0%  
BAKER INSTRA-ANALYZED® Reagent  
For Trace Metal Analysis



Material No.: 9530-33  
Batch No.: 22E1662006

Test	Specification	Result
Trace Impurities – Lead (Pb)	≤ 1.0 ppb	< 0.5 ppb
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	1.0 ppb
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4 ppb
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	0.1 ppb
Trace Impurities – Molybdenum (Mo)	≤ 10.0 ppb	< 3.0 ppb
Trace Impurities – Nickel (Ni)	≤ 4.0 ppb	< 0.3 ppb
Trace Impurities – Niobium (Nb)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Potassium (K)	≤ 9.0 ppb	< 2.0 ppb
Trace Impurities – Selenium (Se), For Information Only		1.0 ppb
Trace Impurities – Silicon (Si)	≤ 100.0 ppb	< 0.4 ppb
Trace Impurities – Silver (Ag)	≤ 1.0 ppb	< 0.3 ppb
Trace Impurities – Sodium (Na)	≤ 100.0 ppb	1.9 ppb
Trace Impurities – Strontium (Sr)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Tantalum (Ta)	≤ 1.0 ppb	< 0.9 ppb
Trace Impurities – Thallium (Tl)	≤ 5.0 ppb	< 2.0 ppb
Trace Impurities – Tin (Sn)	≤ 5.0 ppb	< 0.8 ppb
Trace Impurities – Titanium (Ti)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Vanadium (V)	≤ 1.0 ppb	< 0.2 ppb
Trace Impurities – Zinc (Zn)	≤ 5.0 ppb	< 0.3 ppb
Trace Impurities – Zirconium (Zr)	≤ 1.0 ppb	< 0.1 ppb

>>> Continued on page 3 >>>

Hydrochloric Acid, 36.5–38.0%  
BAKER INSTRA–ANALYZED® Reagent  
For Trace Metal Analysis



Material No.: 9530–33  
Batch No.: 22E1662006

Test	Specification	Result
------	---------------	--------

For Laboratory, Research, or Manufacturing Use  
Product Information (not specifications):  
Appearance (clear, fuming liquid)  
Meets ACS Specifications  
Storage Condition: Store below 25 °C.

Country of Origin: USA  
Packaging Site: Phillipsburg Mfg Ctr & DC

  
Jamie Ethier  
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700  
Avantor Performance Materials, LLC  
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone 610.386.1700

Sodium Phosphate, Monobasic, Monohydrate,  
Crystal  
BAKER ANALYZED® A.C.S. Reagent

(sodium dihydrogen phosphate, monohydrate)



Material No.: 3818-05  
Batch No.: 0000225799  
Manufactured Date: 2018/12/05  
Retest Date: 2025/12/03  
Revision No: 1

## Certificate of Analysis

Meets ACS Reagent Chemical Requirements,

Test	Specification	Result
Assay ( $\text{NaH}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ )	98.0 – 102.0 %	99.5
pH of 5% Solution at 25°C	4.1 – 4.5	4.3
Insoluble Matter	$\leq 0.01$ %	$< 0.01$
Chloride (Cl)	$\leq 5$ ppm	$< 5$
ACS – Sulfate ( $\text{SO}_4$ )	$\leq 0.003$ %	$< 0.003$
Calcium (Ca)	$\leq 0.005$ %	$< 0.005$
Potassium (K)	$\leq 0.01$ %	$< 0.01$
Heavy Metals (as Pb)	$\leq 0.001$ %	$< 0.001$
Trace Impurities – Iron (Fe)	$\leq 0.001$ %	$< 0.001$

For Laboratory, Research or Manufacturing Use  
Meets Reagent Specifications for testing USP/NF monographs

Country of Origin: IN  
Packaging Site: Paris Mfg Ctr & DC

  
Jamie Ethier  
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700  
Avantor Performance Materials, LLC  
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone: 610.386.1700



## Certificate of Analysis

W2887  
50

Buffer, Reference Standard, pH 7.00 ± 0.01 at 25°C (Color Coded Yellow)

Lot Number: 2111F16

Product Number: 1551

Manufacture Date: NOV 19, 2021

Expiration Date: NOV 2023

The certified value for this product is confirmed in independent testing by a second qualified chemist.

The NIST traceable pH value is certified to ±0.01 at 25 °C only. All other pH values at their corresponding temperatures are accurate to ± 0.05.

°C	0	5	10	15	20	25	30	35	40	45	50
pH	7.12	7.09	7.06	7.04	7.02	7.00	6.99	6.98	6.98	6.97	6.97

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Sodium Phosphate Dibasic	7558-79-4	ACS
Potassium Dihydrogen Phosphate	7778-77-0	ACS
Preservative	Proprietary	
Yellow Dye	Proprietary	
Sodium Hydroxide	1310-73-2	Reagent.

Test	Specification	Result	NIST SRM#
Appearance	Yellow liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	6.990-7.010	7.007	186-I-g, 186-II-g, 191d
pH at 25°C (Method: SQCP027, SQCP033)	0.01	0.01	
Uncertainty			

Specification	Reference
Commercial Buffer Solutions	ASTM (D 1293 B)
Buffer A	ASTM (D 5464)
Buffer A	ASTM (D 5128)

pH measurements were performed in our Pocomoke City, MD laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.01) and are certified traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by k=2, corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434: it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1551-1	4 L natural poly	24 months
1551-1CS	4 x 4 L natural poly	24 months
1551-1CT	4 L Cubitainer®	24 months
1551-2.5	10 L Cubitainer®	24 months
1551-32	1 L natural poly	24 months
1551-5	20 L Cubitainer®	24 months



## Certificate of Analysis

W2886  
50

Buffer, Reference Standard, pH 10.00 ± 0.01 at 25°C (Color Coded Blue)

Lot Number: 2110E30

Product Number: 1601

Manufacture Date: OCT 14, 2021

Expiration Date: APR 2023

The certified value for this product is confirmed in independent testing by a second qualified chemist.

The NIST traceable pH value is certified to ±0.01 at 25 °C only. All other pH values at their corresponding temperatures are accurate to ± 0.05.

°C	0	5	10	15	20	25	30	35	40	50
pH	10.31	10.23	10.17	10.11	10.05	10.00	9.95	9.91	9.87	9.81

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Sodium Carbonate	497-19-8	ACS
Sodium Bicarbonate	144-55-8	ACS
Sodium Hydroxide	1310-73-2	Reagent
Preservative	Proprietary	
Blue Dye	Proprietary	

Test	Specification	Result	NIST SRM#
Appearance	Blue liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	9.990-10.010	10.005	186-I-g, 186-II-g, 191d
pH at 25°C (Method: SQCP027, SQCP033)	0.01	0.01	
Uncertainty			

Specification	Reference
Commercial Buffer Solutions	ASTM (D 1293 B)
Buffer C	ASTM (D 5464)
Buffer C	ASTM (D 5128)

pH measurements were performed in our Pocomoke City, MD laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.01) and are certified traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by k=2, corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1601-1	4 L natural poly	18 months
1601-1CS	4 x 4 L natural poly	18 months
1601-1CT	4 L Cubitainer®	18 months
1601-2.5	10 L Cubitainer®	18 months
1601-32	1 L natural poly	18 months
1601-5	20 L Cubitainer®	18 months



## Certificate of Analysis – Certified Reference Material

## Cyanide Standard for IC

TraceCERT®  
Traceable Certified Reference Materials

**Product no.:** 90157  
**Lot no.:** BCCD9263  
**Description of CRM:**  $K_2[Zn(CN)_4]$  (pure material) in high-purity water (18.2 M $\Omega$ .cm, 0.22  $\mu$ m filtered).  
**Expiry date:** OCT 2023  
**Storage:** Store at 5°C-25°C  
**Density (certified) at 20°C:** 999.6 kg m<sup>-3</sup>  $\pm$  0.5 kg m<sup>-3</sup>

Constituent	Certified values at 20°C and expanded uncertainties, $U = k \cdot u$ ( $k = 2$ ) [1][2]			
Cyanide	1000 mg kg <sup>-1</sup>	$\pm$ 9 mg kg <sup>-1</sup>	1000 mg L <sup>-1</sup>	$\pm$ 9 mg L <sup>-1</sup>

**Metrological traceability:** Directly traceable to NIST SRM 919b. [3]  
**Measurement method:** Argentometric titration  
**Intended use:** Calibration of ion chromatography or any other analytical technique.  
**Instructions for handling and correct use:** The bottle's temperature must be 20°C. Shake well before every use. If storage of a partially used bottle is necessary (at the user's risk), the cap should be tightly sealed and the bottle should be stored at reduced temperature (e.g. refrigerator) to minimize transpiration rate.  
**Health and safety information:** Please refer to the Safety Data Sheet for detailed information about the nature of any hazard and appropriate precautions to be taken.  
**Packaging:** 100 mL HDPE bottle  
**Accreditation:** Sigma-Aldrich Production GmbH is accredited by the Swiss accreditation authority SAS as registered reference material producer SRMS 0001 in accordance with ISO 17034 and registered testing laboratory STS 0490 according to ISO/IEC 17025.[4][5]  
**Certificate issue date:** 15 DEC 2020

ISO 17034  
SRMS 0001ISO/IEC 17025  
STS 0490ISO 9001  
005356 QM08

S. Matt

S. Matt – CRM Operations

Dr. P. Zell

Dr. P. Zell – Approving Officer



### Certification process details:

The certified value of the content (mg/kg) is determined using argentometric titration. The mean value is based on seven individual measurements. All measurements are traced gravimetrically to an internationally accepted reference material e.g. from NIST (USA) or BAM (Germany).

### Homogeneity assessment:

Due to the production process, a homogeneous solution derives. Nevertheless a small homogeneity contribution is included into the calculation of content uncertainty of this CRM.

### Density Measurement:

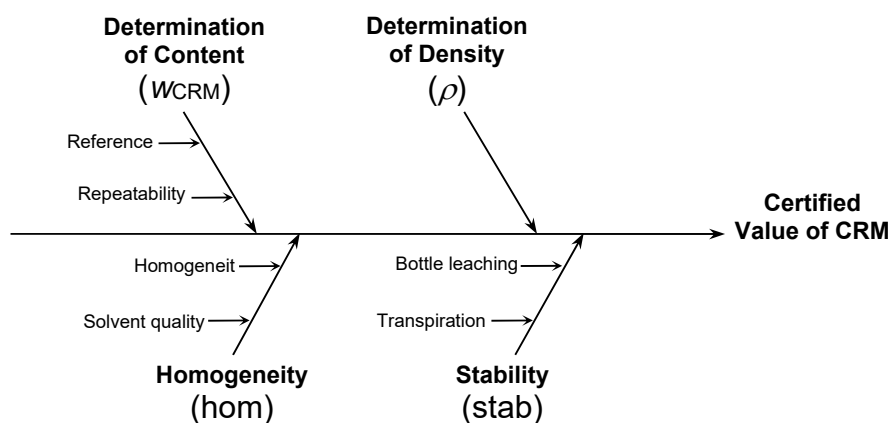
The density measurement is carried out under the scope of the ISO/IEC 17025 accreditation according to ISO 15212-1<sup>[6]</sup> and using the digital density meter DMA 4500M from Anton Paar with an oscillating U-tube installed. The measurement uncertainty is calculated according to Eurachem/CITAC Guide and reported as combined expanded uncertainty at the 95% confidence level, using a coverage factor of  $k = 2$ .

### Uncertainty evaluation:

The uncertainty contributions are illustrated by the following cause-effect diagram:

Typical relative contributions are:

$u(W_{\text{CRM}})$	0.1 – 0.3 %
$u_{\text{hom}}$	< 0.03 %
$u_{\text{stab}}$	< 0.09 %
$u(\rho)$	< 0.05 %



The combined standard uncertainty is calculated by combination of the standard uncertainties of the input estimates according to Eurachem/CITAC Guide "Quantifying Uncertainty in Analytical Measurement" and ISO 17034.<sup>[2][4]</sup>

Expanded uncertainty is then calculated to a confidence level of 95%, typically by multiplying with a confidence level factor of  $k=2$ .

### Trace Impurities in bottled solution:

The following anions were measured as possible impurities (in  $\mu\text{g kg}^{-1}$ , <X = below detection limit, m = matrix):

Bromide	Chloride	Fluoride	Iodide	Nitrite	Nitrate	Phosphate	Sulfate
< 12.5	2950	69	< 12.5	54	34	40	383

#### References:

- [1] ISO Guide 35:2017, "Reference materials - Guidance for characterization and assessment of homogeneity and stability"
- [2] Eurachem/CITAC Guide, 3<sup>rd</sup> Ed. (2012), "Quantifying uncertainty in analytical measurement"
- [3] Eurachem/CITAC Guide, 2<sup>nd</sup> Ed. (2019), "Metrological Traceability in chemical measurement"
- [4] ISO 17034:2016, "General requirements for the competence of reference material producers"
- [5] ISO/IEC 17025:2017, "General requirements for the competence of testing and calibration laboratories"
- [6] DIN EN ISO 15212-1:1998, Oscillation-type density meters - Part 1: Laboratory instruments

#### Certificate of analysis revision history:

Certificate version	Certificate issue date	Reason for version
01	15 DEC 2020	Initial version

#### Disclaimer:

The purchaser must determine the suitability of this product for its particular use. Sigma-Aldrich Production GmbH makes no warranty of any kind, express or implied, other than its products meet all quality control standards set by Sigma-Aldrich Production GmbH. We do not guarantee that the product can be used for a special application.





W 2924  
W 2925  
Open 7/5/22

### CERTIFICATE OF ANALYSIS

Description: IODINE, 0.025N (0.0125M)

Mfg. Date: 03/02/2022

Catalog Number: LC15620

Exp. Date: 09/02/2023

Lot Number: M046-10

### ANALYTICAL SECTION

Test	Specification	Test Result
Appearance	red-brown solution	Pass Test
Normality	0.0250N +/- 0.0003N	0.0252N
Traceable to NIST	Potassium Dichromate	136f

**Intended Use** - Product is intended for use in manufacturing procedures and laboratory procedures and protocols.

**Storage Information** - Unless otherwise noted on the product label, store the product under normal lab conditions in its tightly closed, original container. Do not pipet directly from the container or return unused portions to the container.

**Instructions for Handling and Use** - Please refer to the associated product label and Safety Data Sheet (SDS) for information regarding safety and handling of this product.

**Preparation** - All products are manufactured and tested according to established, documented procedures and methodology. Production documentation records manufacturing data, raw material traceability and testing history on a per lot basis. Balances, thermometers, and glassware are calibrated before first use and on a regular schedule with references traceable to NIST standards.

Submitted by: Greg Albright, Chemist Supervisor

An ISO9001:2015 certified company. Registration # 0306-01

07/05/2022 3:46 PM

Form #17.13 07/28/2016



RICCA CHEMICAL COMPANY®

1490 Lammers Pike

Batesville, IN 47006

<http://www.riccachemical.com>

1-888-GO-RICCA

customerservice@riccachemical.com

## Certificate of Analysis

Buffer, Reference Standard, pH 12.00 ± 0.01 at 25°C

Lot Number: 4206H39

Product Number: 1615

Manufacture Date: JUN 21, 2022

Expiration Date: DEC 2023

The certified value for this product is confirmed in independent testing by a second qualified chemist.

°C	15	20	25	30	35	40
pH	12.35	12.17	11.99	11.78	11.62	11.46

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Chloride	7447-40-7	ACS
Sodium Hydroxide	1310-73-2	Reagent

Test	Specification	Result	NIST SRM#
Appearance	Colorless liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	11.990-12.010	12.002	186-I-g, 186-II-g, 191d
pH at 25°C (Method: SQCP027, SQCP033)	0.02	0.02	
Uncertainty			

pH measurements were performed in our Batesville, IN laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.02) and are certified traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by  $k=2$ , corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1615-1	4 L natural poly	18 months
1615-16	500 mL clear PET-G	18 months
1615-2.5	10 L Cubitainer®	18 months
1615-32	1 L natural poly	18 months
1615-5	20 L Cubitainer®	18 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)

W2941

**CERTIFICATE OF ANALYSIS**

Description: SODIUM THIOSULFATE, 0.025N (0.025M)

Mfg. Date: 03/31/2022

Catalog Number: LC25020

Exp. Date: 04/01/2023

Lot Number: M075-30

**ANALYTICAL SECTION**

Test	Specification	Test Result
Appearance	clear, colorless solution	Pass Test
Normality	0.0250N +/- 0.0002N	0.0249N
Traceable to NIST	Potassium Dichromate	136f

**Intended Use** - Product is intended for use in manufacturing procedures and laboratory procedures and protocols.

**Storage Information** - Unless otherwise noted on the product label, store the product under normal lab conditions in its tightly closed, original container. Do not pipet directly from the container or return unused portions to the container.

**Instructions for Handling and Use** - Please refer to the associated product label and Safety Data Sheet (SDS) for information regarding safety and handling of this product.

**Preparation** - All products are manufactured and tested according to established, documented procedures and methodology. Production documentation records manufacturing data, raw material traceability and testing history on a per lot basis. Balances, thermometers, and glassware are calibrated before first use and on a regular schedule with references traceable to NIST standards.

Submitted by: Greg Albright, Chemist Supervisor

An ISO9001:2015 certified company. Registration # 0306-01

08/01/2022 3:08 PM

Form #17.13 07/28/2016



W2977 Rec 11/15/22

## Certificate of Analysis

## Starch Indicator, 0.5% (w/v), Mercury Free, for Iodometric Titrations

Lot Number: 4210G90

Product Number: 8000

Manufacture Date: OCT 17, 2022

Expiration Date: OCT 2024

This product is Mercury-free.

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Starch, soluble	9005-84-9	ACS
Salicylic Acid	69-72-7	ACS

Test	Specification	Result
Appearance	White translucent liquid	Passed
Suitability for Use	Colorless (Iodine absent) - Blue (Iodine present)	Passed

Specification	Reference
Starch Solution	APHA (4500-S2- F)
Starch Indicator Solution	APHA (4500-CI B)
Starch Indicator	APHA (4500-SO32- B)
Starch indicator solution	APHA (2350 B)
Starch indicator solution	APHA (2350 E)
Starch Solution	APHA (510 B)
Starch Solution	APHA (5530 C)
Starch Indicator	APHA (4500-CI C)
Starch Indicator	EPA (345.1)

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
8000-1	4 L natural poly	24 months
8000-5	20 L Cubitainer®	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)



Paul Brandon (10/17/2022)

Production Manager

This Certificate of Analysis is designed to comply with ISO Guide 31 "Reference Materials -- Contents of Certificates and Labels."

This test report shall not be reproduced, except in full, without the written approval of Ricca Chemical Company.





# RICCA CHEMICAL COMPANY®

1841 Broad Street  
Pocomoke City, MD 21851  
<http://www.riccachemical.com>  
1-888-GO-RICCA  
[customerservice@riccachemical.com](mailto:customerservice@riccachemical.com)

## Certificate of Analysis

W2980  
30  
04/11/21  
12/12/2022

Buffer, Reference Standard, pH 4.00 ± 0.01 at 25°C (Color Coded Red)

Lot Number: 2206A61

Product Number: 1501

Manufacture Date: JUN 08, 2022

Expiration Date: MAY 2024

Certified value for this product is confirmed in independent testing by a second qualified chemist.

NIST Traceable pH value is certified to ±0.01 at 25 °C only. All other pH values at their corresponding temperatures are accurate to ± 0.05.

°C	0	5	10	15	20	25	30	35	40	45	50
pH	4.00	4.00	4.00	4.00	4.00	4.00	4.01	4.02	4.03	4.04	4.06

Name	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Potassium Acid Phthalate	877-24-7	Buffer
Preservative	Proprietary	Commercial
Red Dye	Proprietary	Purified

Test	Specification	Result	NIST SRM#
Appearance	Red liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	3.990-4.010	4.010	185i, 186-I-g,
pH at 25°C (Method: SQCP027, SQCP033)	0.02	0.02	186-II-g
Uncertainty			

Specification	Reference
Commercial Buffer Solutions	ASTM (D 1293 B)
Water B	ASTM (D 5464)
Water B	ASTM (D 5128)

Measurements were performed in our Pocomoke City, MD laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.01) and are traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by k=2, corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1501-1	4 L natural poly	24 months
1501-1CT	4 L Cubitainer®	24 months
1501-32	1 L natural poly	24 months
1501-5	20 L Cubitainer®	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)



## Certificate of Analysis

W2481  
DATE: 12/12/2022  
JP

Buffer, Reference Standard, pH 7.00 ± 0.01 at 25°C (Color Coded Yellow)

Lot Number: 4203B62

Product Number: 1551

Manufacture Date: MAR 04, 2022

Expiration Date: FEB 2024

The certified value for this product is confirmed in independent testing by a second qualified chemist.

NIST traceable pH value is certified to ±0.01 at 25 °C only. All other pH values at their corresponding temperatures are accurate to ± 0.05.

	0	5	10	15	20	25	30	35	40	45	50
pH	7.12	7.09	7.06	7.04	7.02	7.00	6.99	6.98	6.98	6.97	6.97

Component	CAS#	Grade
Water	7732-18-5	ACS/ASTM/USP/EP
Sodium Phosphate Dibasic	7558-79-4	ACS
Potassium Dihydrogen Phosphate	7778-77-0	ACS
Preservative	Proprietary	
Yellow Dye	Proprietary	
Sodium Hydroxide	1310-73-2	Reagent

Test	Specification	Result	NIST SRM#
Appearance	Yellow liquid	Passed	
pH at 25°C (Method: SQCP027, SQCP033)	6.990-7.010	7.000	186-I-g, 186-II-g, 191d
pH at 25°C (Method: SQCP027, SQCP033)	0.02	0.02	
Uncertainty			

Specification	Reference
Commercial Buffer Solutions	ASTM (D 1293 B)
Water A	ASTM (D 5464)
Water A	ASTM (D 5128)

pH measurements were performed in our Batesville, IN laboratory under ISO/IEC 17025 accreditation (ANAB Certificate L2387.02) and are certified traceable to National Institute of Standards and Technology (NIST) Standard Reference Material as indicated above via an unbroken chain of comparisons. The uncertainty is calculated from the uncertainty of the measurement variation from sample to sample, the uncertainty in the NIST Standard Reference Material, and the uncertainty of the measurement process. The uncertainty is multiplied by k=2, corresponding to 95% coverage in a normal distribution.

Volumetric glassware complies with Class A tolerance requirements of ASTM E 288 and NIST Circular 434; it is calibrated before first use and recalibrated regularly in accordance with ASTM E 542 and NIST Procedure NBSIR 74-461. Balances are calibrated regularly with weights certified traceable to the NIST national mass standard. Thermometers and temperature probes are calibrated before first use and recalibrated regularly with a thermometer traceable to NIST standards. All products are prepared according to master documents that assure manufacture according to validated methods. Batch records document raw material traceability and production and testing history for each lot manufactured.

Part Number	Size / Package Type	Shelf Life (Unopened Container)
1551-1CT	4 L Cubitainer®	24 months
1551-2.5	10 L Cubitainer®	24 months
1551-5	20 L Cubitainer®	24 months

Recommended Storage: 15°C - 30°C (59°F - 86°F)