

Ammonium Hydroxide 29%  
CMOS



Material No.: 9731-03  
Batch No.: 0000216203  
Manufactured Date: 2018/11/15  
Retest Date: 2023/11/14  
Revision No: 1

## Certificate of Analysis

| Test                               | Specification | Result |
|------------------------------------|---------------|--------|
| Appearance                         | Passes Test   | PT     |
| Assay (as NH <sub>3</sub> )        | 28.0 – 30.0 % | 28.7   |
| Color (APHA)                       | <= 7          | 5      |
| Insoluble Matter                   | <= 1 ppm      | < 1    |
| Residue after Ignition             | <= 3 ppm      | < 3    |
| Carbon Dioxide (CO <sub>2</sub> )  | <= 10 ppm     | < 10   |
| Pyridine                           | Passes Test   | PT     |
| Substances Reducing Permanganate   | Passes Test   | PT     |
| Chloride (Cl)                      | <= 0.3 ppm    | < 0.2  |
| Phosphate (PO <sub>4</sub> )       | <= 0.2 ppm    | < 0.1  |
| Total Sulfur (as SO <sub>4</sub> ) | <= 0.8 ppm    | < 0.2  |
| Trace Impurities – Aluminum (Al)   | <= 10.0 ppb   | < 5.0  |
| Trace Impurities – Arsenic (As)    | <= 50.0 ppb   | < 2.0  |
| Arsenic and Antimony (as As)       | <= 30 ppb     | < 5    |
| Trace Impurities – Barium (Ba)     | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Beryllium (Be)  | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Bismuth (Bi)    | <= 20.0 ppb   | < 10.0 |
| Trace Impurities – Boron (B)       | <= 10.0 ppb   | < 5.0  |
| Trace Impurities – Cadmium (Cd)    | <= 5.0 ppb    | < 1.0  |
| Trace Impurities – Calcium (Ca)    | <= 100.0 ppb  | 2.0    |
| Trace Impurities – Chromium (Cr)   | <= 5.0 ppb    | < 1.0  |
| Trace Impurities – Cobalt (Co)     | <= 1.0 ppb    | < 1.0  |
| Trace Impurities – Copper (Cu)     | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Gallium (Ga)    | <= 10.0 ppb   | < 1.0  |

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)   | <= 50.0 ppb   | < 10.0 |
| Trace Impurities – Gold (Au)        | <= 10.0 ppb   | < 5.0  |
| Heavy Metals (as Pb)                | <= 200 ppb    | < 100  |
| Trace Impurities – Iron (Fe)        | <= 10.0 ppb   | 1.0    |
| Trace Impurities – Lead (Pb)        | <= 10.0 ppb   | < 10.0 |
| Trace Impurities – Lithium (Li)     | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Magnesium (Mg)   | <= 50.0 ppb   | < 1.0  |
| Trace Impurities – Manganese (Mn)   | <= 5.0 ppb    | < 1.0  |
| Trace Impurities – Molybdenum (Mo)  | <= 10.0 ppb   | < 5.0  |
| Trace Impurities – Nickel (Ni)      | <= 5.0 ppb    | < 5.0  |
| Trace Impurities – Niobium (Nb)     | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Potassium (K)    | <= 100.0 ppb  | < 10.0 |
| Trace Impurities – Silicon (Si)     | <= 150.0 ppb  | < 10.0 |
| Trace Impurities – Silver (Ag)      | <= 5.0 ppb    | < 1.0  |
| Trace Impurities – Sodium (Na)      | <= 100.0 ppb  | 23.0   |
| Trace Impurities – Strontium (Sr)   | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Tantalum (Ta)    | <= 10.0 ppb   | < 5.0  |
| Trace Impurities – Thallium (Tl)    | <= 20.0 ppb   | < 5.0  |
| Trace Impurities – Tin (Sn)         | <= 20.0 ppb   | < 10.0 |
| Trace Impurities – Titanium (Ti)    | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Vanadium (V)     | <= 10.0 ppb   | < 1.0  |
| Trace Impurities – Zinc (Zn)        | <= 5.0 ppb    | < 1.0  |
| Trace Impurities – Zirconium (Zr)   | <= 10.0 ppb   | < 1.0  |
| Particle Count – 0.5 µm and greater | <= 80 par/ml  | 20     |
| Particle Count – 1.0 µm and greater | <= 10 par/ml  | 6      |

For Microelectronic Use

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




Jamie Ethier  
 Vice President Global Quality

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