

### Prep Standard - Chemical Standard Summary

**Order ID :** Q3176  
**Test :** Cyanide,Percent Solids

**Prepbatch ID :** PB169871,  
**Sequence ID/Qc Batch ID:** LB137340,

**Standard ID :**  
WP112826,WP112827,WP113836,WP113837,WP113838,WP114921,WP114922,WP114923,WP114924,WP114926,WP114927,WP114928,WP114929,

**Chemical ID :**  
M6041,W3012,W3112,W3113,W3152,W3214,W3224,

## 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> |
|------------------|--------------------------|--------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 1714             | Sulfuric Acid, 50% (v/v) | <a href="#">WP112826</a> | 04/25/2025       | 10/25/2025             | Rubina Mughal      | None           | None             | Iwona Zarych         |
|                  |                          |                          |                  |                        |                    |                |                  | 04/25/2025           |

**FROM** 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<br>2.5M(51%W/V) | <a href="#">WP112827</a> | 04/25/2025       | 10/25/2025             | Rubina Mughal      | WETCHEM_S<br>CALE_8 (WC<br>SC-7) | None             | Iwona Zarych         |
|                  |                                                |                          |                  |                        |                    |                                  |                  | 04/25/2025           |

**FROM** 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>           |
|-------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|------------------|------------------------|--------------------|----------------------------------|------------------|--------------------------------|
| 11                                                                                        | Sodium hydroxide absorbing solution 0.25 N | <a href="#">WP113836</a> | 07/08/2025       | 12/31/2025             | Rubina Mughal      | WETCHEM_S<br>CALE_8 (WC<br>SC-7) | None             | Iwona Zarych<br><br>07/08/2025 |
| <b><u>FROM</u></b> 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 | <a href="#">WP113837</a> | 07/08/2025       | 11/30/2025             | Rubina Mughal      | None           | WETCHEM_FIPETTE_3<br>(WC) | Iwona Zarych<br>07/08/2025 |
| <b><u>FROM</u></b> 1.00000ml of W3214 + 199.00000ml of WP113836 = Final Quantity: 200.000 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>       |
|------------------|----------------------------------|--------------------------|------------------|------------------------|--------------------|----------------|---------------------------|----------------------------|
| 3371             | Cyanide LCS Spike Solution, 5PPM | <a href="#">WP113838</a> | 07/08/2025       | 12/24/2025             | Rubina Mughal      | None           | WETCHEM_FIPETTE_3<br>(WC) | Iwona Zarych<br>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 | <a href="#">WP114921</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_FIPETTE_3<br>(WC) | Iwona Zarych<br>09/29/2025 |

**FROM** 0.25000ml of W3214 + 49.75000ml 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>           |
|----------------------------------------------------------------------------------------|------------------------------|--------------------------|------------------|------------------------|--------------------|----------------|-------------------------------|--------------------------------|
| 4                                                                                      | Calibration standard 500 ppb | <a href="#">WP114922</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_F<br>IPETTE_3<br>(WC) | Iwona Zarych<br><br>09/29/2025 |
| <b>FROM</b> 45.00000ml of WP113836 + 5.00000ml of WP114921 = 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>           |
|----------------------------------------------------------------------------------------|-------------------------------------|--------------------------|------------------|------------------------|--------------------|----------------|-------------------------------|--------------------------------|
| 3761                                                                                   | Calibration-CCV CN Standard 250 ppb | <a href="#">WP114923</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_F<br>IPETTE_3<br>(WC) | Iwona Zarych<br><br>09/29/2025 |
| <b>FROM</b> 2.50000ml of WP114921 + 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 | <a href="#">WP114924</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_PIPETTE_3 | Iwona Zarych         |
| <p>(WC)</p> <p><b>FROM</b> 1.00000ml of WP114921 + 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>       |
|-----------------------------------------------------------------------------------------------|-----------------------------|--------------------------|------------------|------------------------|--------------------|----------------|---------------------------|----------------------------|
| 7                                                                                             | Calibration Standard 50 ppb | <a href="#">WP114926</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_PIPETTE_3<br>(WC) | Iwona Zarych<br>09/29/2025 |
| <b><u>FROM</u></b> 0.50000ml of WP114921 + 49.50000ml of WP113836 = Final Quantity: 50.000 ml |                             |                          |                  |                        |                    |                |                           |                            |

## Wet Chemistry STANDARD PREPARATION LOG

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|------------------|-----------------------------|--------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 8                | Calibration Standard 10 ppb | <a href="#">WP114927</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | None             | Iwona Zarych         |
|                  |                             |                          |                  |                        |                    |                |                  | 09/29/2025           |

**FROM** 1.00000ml of WP114922 + 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> |
|------------------|----------------------------|--------------------------|------------------|------------------------|--------------------|----------------|-------------------|----------------------|
| 9                | Calibration Standard 5 ppb | <a href="#">WP114928</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | WETCHEM_FIPETTE_3 | Iwona Zarych         |
|                  |                            |                          |                  |                        |                    |                | (WC)              | 09/29/2025           |

**FROM** 0.50000ml of WP114922 + 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 | <a href="#">WP114929</a> | 09/26/2025       | 09/27/2025             | Rubina Mughal      | None           | None             | Iwona Zarych         |
|                  |                          |                          |                  |                        |                    |                |                  | 09/29/2025           |

**FROM** 50.00000ml of WP113836 = Final Quantity: 50.000 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 # |
|----------|---------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| EPA      | / ICV-CN            | ICV6-400 | 12/31/2025      | 01/08/2025 / lwona      | 02/20/2020 / lwona          | W3012          |

| 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 / lwona      | 07/03/2024 / lwona          | 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 / lwona      | 07/08/2024 / lwona          | W3113          |

| 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 / lwona      | 11/25/2024 / lwona          | W3152          |

| 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          |

### CHEMICAL RECEIPT LOG BOOK

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



QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY  
"An ISO 9001:2015 Certified Program"

Instructions for QATS Reference Material: *Inorganic ICV Solutions*

QATS LABORATORY INORGANIC REFERENCE MATERIAL  
INITIAL CALIBRATION VERIFICATION SOLUTIONS  
(ICV1, ICV5, AND ICV6)

**NOTE:** These instructions are for advisory purposes only. If any apparent conflict exists between these instructions and the analytical protocol or your contract, disregard these instructions.

**APPLICATION:** For use with the CLP SFAM01.0 SOW and revisions.

**CAUTION:** Read instructions carefully before opening bottle(s) and proceeding with the analyses.

Contains Metals in Dilute Acidic or  
Cyanide in Basic Aqueous Solutions  
**HAZARDOUS MATERIAL**

Safety Data Sheets  
Available Upon Request

W2160, W2161, W2162,  
W2163, W2164 Receive by  
AP on 9/2/2016

**(A) SAMPLE DESCRIPTION**

Enclosed is a set of one (1) or more Aqueous Inorganic Reference Materials containing various analyte concentrations. ICV1 and ICV5 are in a matrix of dilute nitric acid. ICV6 is in a matrix of dilute basic solution. **For the reference material source in reporting ICVs use "USEPA". For the reference material lot number for the ICV1, ICV5, and ICV6 solutions use "ICV1-1014", "ICV5-0415", and "ICV6-0400", respectively.**

**(B) BREAKAGE OR MISSING ITEMS**

Check the contents of the shipment carefully for any broken, leaking, or missing items. Check that the seal is intact on each bottle. Refer to the enclosed chain of custody record. Report any problems to Mr. Keith Strout, APTIM Federal Services, LLC, at (702) 895-8722. If requested, return the chain-of-custody record with appropriate annotations and signatures to the address provided below.

QUALITY ASSURANCE TECHNICAL SUPPORT LABORATORY  
APTIM Federal Services, LLC  
2700 Chandler Avenue - Building C  
Las Vegas, NV 89120

**(C) ANALYSIS OF SAMPLES**

The Initial Calibration Verification Solutions (ICVs) are to be used to evaluate the accuracy of the initial calibrations of ICP, AA, and Cyanide colorimetric instruments, and are to be used with the CLP SOWs and revisions. The values for each element in the ICVs are listed below in µg/L (ppb) for the resulting solution(s) after the dilution of the concentrate(s) according to the following instructions. Use Class 'A' glassware to prepare the solution(s).

**ICV1-1014** For ICP-AES analysis, use a 10-fold dilution by pipetting 10 mL of the ICV1 concentrate into a 100 mL volumetric flask and dilute to volume with 2% (v/v) nitric acid.





Instructions for QATS Reference Material: *Inorganic ICV Solutions*

- ICV1-1014** For ICP-MS analysis, use a 50-fold dilution by pipetting 2 mL of the ICV1 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, use a 100-fold dilution by pipetting 1 mL of the ICV5 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<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> and 5% (v/v) nitric acid.
- ICV6-0400** For the analysis of cyanide, use a 100-fold dilution by pipetting 1 mL of the ICV6 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<sub>3</sub>Fe(CN)<sub>6</sub>, 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)<br>(after 10-fold dilution) | Concentration (µg/L)<br>(after 50-fold dilution) |
| Al        | 2500                                             | 500                                              |
| Sb        | 1000                                             | 200                                              |
| As        | 1000                                             | 200                                              |
| Ba        | 520                                              | 100                                              |
| Be        | 510                                              | 100                                              |
| Cd        | 510                                              | 100                                              |
| Ca        | 10000                                            | 2000                                             |
| Cr        | 520                                              | 100                                              |
| Co        | 520                                              | 100                                              |
| Cu        | 510                                              | 100                                              |
| Fe        | 10000                                            | 2000                                             |
| Pb        | 1000                                             | 200                                              |
| Mg        | 6000                                             | 1200                                             |
| Mn        | 520                                              | 100                                              |
| Ni        | 530                                              | 110                                              |
| K         | 9900                                             | 2000                                             |
| Se        | 1000                                             | 200                                              |
| Ag        | 250                                              | 50                                               |
| Na        | 10000                                            | 2000                                             |
| Tl        | 1000                                             | 210                                              |
| V         | 500                                              | 100                                              |
| Zn        | 1000                                             | 200                                              |

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

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

avantor™



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 <sub>2</sub> SO <sub>4</sub> )                | 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 <sub>2</sub> ) | ≤ 2 ppm       | < 2 ppm     |
| Ammonium (NH <sub>4</sub> )                                  | ≤ 1 ppm       | 1 ppm       |
| Chloride (Cl)                                                | ≤ 0.1 ppm     | < 0.1 ppm   |
| Nitrate (NO <sub>3</sub> )                                   | ≤ 0.2 ppm     | < 0.1 ppm   |
| Phosphate (PO <sub>4</sub> )                                 | ≤ 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

 **avantorsm**

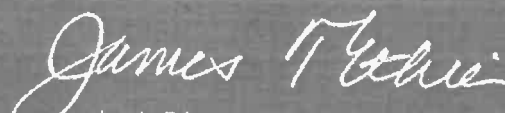


Material No.: 9673-33  
Batch No.: 23D2462010

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



# 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

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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.



# ***Chem-Impex International, Inc.***

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## ***Certificate of Analysis***

|                         |                                       |
|-------------------------|---------------------------------------|
| <b>Catalogue Number</b> | 01237                                 |
| <b>Lot Number</b>       | 002126-2019-201                       |
| <b>Product</b>          | <b>Magnesium chloride hexahydrate</b> |

Magnesium chloride•6H<sub>2</sub>O

|                          |                                      |
|--------------------------|--------------------------------------|
| <b>CAS Number</b>        | 7791-18-6                            |
| <b>Molecular Formula</b> | MgCl <sub>2</sub> •6H <sub>2</sub> O |
| <b>Molecular Weight</b>  | 203.3                                |

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

## ***Certificate of Analysis***

**Catalog Number: 01237**

**Lot Number: 002126-2019-201**

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**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**

# Certificate of Analysis

## Cyanide Standard, 1000 ppm CN<sup>-</sup>

**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 <sup>-</sup> ) | 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 <sup>-</sup> ) | 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 <sup>-</sup> )        | 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

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](http://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