

Hydrochloric Acid
VLSI



Material No.: 5367-03
Batch No.: 0000032444
Manufactured Date: 2013/01/02
Retest Date: 2018/01/01

Certificate of Analysis

Test	Specification	Result
Assay (as HCl) (by acid-base titrn)	37.0 – 38.0 %	37.7
Color (APHA)	<= 10	6
Residue after Ignition	<= 3 ppm	<1
Extractable Organic Substances	<= 3 ppm	<1
Bromide (Br)	<= 0.005 %	< 0.005
Free Halogen (as Cl ₂)	Passes Test	PT
Ammonium (NH ₄)	<= 1 ppm	<1
Phosphate (PO ₄)	<= 0.05 ppm	< 0.03
Sulfate (SO ₄)	<= 0.3 ppm	0.3
Sulfite (SO ₃)	<= 0.8 ppm	0.2
Trace Impurities – Aluminum (Al)	<= 100.0 ppb	< 5.0
Arsenic and Antimony (as As)	<= 5 ppb	< 3
Trace Impurities – Barium (Ba)	<= 20.0 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)	<= 20.0 ppb	< 5.0
Trace Impurities – Cadmium (Cd)	<= 5.0 ppb	< 1.0
Trace Impurities – Calcium (Ca)	<= 100.0 ppb	19.2
Trace Impurities – Chromium (Cr)	<= 50.0 ppb	< 1.0
Trace Impurities – Cobalt (Co)	<= 5.0 ppb	< 1.0
Trace Impurities – Copper (Cu)	<= 5.0 ppb	< 1.0
Trace Impurities – Gallium (Ga)	<= 20.0 ppb	< 1.0
Trace Impurities – Germanium (Ge)	<= 20.0 ppb	< 10.0
Trace Impurities – Gold (Au)	<= 20.0 ppb	< 5.0

Test	Specification	Result
Heavy Metals (as Pb)	<= 100 ppb	<5
Trace Impurities – Iron (Fe)	<= 50.0 ppb	12.7
Trace Impurities – Lead (Pb)	<= 25.0 ppb	< 10.0
Trace Impurities – Lithium (Li)	<= 50.0 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)	<= 10.0 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)	<= 100.0 ppb	< 10.0
Trace Impurities – Silver (Ag)	<= 20.0 ppb	< 1.0
Trace Impurities – Sodium (Na)	<= 100.0 ppb	12.9
Trace Impurities – Strontium (Sr)	<= 20.0 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)	<= 50.0 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)	<= 50.0 ppb	< 1.0
Trace Impurities – Zirconium (Zr)	<= 10.0 ppb	< 1.0
Particle Count – 0.5 µm and greater	<= 50 par/ml	3
Particle Count – 1.0 µm and greater	<= 10 par/ml	<1

For Microelectronic Use

Reported value is the average of all samples counted for this lot number, with no individual sample value exceeding the specification.

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



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



Richard M Siberski
 Global Director of Quality Assurance