

Prep Standard - Chemical Standard Summary

Order ID : Q2724

Test : Cyanide,Field pH

Prepbatch ID : PB169055,

Sequence ID/Qc Batch ID: LB136651, LB136682,

Standard ID :

WP112643, WP112826, WP112827, WP112900, WP113836, WP113837, WP113838, WP114116, WP114117, WP114118, WP114119, WP114120, WP114121, WP114122, WP114123, WP114125,

Chemical ID :

M6041, M6151, W2668, W3012, W3019, W3093, W3101, W3112, W3113, W3139, W3152, W3178, W3191, W3203, W3214, W3215, W3217, W3224,

| <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 | WP112643 | 04/09/2025 | 10/09/2025 | Niha Farheen Shaik | WETCHEM_SCALE_5 (WCS-5) | None | Iwona Zarych 04/09/2025 |
| <u>FROM</u> 138.00000gram of W2668 + 862.00000ml of W3112 = 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> |
|--|--------------------------|--------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------------|
| 1714 | Sulfuric Acid, 50% (v/v) | WP112826 | 04/25/2025 | 10/25/2025 | Rubina Mughal | None | None | Iwona Zarych 04/25/2025 |
| <u>FROM</u> 1000.00000ml of M6041 + 1000.00000ml of W3112 = Final Quantity: 2000.000 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> |
|--|---|--------------------------|------------------|------------------------|--------------------|----------------------------------|------------------|--------------------------------|
| 3214 | Magnesium Chloride For Cyanide 2.5M(51%W/V) | WP112827 | 04/25/2025 | 10/25/2025 | Rubina Mughal | WETCHEM_S CALE_8 (WC SC-7) | None | Iwona Zarych 04/25/2025 |
| <u>FROM</u> 500.00000ml of W3112 + 510.00000gram of W3152 = 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> |
|------------------|---|--------------------------|------------------|------------------------|--------------------|---------------------------|------------------|----------------------------|
| 607 | PYRIDINE-BARBITURIC ACID | WP112900 | 05/01/2025 | 08/18/2025 | Rubina Mughal | WETCHEM_SCALE_8 (WC SC-7) | Glass Pipette-A | Iwona Zarych 05/01/2025 |
| <u>FROM</u> | 145.00000ml of W3112 + 15.00000gram of W3203 + 15.00000ml of M6151 + 75.00000ml of W3019 = 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> |
|---|--|--------------------------|------------------|------------------------|--------------------|----------------------------------|------------------|--------------------------------|
| 11 | Sodium hydroxide absorbing solution 0.25 N | WP113836 | 07/08/2025 | 12/31/2025 | Rubina Mughal | WETCHEM_S CALE_8 (WC SC-7) | None | Iwona Zarych 07/08/2025 |
| <u>FROM</u> 21.00000L of W3112 + 210.00000gram of W3113 = Final Quantity: 21.000 L | | | | | | | | |

| <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> |
|--|---------------------------------------|--------------------------|------------------|------------------------|--------------------|----------------|-------------------|----------------------|
| 3850 | Cyanide MS-MSD spiking solution, 5PPM | WP113837 | 07/08/2025 | 11/30/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 | Iwona Zarych |
| <p>(WC)</p> <p><u>FROM</u> 1.00000ml of W3214 + 199.00000ml of WP113836 = Final Quantity: 200.000 ml</p> | | | | | | | | |

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> |
|------------------|----------------------------------|--------------------------|------------------|------------------------|--------------------|----------------|---------------------------|----------------------------|
| 3371 | Cyanide LCS Spike Solution, 5PPM | WP113838 | 07/08/2025 | 12/24/2025 | Rubina Mughal | None | WETCHEM_FIPETTE_3 (WC) | Iwona Zarych 07/08/2025 |

FROM 1.00000ml of W3224 + 199.00000ml of WP113836 = Final Quantity: 200.000 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> |
|------------------|--|--------------------------|------------------|------------------------|--------------------|----------------|---------------------------|----------------------------|
| 3456 | Cyanide Intermediate Working Std, 5PPM | WP114116 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_FIPETTE_3 (WC) | Iwona Zarych 07/31/2025 |

FROM 0.25000ml of W3214 + 49.75000ml of WP113836 = 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 | WP114117 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 | Iwona Zarych |
| <p>(WC)</p> <p>FROM 45.00000ml of WP113836 + 5.00000ml of WP114116 = Final Quantity: 50.000 ml</p> | | | | | | | | |

| <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 | WP114118 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 (WC) | Iwona Zarych 07/31/2025 |
| <u>FROM</u> 2.50000ml of WP114116 + 47.50000ml of WP113836 = 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 | WP114119 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 | Iwona Zarych |
| (WC) | | | | | | | | |
| <u>FROM</u> | 1.00000ml of WP114116 + 49.00000ml of WP113836 = 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> |
|--|-----------------------------|--------------------------|------------------|------------------------|--------------------|----------------|---------------------------|----------------------------|
| 7 | Calibration Standard 50 ppb | WP114120 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 (WC) | Iwona Zarych 07/31/2025 |
| FROM 0.50000ml of WP114116 + 49.50000ml of WP113836 = 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 | WP114121 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 | Iwona Zarych |
| <p>(WC)</p> <p>FROM 1.00000ml of WP114117 + 49.00000ml of WP113836 = Final Quantity: 50.000 ml</p> | | | | | | | | |

| <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 | WP114122 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | WETCHEM_PIPETTE_3 (WC) | Iwona Zarych 07/31/2025 |
| <u>FROM</u> | 0.50000ml of WP114117 + 49.50000ml of WP113836 = Final Quantity: 50.000 ml | | | | | | | |

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> |
|------------------|--------------------------|--------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 167 | 0 ppb CN calibration std | WP114123 | 07/30/2025 | 07/31/2025 | Rubina Mughal | None | None | Iwona Zarych |
| | | | | | | | | 07/31/2025 |

FROM 50.00000ml of WP113836 = 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 | WP114125 | 07/30/2025 | 07/31/2025 | Rubina Mughal | WETCHEM_S CALE_5 (WC SC-5) | Glass Pipette-A | Iwona Zarych |
| | | | | | | | | 07/31/2025 |

FROM 0.08000gram of W3139 + 20.00000ml of W3112 = Final Quantity: 20.000 ml

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9673-33 / Sulfuric Acid, Instra-Analyzed (cs/6c2.5L) | 23D2462010 | 03/20/2028 | 08/16/2024 / mohan | 08/16/2024 / mohan | M6041 |

| 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) | 22G2862015 | 08/18/2025 | 02/18/2025 / Sagar | 01/15/2025 / Sagar | M6151 |

| 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 # |
|----------|---------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| EPA | / ICV-CN | ICV6-400 | 12/31/2025 | 01/08/2025 / Iwona | 02/20/2020 / Iwona | W3012 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|---------------|-------------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| SIGMA ALDRICH | 270970-1L / Pyridine 1L | SHBQ2113 | 04/03/2028 | 04/03/2023 / Iwona | 04/03/2023 / Iwona | W3019 |

| 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 | 44001f99 | 12/31/2025 | 04/03/2024 / jignesh | 04/02/2024 / jignesh | W3093 |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|--|--------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | 470112-662 / TEST STRIPES, NITRATE/NITRITE, PK50 | 402403 | 04/30/2026 | 05/02/2024 / Iwona | 04/10/2024 / Iwona | W3101 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---------------------|---------------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | DIW / DI Water | Daily Lab-Certified | 07/03/2029 | 07/03/2024 / Iwona | 07/03/2024 / Iwona | W3112 |

| 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 | 23B1556310 | 12/31/2025 | 07/08/2024 / Iwona | 07/08/2024 / Iwona | W3113 |

| 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 | 10239484 | 09/09/2029 | 09/09/2024 / Iwona | 09/09/2024 / Iwona | W3139 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|--|-----------------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | 01237-10KG / Magnesium Chloride Hexahydrate ACS 10KG | 002126-2019-201 | 11/25/2029 | 11/25/2024 / Iwona | 11/25/2024 / Iwona | W3152 |

| 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 | 2411A93 | 10/30/2026 | 04/01/2025 / JIGNESH | 01/27/2025 / jignesh | W3178 |

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 | 2410F80 | 03/31/2026 | 04/01/2025 / JIGNESH | 03/13/2025 / jignesh | W3191 |

| 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 | WXBF3271V | 05/16/2029 | 04/21/2025 / lwona | 04/21/2025 / lwona | W3203 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|------------------------------------|---------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | RC2543-4 / CYANIDE STD 1000PPM 4OZ | 1505H73 | 11/30/2025 | 05/21/2025 / lwona | 05/21/2025 / lwona | W3214 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|---|---------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | 140444 / TEST PAPERS,PH 0-14,.5 SENSI,100PK | 10D3242 | 12/31/2028 | 06/09/2025 / lwona | 06/09/2025 / lwona | W3215 |

| 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 | 2504D34 | 03/31/2027 | 07/02/2025 / jignesh | 06/26/2025 / lwona | W3217 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|--|----------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | LC135457 / Cyanide Standard, 1000 PPM, Second Source | 45060288 | 12/24/2025 | 07/07/2025 / lwona | 07/07/2025 / lwona | W3224 |

W3019
rec 4/3/23

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.comEmail USA: techserv@sial.comOutside USA: eurtechserv@sial.com

Certificate of Analysis

Product Name:

Pyridine - anhydrous, 99.8%

Product Number:

270970

Batch Number:

SHBQ2113

Brand:

SIAL

CAS Number:

110-86-1

MDL Number:

MFCD00011732

Formula:

C₅H₅N

Formula Weight:

79.10 g/mol

Quality Release Date:

15 DEC 2022



| 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 % |


Larry Coers, Director
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.





R: 02/20/20
53

Instructions for QATS Reference Material: *Inorganic ICV Solutions*

For ICP-MS use: dilute the ICV1 concentrate 50-fold with 1% (v/v) nitric acid; pipet 2 mL of the concentrate into a 100 mL volumetric flask and dilute to volume with 1% (v/v) nitric acid.

ICV5-0415

For the cold vapor analysis of mercury by AA: dilute the ICV5 concentrate 100-fold with 2% (v/v) nitric acid; pipet 1 mL of the concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid. The ICV5 concentrate is prepared in 0.05% (w/v) $K_2Cr_2O_7$ and 5% (v/v) nitric acid.

ICV6-0400

For the analysis of cyanide: dilute the ICV6 concentrate 100-fold with Type II water; pipet 1 mL of the concentrate into a 100 mL volumetric flask and dilute to volume with Type II water. Distill this solution along with the samples before analysis. The cyanide concentrate is prepared from $K_3Fe(CN)_6$, Type II water, and 0.1 % sodium hydroxide, and will decompose rapidly if exposed to light.

NOTE: USE TYPE II WATER AND HIGH-PURITY ACIDS FOR ALL DILUTIONS.

(D) CERTIFIED CONCENTRATIONS OF QATS ICV1, ICV5, AND ICV6 SOLUTIONS

| ICV1-1014 | | |
|-----------|--|--|
| Element | Concentration (µg/L) (after 10-fold dilution) | Concentration (µg/L) (after 50-fold dilution) |
| Al | 2520 | 504 |
| Sb | 1010 | 202 |
| As | 997 | 199 |
| Ba | 518 | 104 |
| Be | 514 | 103 |
| Cd | 514 | 103 |
| Ca | 10000 | 2000 |
| Cr | 517 | 103 |
| Co | 521 | 104 |
| Cu | 505 | 101 |
| Fe | 10100 | 2020 |
| Pb | 1030 | 206 |
| Mg | 5990 | 1198 |
| Mn | 524 | 105 |
| Ni | 525 | 105 |
| K | 9940 | 1988 |
| Se | 1030 | 206 |
| Ag | 252 | 50 |
| Na | 10100 | 2020 |
| Tl | 1040 | 208 |
| V | 504 | 101 |
| Zn | 1010 | 202 |

| ICV5-0415 | | ICV6-0400 | |
|-----------|---|-----------------|---|
| Element | Concentration (µg/L) (after 100-fold dilution) | Analyte | Concentration (µg/L) (after 100-fold dilution) |
| Hg | 4.0 | CN ⁻ | 99 |

W3011
W3012
W3013
W3014
W3015

Sulfuric Acid
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis
Low Selenium

avantor™



M 6041-4b
MS

Material No.: 9673-33
Batch No.: 23D2462010
Manufactured Date: 2023-03-22
Retest Date: 2028-03-20
Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|--|---------------|-------------|
| ACS – Assay (H ₂ SO ₄) | 95.0 – 98.0 % | 96.1 % |
| Appearance | Passes Test | Passes Test |
| ACS – Color (APHA) | ≤ 10 | 5 |
| ACS – Residue after Ignition | ≤ 3 ppm | < 1 ppm |
| ACS – Substances Reducing Permanganate (as SO ₂) | ≤ 2 ppm | < 2 ppm |
| Ammonium (NH ₄) | ≤ 1 ppm | 1 ppm |
| Chloride (Cl) | ≤ 0.1 ppm | < 0.1 ppm |
| Nitrate (NO ₃) | ≤ 0.2 ppm | < 0.1 ppm |
| Phosphate (PO ₄) | ≤ 0.5 ppm | < 0.1 ppm |
| Trace Impurities – Aluminum (Al) | ≤ 30.0 ppb | < 5.0 ppb |
| Arsenic and Antimony (as As) | ≤ 4.0 ppb | < 2.0 ppb |
| Trace Impurities – Boron (B) | ≤ 10.0 ppb | 8.5 ppb |
| Trace Impurities – Cadmium (Cd) | ≤ 2.0 ppb | < 0.3 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 6.0 ppb | < 0.4 ppb |
| Trace Impurities – Cobalt (Co) | ≤ 0.5 ppb | < 0.3 ppb |
| Trace Impurities – Copper (Cu) | ≤ 1.0 ppb | < 0.1 ppb |
| Trace Impurities – Gold (Au) | ≤ 10.0 ppb | 0.5 ppb |
| Heavy Metals (as Pb) | ≤ 500.0 ppb | < 100.0 ppb |
| Trace Impurities – Iron (Fe) | ≤ 50.0 ppb | 1.3 ppb |
| Trace Impurities – Lead (Pb) | ≤ 0.5 ppb | < 0.5 ppb |
| Trace Impurities – Magnesium (Mg) | ≤ 7.0 ppb | 0.8 ppb |
| Trace Impurities – Manganese (Mn) | ≤ 1.0 ppb | < 0.4 ppb |
| Trace Impurities – Mercury (Hg) | ≤ 0.5 ppb | < 0.1 ppb |
| Trace Impurities – Nickel (Ni) | ≤ 2.0 ppb | 0.3 ppb |
| Trace Impurities – Potassium (K) | ≤ 500.0 ppb | < 2.0 ppb |
| Trace Impurities – Selenium (Se) | ≤ 50.0 ppb | < 0.1 ppb |
| Trace Impurities – Silicon (Si) | ≤ 100.0 ppb | 31.5 ppb |
| Trace Impurities – Silver (Ag) | ≤ 1.0 ppb | < 0.3 ppb |

>>> Continued on page 2 >>>

Sulfuric Acid
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis
Low Selenium

 **avantor™**



Material No.: 9673-33
Batch No.: 23D2462010

| Test | Specification | Result |
|-----------------------------------|------------------|-----------|
| Trace Impurities – Sodium (Na) | ≤ 500.0 ppb | 5.4 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 5.0 ppb | < 0.2 ppb |
| Trace Impurities – Tin (Sn) | ≤ 5.0 ppb | < 0.8 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 5.0 ppb | 0.4 ppb |

For Laboratory, Research, or Manufacturing Use

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


Jamie Ethier
Vice President Global Quality

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

 **avantor™**



M6151

R → 11/15/25

Material No.: 9530-33
Batch No.: 22G2862015
Manufactured Date: 2022-06-15
Retest Date: 2027-06-14
Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|---|---------------|-------------|
| ACS – Assay (as HCl) (by acid–base titrn) | 36.5 – 38.0 % | 37.9 % |
| ACS – Color (APHA) | ≤ 10 | 5 |
| ACS – Residue after Ignition | ≤ 3 ppm | < 1 ppm |
| ACS – Specific Gravity at 60°/60°F | 1.185 – 1.192 | 1.191 |
| ACS – Bromide (Br) | ≤ 0.005 % | < 0.005 % |
| ACS – Extractable Organic Substances | ≤ 5 ppm | < 1 ppm |
| ACS – Free Chlorine (as Cl ₂) | ≤ 0.5 ppm | < 0.5 ppm |
| Phosphate (PO ₄) | ≤ 0.05 ppm | < 0.03 ppm |
| Sulfate (SO ₄) | ≤ 0.5 ppm | < 0.3 ppm |
| Sulfite (SO ₃) | ≤ 0.8 ppm | 0.3 ppm |
| Ammonium (NH ₄) | ≤ 3 ppm | < 1 ppm |
| Trace Impurities – Arsenic (As) | ≤ 0.010 ppm | < 0.003 ppm |
| Trace Impurities – Aluminum (Al) | ≤ 10.0 ppb | 1.3 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 | 163.0 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 1.0 ppb | 0.7 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 | 0.6 ppb |
| Heavy Metals (as Pb) | ≤ 100 ppb | < 50 ppb |
| Trace Impurities – Iron (Fe) | ≤ 15 ppb | 6 ppb |

>>> Continued on page 2 >>>

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

 **avantorsm**



Material No.: 9530-33
Batch No.: 22G2862015

| 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 | 2.9 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 | 0.8 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 | < 10.0 ppb |
| Trace Impurities – Silver (Ag) | ≤ 1.0 ppb | 0.5 ppb |
| Trace Impurities – Sodium (Na) | ≤ 100.0 ppb | 2.3 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Tantalum (Ta) | ≤ 1.0 ppb | 1.6 ppb |
| Trace Impurities – Thallium (Tl) | ≤ 5.0 ppb | < 2.0 ppb |
| Trace Impurities – Tin (Sn) | ≤ 5.0 ppb | 4.0 ppb |
| Trace Impurities – Titanium (Ti) | ≤ 1.0 ppb | 1.5 ppb |
| Trace Impurities – Vanadium (V) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 5.0 ppb | 0.8 ppb |
| Trace Impurities – Zirconium (Zr) | ≤ 1.0 ppb | 0.3 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.: 22G2862015

| 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

A handwritten signature in cursive script that reads 'Jamie Ethier'.
Jamie Ethier
Vice President Global Quality

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 | ≤ 0.01 % | < 0.01 |
| Chloride (Cl) | ≤ 5 ppm | < 5 |
| ACS – Sulfate (SO_4) | ≤ 0.003 % | < 0.003 |
| Calcium (Ca) | ≤ 0.005 % | < 0.005 |
| Potassium (K) | ≤ 0.01 % | < 0.01 |
| Heavy Metals (as Pb) | ≤ 0.001 % | < 0.001 |
| Trace Impurities – Iron (Fe) | ≤ 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

**RICCA CHEMICAL COMPANY®**

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Batesville, IN 47006

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Certificate of Analysis

W3093
094121
04/03/2024
16

Buffer, Reference Standard, pH 7.00 ± 0.01 at 25°C (Color Coded Yellow)**Lot Number:** 4401F99**Product Number:** 1551**Manufacture Date:** JAN 08, 2024**Expiration Date:** DEC 2025

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 | |

| Test | Specification | Result |
|------------|---------------|--------|
| Appearance | Yellow liquid | Passed |

*Not a certified value.

| Test | Certified Value | Uncertainty | NIST SRM# |
|---------------------------------------|-----------------|-------------|-------------------------|
| pH at 25°C (Method: SQCP027, SQCP033) | 7.004 | 0.02 | 186-I-g, 186-II-g, 191d |

| 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 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) |
|-------------|---------------------|---------------------------------|
| 1551-1 | 4 L natural poly | 24 months |
| 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)



Paul Brandon (01/08/2024)

Production Manager

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

This product was tested in an ISO 17025 Accredited Laboratory

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



Certificate of Analysis



Sodium Hydroxide (Pellets)

Material: 0583
Grade: ACS GRADE
Batch Number: 23B1556310

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

Manufacture Date: 12/14/2022
Expiration Date: 12/31/2025

Storage: Room Temperature

Pellets

| TEST | SPECIFICATION | ANALYSIS | DISPOSITION |
|--------------------|---------------|----------|-------------|
| Calcium | <= 0.005 % | <0.005 % | PASS |
| Chloride | <= 0.005 % | 0.002 % | 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 % | 99.2 % | PASS |
| Sodium Carbonate | <= 1.0 % | 0.5 % | PASS |
| Sulfate | <= 0.003 % | <0.003 % | PASS |

Internal ID #: 710

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: 23B1556310

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

Manufacture Date: 12/14/2022
Expiration Date: 12/31/2025

Storage: Room Temperature

Pellets

Spec Set: 0583ACS

Internal ID #: 710

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.

W3139 Received on 9/9/24 by IZ

Product No.: A12044
Product: Chloramine-T trihydrate, 98%
Lot No.: 10239484

| | |
|-------------------------------|--------------|
| Appearance: | White powder |
| Melting Point: | 166°C(dec) |
| Assay (Iodometric titration): | 100.5% |
| Identification (FTIR): | Conforms |

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Products are processed under ISO 9001:2015 quality management systems and samples are tested for conformance to the noted specifications. Certain data may have been supplied by third parties. We disclaim the implied warranties of merchantability and fitness for a particular purpose, and the accuracy of third party data or information associated with the product. Products are for research and development use only. Products are not for direct administration to humans or animals. It is the responsibility of the final formulator or end user to determine suitability, and to qualify and/or validate each product for its intended use.

Chem-Impex International, Inc.

Tel: (630) 766-2112**E-mail: sales@chemimpex.com****Shipping and Correspondence:**

935 Dillon Drive

Wood Dale, IL 60191

Fax: (630) 766-2218**Web site: www.chemimpex.com****Manufacturing site:**

825 Dillon Drive

Wood Dale, IL 60191

Certificate of Analysis

| | |
|-------------------------|---------------------------------------|
| Catalogue Number | 01237 |
| Lot Number | 002126-2019-201 |
| Product | Magnesium chloride hexahydrate |

Magnesium chloride•6H₂O

| | |
|--------------------------|--------------------------------------|
| CAS Number | 7791-18-6 |
| Molecular Formula | MgCl ₂ •6H ₂ O |
| Molecular Weight | 203.3 |

| | |
|---------------------------|---|
| Appearance | White crystals |
| Solubility | 167 g in 100 mL water |
| Melting Point | ~ 115 °C |
| Heavy Metals | 4.393 ppm |
| Anion | Nitrate (NO ₃) : < 0.001% Phosphate (PO ₄) : < 5 ppm Sulfate (SO ₄) : < 0.002% |
| Cation | Ammonium (NH ₄) : < 0.002% Barium (Ba) : 0.005% Calcium (Ca) : 0.01% Iron (Fe) : 4.5 ppm Manganese (Mn) : 0.624 ppm Potassium (K) : 0.004% Sodium (Na) : 0.000003% Strontium (Sr) : 0.005% |
| Insoluble material | 0.0021% |
| Assay by titration | 100.83% |
| Grade | ACS reagent |
| Storage | Store at RT |

Certificate of Analysis

Catalog Number: 01237

Lot Number: 002126-2019-201

Remarks

See material safety data sheet for additional information

For laboratory use only

The foregoing is a copy of the Certificate of Analysis as provided by our supplier

A handwritten signature in black ink, appearing to read 'Bala Kumar', with a stylized flourish at the end.

Bala Kumar
Quality Control Manager

**RICCA CHEMICAL COMPANY®**

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Certificate of Analysis

031758 58

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

Lot Number: 2411A93

Product Number: 1501

Manufacture Date: NOV 04, 2024

Expiration Date: OCT 2026

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 | 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 |
|------------|---------------|--------|
| Appearance | Red liquid | Passed |

*Not a certified value.

| Test | Certified Value | Uncertainty | NIST SRM# |
|---------------------------------------|-----------------|-------------|-------------------------|
| pH at 25°C (Method: SQCP027, SQCP033) | 4.008 | 0.02 | 185i, 186-I-g, 186-II-g |

| Specification | Reference |
|-----------------------------|-----------------|
| Commercial Buffer Solutions | |
| Buffer B | ASTM (D 1293 B) |
| Buffer B | ASTM (D 5464) |
| Buffer B | 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) |
|-------------|---------------------|---------------------------------|
| 1501-16 | 500 mL natural poly | 24 months |
| 1501-2.5 | 10 L Cubitainer® | 24 months |
| 1501-5 | 20 L Cubitainer® | 24 months |

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



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Certificate of Analysis

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

Lot Number: 2410F80

Product Number: 1601

Manufacture Date: OCT 09, 2024

Expiration Date: MAR 2026

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 |
|------------|---------------|--------|
| Appearance | Blue liquid | Passed |

| Test | Certified Value | Uncertainty | NIST SRM# |
|---------------------------------------|-----------------|-------------|-------------------------|
| pH at 25°C (Method: SQCP027, SQCP033) | 10.009 | 0.02 | 186-I-g, 186-II-g, 191d |

| Specification | Reference |
|-----------------------------|-----------------|
| Commercial Buffer Solutions | |
| Buffer C | ASTM (D 1293 B) |
| Buffer C | ASTM (D 5464) |
| | 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 |
| 1601-16 | 500 mL 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 |

Version: 1.3

Lot Number: 2410F80

Product Number: 1601

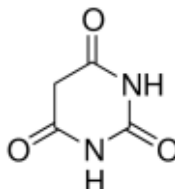
Page 1 of 2

Certificate of Analysis

Product Name:

Barbituric acid - ReagentPlus®, 99%

Product Number: 185698
Batch Number: WXBFB3271V
Brand: SIAL
CAS Number: 67-52-7
Formula: C₄H₄N₂O₃
Formula Weight: 128.09 g/mol
Quality Release Date: 16 MAY 2024



| Test | Specification | Result |
|----------------------------|-----------------------|----------|
| Appearance (Colour) | White to Off-White | White |
| Appearance (Form) | Powder | Powder |
| Infrared spectrum | Conforms to Structure | Conforms |
| Purity (Titration by NaOH) | 98.5 - 101.5 % | 100.4 % |
| GC (area %) | ≥ 98 % | 100 % |
| VPCT | | |



Kang Chen
Quality Manager
Wuxi, China CN

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

Cyanide Standard, 1000 ppm CN⁻

Lot Number: 1505H73

Product Number: 2543

Manufacture Date: MAY 08, 2025

Expiration Date: NOV 2025

This standard is prepared using accurate volumetric techniques from material that has been assayed against Silver Nitrate solution certified traceable to NIST Standard Reference Material 999. The certified value reported is the prepared value based upon the method of preparation of the material. The uncertainty in the prepared value is the combined uncertainty based on the stability of the assayed Potassium Cyanide, and the uncertainty in the mass and volume measurements.

Use 0.16% (w/v) (0.04 N) Sodium Hydroxide or 0.225 % (w/v) (0.04 N) Potassium Hydroxide to make dilutions of this standard. Restandardize weekly if extreme accuracy is required.

| Name | CAS# | Grade |
|-------------------|-----------|--------------------|
| Water | 7732-18-5 | ACS/ASTM/USP/EP |
| Potassium Cyanide | 151-50-8 | ACS |
| Sodium Hydroxide | 1310-73-2 | Reagent (from ACS) |

| Test | Specification | Result |
|----------------------------|------------------|----------|
| Appearance | Colorless liquid | Passed |
| Cyanide (CN ⁻) | 995-1005 ppm | 1000 ppm |

| Specification | Reference |
|--|------------------------|
| Stock Standard Cyanide Solution | APHA (4500-CN- F) |
| Stock Cyanide Solution | APHA (4500-CN- E) |
| Stock Cyanide Solution | APHA (4500-CN- K) |
| Stock Cyanide Solution | APHA (4500-CN- H) |
| Cyanide Reference Solution (1000 mg/L) | EPA (SW-846) (7.3.3.2) |
| Cyanide Calibration Stock Solution (1,000 mg/L CN ⁻) | EPA (SW-846) (9213) |
| Stock Cyanide Solution | EPA (335.3) |
| Stock Cyanide Solution | EPA (335.2) |
| Cyanide Solution Stock | ASTM (D 4282) |
| Simple Cyanide Solution, Stock (1.0 g/L CN ⁻) | ASTM (D 4374) |

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) |
|-------------|---------------------|---------------------------------|
| 2543-16 | 500 mL amber poly | 6 months |
| 2543-32 | 1 L amber poly | 6 months |
| 2543-4 | 120 mL amber poly | 6 months |

Recommended Storage: 2°C - 8°C (36°F - 46°F)



Ernest Mahan (05/08/2025)
Plant Manager

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Certificate of Analysis

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

Lot Number: 2504D34

Product Number: 1551

Manufacture Date: APR 03, 2025

Expiration Date: MAR 2027

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 (from ACS) |

| Test | Specification | Result |
|------------|---------------|--------------------------------|
| Appearance | Yellow liquid | Passed *Not a certified value. |

| Test | Certified Value | Uncertainty | NIST SRM# |
|---------------------------------------|-----------------|-------------|-------------------------|
| pH at 25°C (Method: SQCP027, SQCP033) | 7.003 | 0.02 | 186-I-g, 186-II-g, 191d |

| 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) |
|-------------|---------------------|---------------------------------|
| 1551-2.5 | 10 L Cubitainer® | 24 months |
| 1551-20 | 20 x 20 mL pack | 24 months |
| 1551-32 | 1 L natural poly | 24 months |
| 1551-5 | 20 L Cubitainer® | 24 months |

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



Jose Pena (04/03/2025)
Operations Manager

This product was tested in an ISO 17025 Accredited Laboratory

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



Part of TCP Analytical Group

Jackson's Pointe Commerce Park- Building 1000
1010 Jackson's Pointe Court, Zelienople, PA 16063

Certificate of Analysis

Cyanide Standard 1000 ppm (1ml = 1mg CN)

Product Code: **LC13545**

Manufacture Date: June 25, 2025

Lot Number: **45060288**

Expiration Date: December 24, 2025

| Test | Specification | Result |
|-----------------------|--------------------|----------------|
| Appearance (clarity) | clear solution | clear solution |
| Appearance (color) | colorless | colorless |
| Concentration (CN) | 0.990 - 1.010mg/mL | 1.000mg/mL |
| Concentration (CN) | 990 - 1,010ppm | 1,000ppm |
| Traceable to NIST SRM | Report | 999b |

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

Storage Information - Unless 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

The suffix of the product code may differ from what is on your product label. The suffix will designate the size and be associated with a numeric digit(s). Visit LabChem.com for more information

| Suffix | 1 | 2 | 3/3S/36/36S | 4/4C | 5 | 6 | 7 | 8 | 9 | 20 | 44 | 200 | 246 | 486 |
|--------|-----------|-----------|---------------------------------------|------|-----|-----|-------|-----|------|---------|------|------|--------|--------|
| Size | 500mL org | 1L or 1kg | 2.5L/2.5L Coated/6x2.5L/6x2.5L Coated | 4L | 20L | 10L | 125mL | 25g | 100g | 20x20mL | 4x4L | 200L | 24x6mL | 48x6mL |

Michael Monteleone

Michael Monteleone
Chemistry Supervisor - Quality Control
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ISO9001:2015 Registration #0306-01