

Prep Standard - Chemical Standard Summary

Order ID : P4584

Test : Mercury

Prepbatch ID : PB164581,PB165014,

Sequence ID/Qc Batch ID: LB133241,LB133469,

Standard ID :

MP82651,MP82652,MP82653,MP82654,MP82980,MP82981,MP82983,MP82984,MP82985,MP82986,MP82987,MP82988,MP82989,MP82990,MP82991,MP82995,MP83208,MP83210,MP83264,MP83265,MP83266,MP83267,MP83268,MP83269,MP83270,MP83271,MP83272,MP83273,MP83274,MP83277,MP83278,

Chemical ID :

M4371,M4465,M4916,M5062,M5501,M5673,M5882,M5884,M5953,M6080,M6095,M6113,M6118,M6120,M6121,W3112,

Metals 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> |
|------------------|------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 3965 | 2:1 H2SO4 : HNO3 | MP82651 | 09/30/2024 | 03/25/2025 | Mohan Bera | None | None | Sarabjit Jaswal |
| | | | | | | | | 10/04/2024 |

FROM 1600.00000ml of M5673 + 800.00000ml of M6080 = Final Quantity: 3200.000 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> |
|------------------|-------------------------------------|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|----------------------|
| 65 | POTASSIUM PERMANGANATE SOLUTION 5 % | MP82652 | 09/30/2024 | 04/03/2025 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal |
| | | | | | | | | 10/04/2024 |

FROM 100.00000gram of M4916 + 2000.00000ml of W3112 = Final Quantity: 2000.000 ml

Metals 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> |
|------------------|-----------------------------------|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|----------------------|
| 66 | POTASSIUM PERSULFATE SOLUTION 5 % | MP82653 | 09/30/2024 | 04/03/2025 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal |
| 10/04/2024 | | | | | | | | |

FROM 100.00000ml of M4465 + 2000.00000ml 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|----------------------|
| 67 | SODIUM CHLORIDE - HYDROXYL- CHLORIDE SOLUTION | MP82654 | 09/30/2024 | 04/03/2025 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal |
| 10/04/2024 | | | | | | | | |

FROM 2000.00000ml of W3112 + 240.00000gram of M4371 + 240.00000gram of M5501 = 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|-----------------------------------|
| 871 | MERCURY INTERMEDIATE B 250PPB WORKING STD. | MP82980 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal 10/31/2024 |

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| <u>FROM</u> | 1.00000ml of M6113 + 2.50000ml of M5062 + 96.50000ml of W3112 = Final Quantity: 100.000 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> |
|---|-----------------|-------------------------|------------------|------------------------|--------------------|----------------|----------------------|----------------------|
| 1340 | Hg 0.00 PPB STD | MP82981 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG | Sarabjit Jaswal |
| <p>FROM 2.50000ml of M6113 + 247.50000ml of W3112 = Final Quantity: 250.000 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> |
|---|----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1341 | Hg 0.2 PPB STD | MP82983 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>FROM 2.50000ml of M6113 + 247.30000ml of W3112 + 0.20000ml of MP82980 = Final Quantity: 250.000 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1342 | Hg 2.5 PPB STD | MP82984 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 10/31/2024 |
| <u>FROM</u> | 2.50000ml of M6113 + 245.00000ml of W3112 + 2.50000ml of MP82980 = 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1343 | Hg 5.0 PPB STD | MP82985 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 10/31/2024 |
| <u>FROM</u> | 2.50000ml of M6113 + 242.50000ml of W3112 + 5.00000ml of MP82980 = 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|------------------------|-------------------------------|
| 1344 | Hg 7.5 PPB STD | MP82986 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HGA) | Sarabjit Jaswal 10/31/2024 |
| <u>FROM</u> | 2.50000ml of M6113 + 240.00000ml of W3112 + 7.50000ml of MP82980 = 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> |
|--|-----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|-------------------------------|
| 1345 | Hg 10.0 PPB STD | MP82987 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal 10/31/2024 |
| FROM 2.50000ml of M6113 + 237.50000ml of W3112 + 10.00000ml of MP82980 = 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|------------------------|-------------------------------|
| 1346 | Hg ICV SOLUTION | MP82988 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HGA) | Sarabjit Jaswal 10/31/2024 |
| <u>FROM</u> | 2.50000ml of M5953 + 2.50000ml of M6113 + 245.00000ml of W3112 = 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> |
|---|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1351 | ICB (Hg 0.00 PPB SOLUTION) | MP82989 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>FROM 2.50000ml of M6113 + 247.50000ml of W3112 = Final Quantity: 250.000 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> |
|--|---------------------------|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1358 | CCV (Hg 5.0 PPB SOLUTION) | MP82990 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 10/31/2024 |
| FROM 485.00000ml of W3112 + 5.00000ml of M6113 + 10.00000ml of MP82980 = Final Quantity: 500.000 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> |
|--|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1352 | CCB (Hg 0.00 PPB SOLUTION) | MP82991 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 10/31/2024 |
| FROM 495.00000ml of W3112 + 5.00000ml of M6113 = Final Quantity: 500.000 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|------------------|-------------------------------|
| 68 | STANNOUS CHLORIDE SOLUTION | MP82995 | 10/31/2024 | 11/01/2024 | Mohan Bera | None | None | Sarabjit Jaswal 10/31/2024 |
| <u>FROM</u> | 450.00000ml of W3112 + 50.00000gram of M5882 + 50.00000ml of M6095 = Final Quantity: 500.000 ml | | | | | | | |

Metals 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> |
|------------------|-------------------------------------|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|----------------------|
| 65 | POTASSIUM PERMANGANATE SOLUTION 5 % | MP83208 | 11/11/2024 | 05/11/2025 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal |
| | | | | | | | | 11/11/2024 |

FROM 100.00000gram of M4916 + 2000.00000ml 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|----------------------|
| 67 | SODIUM CHLORIDE - HYDROXYL- CHLORIDE SOLUTION | MP83210 | 11/11/2024 | 05/11/2025 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal |
| | | | | | | | | 11/11/2024 |

FROM 2000.00000ml of W3112 + 240.00000gram of M4371 + 240.00000gram of M5884 = 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|-----------------------------------|
| 871 | MERCURY INTERMEDIATE B 250PPB WORKING STD. | MP83264 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal 11/15/2024 |

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| <u>FROM</u> | |
|---|------------------------------|
| 1.00000ml of M6120 + 2.50000ml of M5062 + 96.50000ml of W3112 | = Final Quantity: 100.000 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> |
|------------------|--|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1340 | Hg 0.00 PPB STD | MP83265 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 11/15/2024 |
| <u>FROM</u> | 2.50000ml of M6120 + 247.50000ml of W3112 = 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> |
|--|----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1341 | Hg 0.2 PPB STD | MP83266 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>FROM 2.50000ml of M6120 + 247.30000ml of W3112 + 0.20000ml of MP83264 = Final Quantity: 250.000 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|------------------------|-------------------------------|
| 1342 | Hg 2.5 PPB STD | MP83267 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HGA) | Sarabjit Jaswal 11/15/2024 |
| <u>FROM</u> | 2.50000ml of M6120 + 245.00000ml of W3112 + 2.50000ml of MP83264 = 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> |
|--|----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1343 | Hg 5.0 PPB STD | MP83268 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>A)</p> <p>FROM 2.50000ml of M6120 + 242.50000ml of W3112 + 5.00000ml of MP83264 = Final Quantity: 250.000 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> |
|---|----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1344 | Hg 7.5 PPB STD | MP83269 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>FROM 2.50000ml of M6120 + 240.00000ml of W3112 + 7.50000ml of MP83264 = Final Quantity: 250.000 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> |
|---|-----------------|-------------------------|------------------|------------------------|--------------------|----------------|-----------------------|----------------------|
| 1345 | Hg 10.0 PPB STD | MP83270 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG) | Sarabjit Jaswal |
| <p>A)</p> <p>FROM 2.50000ml of M6120 + 237.50000ml of W3112 + 10.00000ml of MP83264 = Final Quantity: 250.000 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> |
|------------------|---|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1346 | Hg ICV SOLUTION | MP83271 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 11/15/2024 |
| <u>FROM</u> | 2.50000ml of M5953 + 2.50000ml of M6120 + 245.00000ml of W3112 = 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> |
|---|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|----------------------|----------------------|
| 1351 | ICB (Hg 0.00 PPB SOLUTION) | MP83272 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG | Sarabjit Jaswal |
| <p>A)</p> <p>FROM 2.50000ml of M6120 + 247.50000ml of W3112 = Final Quantity: 250.000 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> |
|--|---------------------------|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1358 | CCV (Hg 5.0 PPB SOLUTION) | MP83273 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 11/15/2024 |
| FROM 485.00000ml of W3112 + 5.00000ml of M6120 + 10.00000ml of MP83264 = Final Quantity: 500.000 ml | | | | | | | | |

Metals 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> |
|------------------|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|-------------------------|-------------------------------|
| 1352 | CCB (Hg 0.00 PPB SOLUTION) | MP83274 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | METALS_PIPETTE_5 (HG A) | Sarabjit Jaswal 11/15/2024 |

FROM 495.00000ml of W3112 + 5.00000ml of M6120 = Final Quantity: 500.000 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> |
|------------------|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|-------------------------------|
| 887 | AQUA REGIA FOR HG ON 7471A | MP83277 | 11/15/2024 | 11/16/2024 | Mohan Bera | None | None | Sarabjit Jaswal 11/15/2024 |

FROM 150.00000ml of M6118 + 50.00000ml of M6120 = 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> |
|--|----------------------------|-------------------------|------------------|------------------------|--------------------|-------------------------|------------------|-------------------------------|
| 68 | STANNOUS CHLORIDE SOLUTION | MP83278 | 11/15/2024 | 11/16/2024 | Mohan Bera | METALS_SCALE_3 (M SC-3) | None | Sarabjit Jaswal 11/15/2024 |
| <u>FROM</u> 450.00000ml of W3112 + 50.00000gram of M5882 + 50.00000ml of M6121 = Final Quantity: 500.000 ml | | | | | | | | |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-2196-01 / Hydroxylamine Hydrochloride, Crystal (cs/4x500g) | 0000215387 | 06/25/2025 | 07/01/2019 / RICHARD | 06/07/2019 / RICHARD | M4371 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3238-05 / Potassium Persulfate (2.5kg) | 0000234156 | 08/06/2025 | 07/23/2019 /Mohan | 07/25/2019 / manojkumar | M4465 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|--------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3227-05 / Potassium Permanganate (2.5kg) | 210800 | 03/31/2026 | 11/30/2022 / mohan | 07/28/2021 / mohan | M4916 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------|--|-------------|-----------------|-------------------------|-----------------------------|----------------|
| Inorganic Ventures | MSHG-10PPM / MERCURY HCl 125mL 10ug/mL | S2-HG709270 | 09/22/2026 | 05/28/2022 / mohan | 01/27/2022 / mohan | M5062 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|--|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3624-05 / Sodium Chloride, Crystal (cs/4x2.5kg) | 0000281938 | 07/06/2026 | 07/24/2023 / mohan | 04/14/2023 / mohan | M5501 |

| 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 | 09/21/2023 / mohan | 09/05/2023 / mohan | M5673 |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|--|--------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3980-01 / Stannous Chloride (cs/4x500g) | 232820 | 08/31/2028 | 04/30/2024 / mohan | 04/25/2024 / mohan | M5882 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|--|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3624-05 / Sodium Chloride, Crystal (cs/4x2.5kg) | 0000281938 | 07/06/2026 | 04/30/2024 / mohan | 04/25/2024 / mohan | M5884 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|----------|-------------------------------|-----------|-----------------|-------------------------|-----------------------------|----------------|
| EPA | ICV-5 / ICV (HG) STOCK SOLN | ICV5-0415 | 01/01/2025 | 07/01/2024 / mohan | 03/30/2023 / mohan | M5953 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L) | 24D1062002 | 03/25/2025 | 10/02/2024 / Janvi | 09/02/2024 / Janvi | M6080 |

| 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) | | 03/17/2029 | 10/26/2024 / Janvi | 10/21/2024 / Janvi | M6095 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L) | 24B1362001 | 04/29/2025 | 10/31/2024 / Janvi | 09/29/2024 / Eman | M6113 |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9530-33 / Hydrochloric Acid, Instra-Analyzed (cs/6x2.5L) | 22E1662006 | 05/09/2025 | 11/09/2024 / Janvi | 10/09/2024 / Janvi | M6118 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9598-34 / Nitric Acid, Instra-Analyzed (cs/4x2.5L) | 23I0662003 | 05/13/2025 | 11/13/2024 / Eman | 10/13/2024 / Eman | M6120 |

| 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) | 0000275677 | 05/13/2025 | 11/13/2024 / Eman | 10/13/2024 / Eman | M6121 |

| 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 |

M5882
 M3

Certificate of Analysis

1 Reagent Lane
 Fair Lawn, NJ 07410
 201.796.7100 tel
 201.796.1329 fax

Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System
 Standard ISO9001:2015 by SAI Global Certificate Number CERT – 0120633

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Thermo Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Products are for research use or further manufacturing. Not for direct administration to humans or animals. It is the responsibility of the final formulator and end user to determine suitability based upon the intended use of the end product. Products are tested to meet the analytical requirements of the noted grade. The following information is the actual analytical results obtained.

| | | | |
|-------------------|---|-----------------------------|------------|
| Catalog Number | T142 | Quality Test / Release Date | 08/17/2023 |
| Lot Number | 232820 | | |
| Description | STANNOUS CHLORIDE, DIHYDRATE CERTIFIED ACS (Suitable for Mercury Determination) | | |
| Country of Origin | United States | Suggested Retest Date | Aug/2028 |
| Chemical Origin | Inorganic-non animal | | |
| BSE/TSE Comment | No animal products are used as starting raw material ingredients, or used in processing, including lubricants, processing aids, or any other material that might migrate to the finished product. | | |

| N/A | | | |
|-------------------|-----------|----------------------------|---------------------|
| Result Name | Units | Specifications | Test Value |
| APPEARANCE | | REPORT | Clear crystals |
| ASSAY | % | Inclusive Between 98 - 103 | 100.65 |
| CALCIUM | % | <= 0.005 | 0.0017 |
| IDENTIFICATION | PASS/FAIL | = PASS TEST | PASS TEST |
| IRON (Fe) | % | <= 0.003 | 0.0011 |
| LEAD (Pb) | % | <= 0.01 | 0.0006 |
| MERCURY (Hg) | ppm | <= 0.05 | <0.05 |
| POTASSIUM (K) | % | <= 0.005 | 0.0001 |
| SODIUM (Na) | % | <= 0.01 | <0.01 |
| SOLUBILITY IN HCL | PASS/FAIL | = PASS TEST | PASS TEST |
| SULFATE (SO4) | PASS/FAIL | = P.T. (ABOUT 0.003%) | P.T. (ABOUT 0.003%) |



Harout Sahagian - Quality Control Supervisor - Fair Lawn

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of this catalog number listed above.

If there are any questions with this certificate, please call at (800) 227-6701.

*Based on suggested storage condition.

M4371

Hydroxylamine Hydrochloride, Crystal
BAKER ANALYZED® A.C.S. Reagent
Suitable for Mercury Determination
(hydroxylammonium chloride)

Rec - 06.07.19



avantortm

Material No.: 2196-01
Batch No.: 0000215387
Manufactured Date: 2018/06/27
Retest Date: 2025/06/25
Revision No: 1

Certificate of Analysis

Meets ACS Reagent Chemical Requirements,

| Test | Specification | Result |
|---|---------------|---------|
| Assay (NH ₂ OH · HCl) (by KMnO ₄ titrn) | >= 96.0 % | 99.1 |
| Clarity of Alcohol Solution | Passes Test | PT |
| Residue after Ignition | <= 0.050 % | 0.017 |
| Titrate Free Acid (meq/g) | <= 0.25 | 0.19 |
| Ammonium (NH ₄) | Passes Test | PT |
| Sulfur Compounds (as SO ₄) | <= 0.005 % | < 0.003 |
| Trace Impurities - ACS - Heavy Metals (as Pb) | <= 5 ppm | 4 |
| Trace Impurities - Iron (Fe) | <= 5 ppm | < 3 |
| Trace Impurities - Mercury (Hg) | <= 0.050 ppm | < 0.005 |

For Laboratory, Research or Manufacturing Use

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

ISO

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

James Ethier

Jamie Ethier
Vice President Global Quality

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

Avantor Performance Materials, LLC

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

M4913-16

MS

Certificate of Analysis

1 Reagent Lane
 Fair Lawn, NJ 07410
 201.796.7100 tel
 201.796.1329 fax

Thermo Fisher Scientific's Quality System has been found to conform to Quality Management System
 Standard ISO9001:2015 by SAI Global Certificate Number CERT – 0120632

This is to certify that units of the lot number below were tested and found to comply with the specifications of the grade listed. Certain data have been supplied by third parties. Thermo Fisher Scientific expressly disclaims all warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Products are for research use or further manufacturing. Not for direct administration to humans or animals. It is the responsibility of the final formulator and end user to determine suitability based upon the intended use of the end product. Products are tested to meet the analytical requirements of the noted grade. The following information is the actual analytical results obtained.

| | | | |
|-------------------|--------------------------------|-----------------------------|------------|
| Catalog Number | P279 | Quality Test / Release Date | 01/12/2021 |
| Lot Number | 210306 | | |
| Description | POTASSIUM PERMANGANATE, A.C.S. | | |
| Country of Origin | United States | Suggested Retest Date | Jan/2026 |

| N/A | | | |
|---------------------|-----------|----------------|--------------------------------------|
| Result Name | Units | Specifications | Test Value |
| APPEARANCE | | REPORT | Dark purple to purple green crystals |
| ASSAY | % | >= 99 | 99.3 |
| CHLORIDE & CHLORATE | % | <= 0.005 | <0.005 |
| IDENTIFICATION | PASS/FAIL | = PASS TEST | pass test |
| INSOLUBLE MATTER | % | <= 0.2 | <0.2 |
| MERCURY (Hg) | ppm | <= 0.05 | <0.004 |
| SULFATE (SO4) | % | <= 0.02 | <0.02 |

Julian Burton

Julian Burton - Quality Control Manager – Fair Lawn

Note: The data listed is valid for all package sizes of this lot of this product, expressed as an extension of this catalog number listed above.
 If there are any questions with this certificate, please call at (800) 227-6701.

*Based on suggested storage condition.

300 Technology Drive
 Christiansburg, VA 24073 USA
 inorganicventures.com

P: 800-669-6799/540-585-3030
 F: 540-585-3012
 info@inorganicventures.com

MS062
 MS063
 MS

1.0 ACCREDITATION / REGISTRATION

INORGANIC VENTURES is accredited to ISO 17034, "General Requirements for the Competence of Reference Material Producers" and ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories". Inorganic Ventures is also an ISO 9001 registered manufacturer (QSR Certificate Number QSR-1034).



2.0 PRODUCT DESCRIPTION

Product Code: Single Analyte Mass Spec Solution
 Catalog Number: MSHG-10PPM
 Lot Number: S2-HG709270
 Matrix: 10% (v/v) HCl
 Value / Analyte(s): 10 µg/mL ea:
 Mercury
 Starting Material: Hg metal
 Starting Material Lot#: 1959
 Starting Material Purity: 99.9994%

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Value: 10.001 ± 0.053 µg/mL
Density: 1.020 g/mL (measured at 20 ± 4 °C)

Assay Information:

| ANALYTE | METHOD | NIST SRM# | SRM LOT# |
|---------|------------|-----------|--------------|
| Hg | ICP Assay | 3133 | 160921 |
| Hg | EDTA | 928 | 928 |
| Hg | Calculated | | See Sec. 4.2 |

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Characterization of CRM/RM by Two or More Methods

Certified Value, $X_{CRM/RM}$, where two or more methods of characterization are used is the weighted mean of the results:

$$X_{CRM/RM} = \sum (w_i) (X_i)$$

X_i = mean of Assay Method i with standard uncertainty $u_{char i}$
 w_i = the weighting factors for each method calculated using the inverse square of the variance.
 $w_i = (1/u_{char i}^2) / (\sum (1/u_{char i}^2))$

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k (u_{char}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char} = [\sum ((w_i)^2 (u_{char i})^2)]^{1/2}$ where $u_{char i}$ are the errors from each characterization method

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

Characterization of CRM/RM by One Method

Certified Value, $X_{CRM/RM}$, where one method of characterization is used is the mean of individual results:

$$X_{CRM/RM} = (X_a) (u_{char a})$$

X_a = mean of Assay Method A with

$u_{char a}$ = the standard uncertainty of characterization Method A

$$CRM/RM \text{ Expanded Uncertainty } (\pm) = U_{CRM/RM} = k (u_{char a}^2 + u_{bb}^2 + u_{lts}^2 + u_{ts}^2)^{1/2}$$

k = coverage factor = 2

$u_{char a}$ = the errors from characterization

u_{bb} = bottle to bottle homogeneity standard uncertainty

u_{lts} = long term stability standard uncertainty (storage)

u_{ts} = transport stability standard uncertainty

4.0 TRACEABILITY TO NIST

- This product is traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM/RM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRM/RM are available, the term 'in-house std.' is specified.

4.1 Thermometer Calibration

- All thermometers are NIST traceable through thermometers that are calibrated by an accredited calibration laboratory.

4.2 Balance Calibration

- All analytical balances are calibrated by an accredited calibration laboratory and procedure. The weights used for testing are annually compared to master weights and are traceable to NIST.

4.3 Glassware Calibration

- An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM/RMs.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES (µg/mL)

CRM/RMs are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

| | | | | | | | | | | | | | | | | | |
|---|----|----------|----------|----|----------|----------|----------|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| O | Ag | 0.000011 | M | Eu | < | 0.000201 | O | Na | 0.000004 | M | Se | < | 0.015915 | O | Zn | < | 0.001510 |
| O | Al | 0.000001 | O | Fe | 0.000001 | M | Nb | < | 0.000201 | O | Si | 0.000005 | M | Zr | < | 0.000201 | |
| M | As | < | 0.000402 | M | Ga | < | 0.000201 | M | Nd | < | 0.000201 | M | Sm | < | 0.000201 | | |
| M | Au | < | 0.003631 | M | Gd | < | 0.000201 | M | Ni | < | 0.000402 | M | Sn | < | 0.001007 | | |
| M | B | < | 0.001208 | M | Ge | < | 0.000201 | M | Os | < | 0.000605 | M | Sr | < | 0.000201 | | |
| M | Ba | < | 0.000201 | M | Hf | < | 0.000201 | O | P | < | 0.032370 | M | Ta | < | 0.000201 | | |
| M | Be | < | 0.000201 | s | Hg | < | | M | Pb | < | 0.000201 | M | Tb | < | 0.000201 | | |
| M | Bi | < | 0.000201 | M | Ho | < | 0.000201 | M | Pd | < | 0.000403 | M | Te | < | 0.002216 | | |
| O | Ca | 0.000007 | M | In | < | 0.000201 | M | Pr | < | 0.000201 | M | Th | < | 0.000201 | | | |
| M | Cd | < | 0.000201 | M | Ir | < | 0.000201 | M | Pt | < | 0.000402 | M | Ti | < | 0.000402 | | |
| M | Ce | < | 0.000201 | O | K | 0.000020 | M | Rb | < | 0.000201 | O | Tl | < | 0.016508 | | | |
| M | Co | < | 0.000201 | M | La | < | 0.000201 | M | Re | < | 0.000201 | M | Tm | < | 0.000201 | | |
| O | Cr | < | 0.003021 | O | Li | < | 0.000107 | M | Rh | < | 0.000201 | M | U | < | 0.008058 | | |
| M | Cs | < | 0.001208 | M | Lu | < | 0.000201 | M | Ru | < | 0.000201 | M | V | < | 0.000201 | | |
| M | Cu | < | 0.000402 | O | Mg | 0.000001 | O | S | < | 0.053950 | M | W | < | 0.000604 | | | |
| M | Dy | < | 0.000201 | M | Mn | < | 0.000604 | M | Sb | < | 0.001208 | M | Y | < | 0.000201 | | |
| M | Er | < | 0.000201 | M | Mo | 0.000009 | M | Sc | < | 0.000201 | M | Yb | < | 0.000201 | | | |

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference
n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

- For the calibration of analytical instruments and validation of analytical methods as appropriate.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

7.1 Storage and Handling Recommendations

- Store between approximately 4° - 30° C while in sealed TCT bag.

- While stored in the sealed TCT bag, transpiration of this CRM/RM is negligible. After opening the sealed TCT bag transpiration of the CRM/RM will occur, resulting in a gradual increase in the analyte concentration(s). It is the responsibility of the user to account for this effect. When the bottle is weighed both before and after being placed in storage, the mass difference observed will be a measure of transpiration mass loss.

- After opening the sealed TCT bag, keep cap tightly sealed when not in use and store between 4° - 24° C to minimize the effects of transpiration. Use at 20° ± 4° C to minimize volumetric dilution error when using the reported density. Do not pipette from the container. Do not return removed aliquots to container.

- For more information, visit www.inorganicventures.com/TCT

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 200.59 +2 4 Hg(OH)(aq) 1+

Chemical Compatibility - Stable in HNO₃. Avoid basic media forming insoluble carbonate. The sulfide, basic carbonate, oxalate, phosphate, arsenite, arsenate and iodide are insoluble in water.

Stability - 2-100 ppb levels not stable in 1% HNO₃ / LDPE container, stable in 10% HNO₃ packaged in borosilicate glass. 1-100 ppm levels stable in 7% HNO₃ packaged in borosilicate glass. 1000-10,000 ppm solutions are chemically stable for years in 5-10% HNO₃ / LDPE container.

Hg Containing Samples (Preparation and Solution) - Metal (soluble in HNO₃); Oxide (Soluble in HNO₃); Ores and Organic based (The literature has more references to the preparation of Hg containing samples than any other element. Please consult the literature for your specific sample type, since such preparations are prone to error. Or e-mail our technical staff and we will contact you to discuss your particular sample preparation questions in further detail.).

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

| Technique/Line | Estimated D.L. | Order | Interferences (underlined indicates severe) |
|--------------------|--------------------|-------|---|
| ICP-MS 202 amu | 9 ppt | n/a | 186W16O |
| ICP-OES 184.950 nm | 0.03 / 0.005 µg/mL | 1 | |
| ICP-OES 194.227 nm | 0.03 / 0.005 µg/mL | 1 | V |
| ICP-OES 253.652 nm | 0.1 / 0.03 µg/mL | 1 | Ta, Co, Th ,Rh , Fe, U |

8.0 HAZARDOUS INFORMATION

- Please refer to the Safety Data Sheet for information regarding this CRM/RM.

9.0 HOMOGENEITY

- This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous. Homogeneity data indicate that the end user should take a minimum sample size of 0.2 mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration

- QSR Certificate Number QSR-1034

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories"

- Chemical Testing - Accredited / A2LA Certificate Number 883.01

10.3 ISO 17034 "General Requirements for the Competence of Reference Material Producers"

- Reference Material Producer - Accredited / A2LA Certificate Number 883.02

Inorganic Ventures, 300 Technology Drive, Christiansburg, Va, 24073, USA; Telephone: 800.669.6799; 540.585.3030, Fax: 540.585.3012; inorganicventures.com; info@inorganicventures.com

11.0 CERTIFICATION, LOT EXPIRATION AND PERIOD OF VALIDITY

11.1 Certification Issue Date

September 22, 2021

- The certification is valid within the measurement uncertainty specified provided the CRM/RM is stored and handled in accordance with instructions given in Sec 7.1. This certification is nullified if instructions in Sec 7.1 are not followed or if the CRM/RM is damaged, contaminated, or otherwise modified.

11.2 Lot Expiration Date

- **September 22, 2026**

- The date after which this CRM/RM should not be used.
- The lot expiration date reflects the period of time that the stability of a CRM/RM can be supported by long term stability studies conducted on properly stored and handled CRM/RMs. Lot expiration is limited primarily by transpiration (loss of water from the solution) and infrequently by chemical stability.

11.3 Period of Validity

- Sealed TCT Bag Open Date: _____

- This CRM/RM should not be used longer than one year (or six months in the case of a 30 mL bottle) from the date of opening the aluminized bag or after the date given in Sec. 11.2, whichever comes first. This is contingent upon the CRM/RM being stored and handled in accordance with the instructions given in Sec. 7.1.

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:

Uyen Truong
Supervisor, Product Documentation



Certificate Approved By:

Michael Booth
Director, Quality Control



Certifying Officer:

Paul Gaines
Chairman / Senior Technical Director



Sodium Chloride, Crystal
BAKER ANALYZED® A.C.S. Reagent



M5497 - M5408
And on 4/14/23
063

Material No.: 3624-01

Batch No.: 0000281938

Manufactured Date: 2021-06-07

Retest Date: 2026-06-07

Revision No.: 2

Certificate of Analysis

| Test | Specification | Result |
|--|---------------|-------------|
| Assay (NaCl) (by Ag titrn) | ≥ 99.0 % | 100.0 % |
| pH of 5% Solution at 25°C | 5.0 - 9.0 | 6.3 |
| Insoluble Matter | ≤ 0.005 % | 0.003 % |
| Iodide (I) | ≤ 0.002 % | < 0.002 % |
| Bromide (Br) | ≤ 0.01 % | < 0.01 % |
| Chlorate and Nitrate (as NO ₃) | ≤ 0.003 % | < 0.001 % |
| ACS - Phosphate (PO ₄) | ≤ 5 ppm | < 5 ppm |
| Sulfate (SO ₄) | ≤ 0.004 % | < 0.004 % |
| Barium (Ba) | Passes Test | Passes Test |
| ACS - Heavy Metals (as Pb) | ≤ 5 ppm | < 5 ppm |
| Iron (Fe) | ≤ 2 ppm | < 1 ppm |
| Calcium (Ca) | ≤ 0.002 % | < 0.001 % |
| Magnesium (Mg) | ≤ 0.001 % | < 0.001 % |
| Potassium (K) | ≤ 0.005 % | 0.001 % |

For Laboratory, Research, or Manufacturing Use
Meets Reagent Specifications for testing USP/NF monographs
Country of Origin: USA
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

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 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



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

Sodium Chloride, Crystal
BAKER ANALYZED® A.C.S. Reagent



MS824
MB

Material No.: 3624-01

Batch No.: 0000281938

Manufactured Date: 2021-06-07

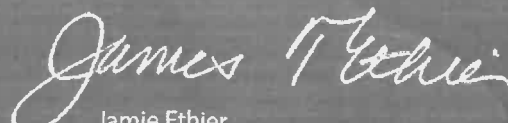
Retest Date: 2026-06-07

Revision No.: 1

Certificate of Analysis

| Test | Specification | Result |
|--|---------------|-------------|
| Assay (NaCl) (by Ag titrn) | ≥ 99.0 % | 100.0 % |
| pH of 5% Solution at 25°C | 5.0 - 9.0 | 6.3 |
| Insoluble Matter | ≤ 0.005 % | 0.003 % |
| Iodide (I) | ≤ 0.002 % | < 0.002 % |
| Bromide (Br) | ≤ 0.01 % | < 0.01 % |
| Chlorate and Nitrate (as NO ₃) | ≤ 0.003 % | < 0.001 % |
| ACS - Phosphate (PO ₄) | ≤ 5 ppm | < 5 ppm |
| Sulfate (SO ₄) | ≤ 0.004 % | < 0.004 % |
| Barium (Ba) | Passes Test | Passes Test |
| ACS - Heavy Metals (as Pb) | ≤ 5 ppm | < 5 ppm |
| Iron (Fe) | ≤ 2 ppm | < 1 ppm |
| Calcium (Ca) | ≤ 0.002 % | < 0.001 % |
| Magnesium (Mg) | ≤ 0.001 % | < 0.001 % |
| Potassium (K) | ≤ 0.005 % | 0.001 % |

For Laboratory, Research, or Manufacturing Use
Meets Reagent Specifications for testing USP/NF monographs
Country of Origin: USA
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 Mansford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone 610.386.1700



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.



M5528-32
M5953
3/30/23

(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.





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

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) $K_2Cr_2O_7$ 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 $K_3Fe(CN)_6$, 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 | 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) (after 100-fold dilution) | Analyte | Concentration (µg/L) (after 100-fold dilution) |
| Hg | 4.0 | CN ⁻ | 99 |

Nitric Acid 69%
CMOS

avantor™



Material No.: 9606-03
Batch No.: 24D1062002
Manufactured Date: 2024-03-26
Retest Date: 2029-03-25
Revision No.: 0

R: 9/2/24

Certificate of Analysis

M6080, M6081, M6082, M6083, M6084

| Test | Specification | Result |
|-----------------------------------|---------------|-------------|
| Assay (HNO ₃) | 69.0 – 70.0 % | 69.7 % |
| Appearance | Passes Test | Passes Test |
| Color (APHA) | ≤ 10 | 5 |
| Residue after Ignition | ≤ 2 ppm | 1 ppm |
| Chloride (Cl) | ≤ 0.08 ppm | < 0.03 ppm |
| Phosphate (PO ₄) | ≤ 0.10 ppm | < 0.03 ppm |
| Sulfate (SO ₄) | ≤ 0.2 ppm | < 0.2 ppm |
| Trace Impurities – Aluminum (Al) | ≤ 40.0 ppb | < 1.0 ppb |
| Arsenic and Antimony (as As) | ≤ 5.0 ppb | < 2.0 ppb |
| Trace Impurities – Barium (Ba) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Beryllium (Be) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Bismuth (Bi) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Boron (B) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Cadmium (Cd) | ≤ 50 ppb | < 1 ppb |
| Trace Impurities – Calcium (Ca) | ≤ 50.0 ppb | 2.3 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 30.0 ppb | < 1.0 ppb |
| Trace Impurities – Cobalt (Co) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Copper (Cu) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Gallium (Ga) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Germanium (Ge) | ≤ 20 ppb | < 10 ppb |
| Trace Impurities – Gold (Au) | ≤ 20 ppb | < 5 ppb |
| Heavy Metals (as Pb) | ≤ 100 ppb | 100 ppb |
| Trace Impurities – Iron (Fe) | ≤ 40.0 ppb | < 1.0 ppb |
| Trace Impurities – Lead (Pb) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Lithium (Li) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Magnesium (Mg) | ≤ 20 ppb | < 1 ppb |
| Trace Impurities – Manganese (Mn) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Nickel (Ni) | ≤ 20.0 ppb | < 5.0 ppb |

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS



Material No.: 9606-03
Batch No.: 24D1062002

| Test | Specification | Result |
|-------------------------------------|---------------|------------|
| Trace Impurities – Niobium (Nb) | ≤ 50.0 ppb | < 1.0 ppb |
| Trace Impurities – Potassium (K) | ≤ 50 ppb | 16 ppb |
| Trace Impurities – Silicon (Si) | ≤ 50 ppb | < 10 ppb |
| Trace Impurities – Silver (Ag) | ≤ 20.0 ppb | < 1.0 ppb |
| Trace Impurities – Sodium (Na) | ≤ 150.0 ppb | < 5.0 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 30.0 ppb | < 1.0 ppb |
| Trace Impurities – Tantalum (Ta) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Thallium (Tl) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Tin (Sn) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Titanium (Ti) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Vanadium (V) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 20.0 ppb | < 1.0 ppb |
| Trace Impurities – Zirconium (Zr) | ≤ 10.0 ppb | < 1.0 ppb |
| Particle Count – 0.5 µm and greater | ≤ 60 par/ml | 10 par/ml |
| Particle Count – 1.0 µm and greater | ≤ 10 par/ml | 3 par/ml |

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantor™**



Material No.: 9606-03
Batch No.: 24D1062002

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

For Microelectronic Use

Country of Origin: USA

Packaging Site: Phillipsburg Mfg Ctr & DC



Jamie Croak
Director Quality Operations, Bioscience Production

Hydrochloric Acid, 36.5–38.0%

BAKER INSTRA-ANALYZED® Reagent

For Trace Metal Analysis

 **avantor™**



M6094
M6095

metdig
10/21/24

Material No.: 9530-33
Batch No.: 24D1562005
Manufactured Date: 2024-03-18
Retest Date: 2029-03-17
Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|---|---------------|-------------|
| ACS – Assay (as HCl) (by acid-base titrn) | 36.5 – 38.0 % | 37.6 % |
| ACS – Color (APHA) | ≤ 10 | 5 |
| ACS – Residue after Ignition | ≤ 3 ppm | < 1 ppm |
| ACS – Specific Gravity at 60°/60°F | 1.185 – 1.192 | 1.192 |
| 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 | < 5.0 ppb |
| Arsenic and Antimony (as As) | ≤ 5.0 ppb | < 3.0 ppb |
| Trace Impurities – Barium (Ba) | ≤ 1.0 ppb | < 1.0 ppb |
| Trace Impurities – Beryllium (Be) | ≤ 1.0 ppb | < 1.0 ppb |
| Trace Impurities – Bismuth (Bi) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Boron (B) | ≤ 20.0 ppb | 2.2 ppb |
| Trace Impurities – Cadmium (Cd) | ≤ 1.0 ppb | < 1.0 ppb |
| Trace Impurities – Calcium (Ca) | ≤ 50.0 ppb | 31.0 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 1.0 ppb | 0.5 ppb |
| Trace Impurities – Cobalt (Co) | ≤ 1.0 ppb | 0.2 ppb |
| Trace Impurities – Copper (Cu) | ≤ 1.0 ppb | < 0.1 ppb |
| Trace Impurities – Gallium (Ga) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Germanium (Ge) | ≤ 3.0 ppb | < 2.0 ppb |
| Trace Impurities – Gold (Au) | ≤ 4.0 ppb | < 0.2 ppb |
| Heavy Metals (as Pb) | ≤ 100 ppb | < 50 ppb |
| Trace Impurities – Iron (Fe) | ≤ 15 ppb | 3 ppb |

>>> Continued on page 2 >>>

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



Material No.: 9530-33
Batch No.: 24D1562005

| Test | Specification | Result |
|--|---------------|------------|
| Trace Impurities – Lead (Pb) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Lithium (Li) | ≤ 1.0 ppb | < 0.1 ppb |
| Trace Impurities – Magnesium (Mg) | ≤ 10.0 ppb | 2.2 ppb |
| Trace Impurities – Manganese (Mn) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Mercury (Hg) | ≤ 0.5 ppb | < 0.1 ppb |
| Trace Impurities – Molybdenum (Mo) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Nickel (Ni) | ≤ 4.0 ppb | 0.2 ppb |
| Trace Impurities – Niobium (Nb) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Potassium (K) | ≤ 9.0 ppb | < 1.0 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 | < 0.3 ppb |
| Trace Impurities – Sodium (Na) | ≤ 100.0 ppb | 2.0 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Tantalum (Ta) | ≤ 1.0 ppb | < 0.9 ppb |
| Trace Impurities – Thallium (Tl) | ≤ 5.0 ppb | < 2.0 ppb |
| Trace Impurities – Tin (Sn) | ≤ 5.0 ppb | < 0.4 ppb |
| Trace Impurities – Titanium (Ti) | ≤ 1.0 ppb | 0.2 ppb |
| Trace Impurities – Vanadium (V) | ≤ 1.0 ppb | < 0.2 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 5.0 ppb | < 0.2 ppb |
| Trace Impurities – Zirconium (Zr) | ≤ 1.0 ppb | < 0.1 ppb |

>>> Continued on page 3 >>>

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

 **avantor™**



Material No.: 9530-33
Batch No.: 24D1562005

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

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

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



Jamie Croak
Director Quality Operations, Bioscience Production

Nitric Acid 69%
CMOS

 **Avantor™**



Receive:
9/29/24
met dig

Material No.: 9606-03
Batch No.: 24B1362001
Manufactured Date: 2024-01-25
Retest Date: 2029-01-23
Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|-----------------------------------|---------------|-------------|
| Assay (HNO ₃) | 69.0 – 70.0 % | 69.6 % |
| Appearance | Passes Test | Passes Test |
| Color (APHA) | ≤ 10 | 5 |
| Residue after Ignition | ≤ 2 ppm | < 1 ppm |
| Chloride (Cl) | ≤ 0.08 ppm | < 0.03 ppm |
| Phosphate (PO ₄) | ≤ 0.10 ppm | < 0.03 ppm |
| Sulfate (SO ₄) | ≤ 0.2 ppm | < 0.2 ppm |
| Trace Impurities – Aluminum (Al) | ≤ 40.0 ppb | < 1.0 ppb |
| Arsenic and Antimony (as As) | ≤ 5.0 ppb | < 2.0 ppb |
| Trace Impurities – Barium (Ba) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Beryllium (Be) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Bismuth (Bi) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Boron (B) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Cadmium (Cd) | ≤ 50 ppb | < 1 ppb |
| Trace Impurities – Calcium (Ca) | ≤ 50.0 ppb | < 0.2 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 30.0 ppb | < 1.0 ppb |
| Trace Impurities – Cobalt (Co) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Copper (Cu) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Gallium (Ga) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Germanium (Ge) | ≤ 20 ppb | < 10 ppb |
| Trace Impurities – Gold (Au) | ≤ 20 ppb | < 5 ppb |
| Heavy Metals (as Pb) | ≤ 100 ppb | < 50 ppb |
| Trace Impurities – Iron (Fe) | ≤ 40.0 ppb | < 1.0 ppb |
| Trace Impurities – Lead (Pb) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Lithium (Li) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Magnesium (Mg) | ≤ 20 ppb | < 1 ppb |
| Trace Impurities – Manganese (Mn) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Nickel (Ni) | ≤ 20.0 ppb | < 5.0 ppb |

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS

 **avantor™**



Material No.: 9606-03
Batch No.: 24B1362001

| Test | Specification | Result |
|-------------------------------------|---------------|------------|
| Trace Impurities – Niobium (Nb) | ≤ 50.0 ppb | < 1.0 ppb |
| Trace Impurities – Potassium (K) | ≤ 50 ppb | < 10 ppb |
| Trace Impurities – Silicon (Si) | ≤ 50 ppb | < 10 ppb |
| Trace Impurities – Silver (Ag) | ≤ 20.0 ppb | < 1.0 ppb |
| Trace Impurities – Sodium (Na) | ≤ 150.0 ppb | < 5.0 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 30.0 ppb | < 1.0 ppb |
| Trace Impurities – Tantalum (Ta) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Thallium (Tl) | ≤ 10.0 ppb | < 5.0 ppb |
| Trace Impurities – Tin (Sn) | ≤ 20.0 ppb | < 10.0 ppb |
| Trace Impurities – Titanium (Ti) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Vanadium (V) | ≤ 10.0 ppb | < 1.0 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 20.0 ppb | < 1.0 ppb |
| Trace Impurities – Zirconium (Zr) | ≤ 10.0 ppb | < 1.0 ppb |
| Particle Count – 0.5 µm and greater | ≤ 60 par/ml | 3 par/ml |
| Particle Count – 1.0 µm and greater | ≤ 10 par/ml | 1 par/ml |

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantor™**



Material No.: 9606-03
Batch No.: 24B1362001

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

For Microelectronic Use

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



Ken Koehnlein
Sr. Manager, Quality Assurance

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

 **avantor™**



Review → 10/9/24
Met dig

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

M6118

Certificate of Analysis

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

>>> Continued on page 2 >>>

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



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

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

>>> Continued on page 3 >>>

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

 **avantorsm**



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

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

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

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


Jamie Ethier
Vice President Global Quality

Nitric Acid 69%
CMOS

avantor™



R -> 10/13/24
Metali g

Material No.: 9606-03
Batch No.: 2310662003
Manufactured Date: 2023-08-21
Retest Date: 2028-08-19
Revision No.: 0

M 6120

Certificate of Analysis

| Test | Specification | Result |
|-----------------------------------|---------------|-------------|
| Assay (HNO ₃) | 69.0 – 70.0 % | 69.5 % |
| Appearance | Passes Test | Passes Test |
| Color (APHA) | ≤ 10 | 10 |
| Residue after Ignition | ≤ 2 ppm | < 2 ppm |
| Chloride (Cl) | ≤ 0.08 ppm | < 0.08 ppm |
| Phosphate (PO ₄) | ≤ 0.10 ppm | < 0.10 ppm |
| Sulfate (SO ₄) | ≤ 0.2 ppm | 0.2 ppm |
| Trace Impurities – Aluminum (Al) | ≤ 40.0 ppb | < 40.0 ppb |
| Arsenic and Antimony (as As) | ≤ 5.0 ppb | < 5.0 ppb |
| Trace Impurities – Barium (Ba) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Beryllium (Be) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Bismuth (Bi) | ≤ 20.0 ppb | < 20.0 ppb |
| Trace Impurities – Boron (B) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Cadmium (Cd) | ≤ 50 ppb | < 50 ppb |
| Trace Impurities – Calcium (Ca) | ≤ 50.0 ppb | < 50.0 ppb |
| Trace Impurities – Chromium (Cr) | ≤ 30.0 ppb | 30.0 ppb |
| Trace Impurities – Cobalt (Co) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Copper (Cu) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Gallium (Ga) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Germanium (Ge) | ≤ 20 ppb | < 20 ppb |
| Trace Impurities – Gold (Au) | ≤ 20 ppb | < 20 ppb |
| Heavy Metals (as Pb) | ≤ 100 ppb | < 100 ppb |
| Trace Impurities – Iron (Fe) | ≤ 40.0 ppb | < 40.0 ppb |
| Trace Impurities – Lead (Pb) | ≤ 20.0 ppb | < 20.0 ppb |
| Trace Impurities – Lithium (Li) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Magnesium (Mg) | ≤ 20 ppb | < 20 ppb |
| Trace Impurities – Manganese (Mn) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Nickel (Ni) | ≤ 20.0 ppb | < 20.0 ppb |

>>> Continued on page 2 >>>

Nitric Acid 69%
CMOS



Material No.: 9606-03
Batch No.: 2310662003

| Test | Specification | Result |
|-------------------------------------|---------------|-------------|
| Trace Impurities – Niobium (Nb) | ≤ 50.0 ppb | < 50.0 ppb |
| Trace Impurities – Potassium (K) | ≤ 50 ppb | < 50 ppb |
| Trace Impurities – Silicon (Si) | ≤ 50 ppb | < 50 ppb |
| Trace Impurities – Silver (Ag) | ≤ 20.0 ppb | < 20.0 ppb |
| Trace Impurities – Sodium (Na) | ≤ 150.0 ppb | < 150.0 ppb |
| Trace Impurities – Strontium (Sr) | ≤ 30.0 ppb | < 30.0 ppb |
| Trace Impurities – Tantalum (Ta) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Thallium (Tl) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Tin (Sn) | ≤ 20.0 ppb | < 20.0 ppb |
| Trace Impurities – Titanium (Ti) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Vanadium (V) | ≤ 10.0 ppb | < 10.0 ppb |
| Trace Impurities – Zinc (Zn) | ≤ 20.0 ppb | < 20.0 ppb |
| Trace Impurities – Zirconium (Zr) | ≤ 10.0 ppb | < 10.0 ppb |
| Particle Count – 0.5 µm and greater | ≤ 60 par/ml | 60 par/ml |
| Particle Count – 1.0 µm and greater | ≤ 10 par/ml | 10 par/ml |

>>> Continued on page 3 >>>

Nitric Acid 69%
CMOS

 **avantorsTM**

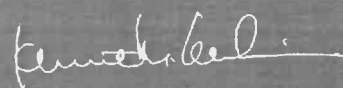


Material No.: 9606-03
Batch No.: 2310662003

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

For Microelectronic Use

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



Ken Koehnlein
Sr. Manager, Quality Assurance

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

avantor™



R → 16/13/24
Met dig

M 6121

Material No.: 9530-33
Batch No.: 0000275677
Manufactured Date: 2020/12/16
Retest Date: 2025/12/15
Revision No: 1

Certificate of Analysis

| Test | Specification | Result |
|---|---------------|---------|
| ACS - Assay (as HCl) (by acid-base titrn) | 36.5 - 38.0 % | 37.6 |
| ACS - Color (APHA) | <= 10 | 5 |
| ACS - Residue after Ignition | <= 3 ppm | 1 |
| ACS - Specific Gravity at 60°/60°F | 1.185 - 1.192 | 1.190 |
| ACS - Bromide (Br) | <= 0.005 % | < 0.005 |
| ACS - Extractable Organic Substances | <= 5 ppm | 1 |
| ACS - Free Chlorine (as Cl ₂) | <= 0.5 ppm | < 0.5 |
| Phosphate (PO ₄) | <= 0.05 ppm | < 0.03 |
| Sulfate (SO ₄) | <= 0.5 ppm | < 0.3 |
| Sulfite (SO ₃) | <= 0.8 ppm | 0.3 |
| Ammonium (NH ₄) | <= 3 ppm | < 1 |
| Trace Impurities - Arsenic (As) | <= 0.010 ppm | < 0.003 |
| Trace Impurities - Aluminum (Al) | <= 10.0 ppb | < 0.2 |
| Arsenic and Antimony (as As) | <= 5 ppb | < 3 |
| Trace Impurities - Barium (Ba) | <= 1.0 ppb | < 0.2 |
| Trace Impurities - Beryllium (Be) | <= 1.0 ppb | < 0.2 |
| Trace Impurities - Bismuth (Bi) | <= 10.0 ppb | < 1.0 |
| Trace Impurities - Boron (B) | <= 20.0 ppb | < 5.0 |
| Trace Impurities - Cadmium (Cd) | <= 1.0 ppb | < 0.3 |
| Trace Impurities - Calcium (Ca) | <= 50.0 ppb | 29.7 |
| Trace Impurities - Chromium (Cr) | <= 1.0 ppb | < 0.4 |
| Trace Impurities - Cobalt (Co) | <= 1.0 ppb | < 0.3 |
| Trace Impurities - Copper (Cu) | <= 1.0 ppb | < 0.1 |
| Trace Impurities - Gallium (Ga) | <= 1.0 ppb | < 0.2 |

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

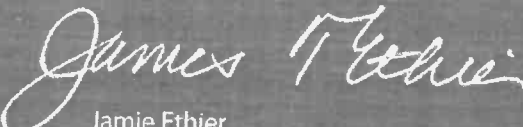
Avantor Performance Materials, LLC

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

| Test | Specification | Result |
|--|---------------|--------|
| Trace Impurities – Germanium (Ge) | <= 3.0 ppb | < 2.0 |
| Trace Impurities – Gold (Au) | <= 4.0 ppb | < 0.2 |
| Heavy Metals (as Pb) | <= 100 ppb | < 50 |
| Trace Impurities – Iron (Fe) | <= 15.0 ppb | < 1 |
| Trace Impurities – Lead (Pb) | <= 1.0 ppb | < 0.5 |
| Trace Impurities – Lithium (Li) | <= 1.0 ppb | 0.2 |
| Trace Impurities – Magnesium (Mg) | <= 10.0 ppb | 0.4 |
| Trace Impurities – Manganese (Mn) | <= 1.0 ppb | < 0.4 |
| Trace Impurities – Mercury (Hg) | <= 0.5 ppb | 0.1 |
| Trace Impurities – Molybdenum (Mo) | <= 10.0 ppb | < 5.0 |
| Trace Impurities – Nickel (Ni) | <= 4.0 ppb | < 0.3 |
| Trace Impurities – Niobium (Nb) | <= 1.0 ppb | < 0.2 |
| Trace Impurities – Potassium (K) | <= 9.0 ppb | < 2.0 |
| Trace Impurities – Selenium (Se), For Information Only | ppb | 1.0 |
| Trace Impurities – Silicon (Si) | <= 100.0 ppb | < 10.0 |
| Trace Impurities – Silver (Ag) | <= 1.0 ppb | < 0.3 |
| Trace Impurities – Sodium (Na) | <= 100.0 ppb | < 5.0 |
| Trace Impurities – Strontium (Sr) | <= 1.0 ppb | < 0.2 |
| Trace Impurities – Tantalum (Ta) | <= 1.0 ppb | < 0.9 |
| Trace Impurities – Thallium (Tl) | <= 5.0 ppb | < 2.0 |
| Trace Impurities – Tin (Sn) | <= 5.0 ppb | < 0.8 |
| Trace Impurities – Titanium (Ti) | <= 1.0 ppb | 0.2 |
| Trace Impurities – Vanadium (V) | <= 1.0 ppb | < 0.2 |
| Trace Impurities – Zinc (Zn) | <= 5.0 ppb | 0.3 |
| Trace Impurities – Zirconium (Zr) | <= 1.0 ppb | < 0.1 |

For Laboratory, Research or Manufacturing Use
Product Information (not specifications):
Appearance (clear, fuming liquid)
Meets ACS Specifications

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


Jamie Ethier
Vice President Global Quality

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