

Ethylene Glycol  
CMOS



Material No.: 9346-05  
Batch No.: 0000032144  
Manufactured Date: 2013/01/14  
Retest Date: 2018/01/13

## Certificate of Analysis

Test	Specification	Result
Assay (HOCH <sub>2</sub> CH <sub>2</sub> OH) (by GC)	>= 99.0 %	100.0
Color (APHA)	<= 10	<5
Acidity (µeq/g)	<= 0.8	0.7
Acidity (as CH <sub>3</sub> COOH)(by wt)	<= 0.01 %	<0.01
Residue after Ignition	<= 0.005 %	<0.001
Water (H <sub>2</sub> O)(by Karl Fischer titrn)	<= 0.2 %	<0.1
Chloride (Cl)	<= 1 ppm	<1
Phosphate (PO <sub>4</sub> )	<= 2 ppm	< 2
Sulfate (SO <sub>4</sub> )	<= 2 ppm	< 2
Arsenic and Antimony (as As)	<= 0.100 ppm	< 0.100
Trace Impurities – Iron (Fe)	<= 0.2 ppm	<0.1
Trace Impurities – Aluminum (Al)	<= 100.0 ppb	< 5.0
Trace Impurities – Barium (Ba)	<= 100.0 ppb	< 1.0
Trace Impurities – Boron (B)	<= 50.0 ppb	< 5.0
Trace Impurities – Calcium (Ca)	<= 300.0 ppb	3.8
Trace Impurities – Chromium (Cr)	<= 50.0 ppb	< 1.0
Trace Impurities – Copper (Cu)	<= 10.0 ppb	< 1.0
Trace Impurities – Gold (Au)	<= 50.0 ppb	< 5.0
Trace Impurities – Lead (Pb)	<= 200.0 ppb	< 10.0
Trace Impurities – Lithium (Li)	<= 100.0 ppb	< 1.0
Trace Impurities – Magnesium (Mg)	<= 100.0 ppb	< 1.0
Trace Impurities – Manganese (Mn)	<= 100.0 ppb	< 1.0
Trace Impurities – Nickel (Ni)	<= 100.0 ppb	< 5.0
Trace Impurities – Potassium (K)	<= 300.0 ppb	< 10.0

Material No.: 9346-05  
Batch No.: 0000032144

Test	Specification	Result
Trace Impurities - Sodium (Na)	<= 300.0 ppb	< 5.0
Trace Impurities - Tin (Sn)	<= 100.0 ppb	< 10.0
Trace Impurities - Titanium (Ti)	<= 100.0 ppb	< 1.0
Trace Impurities - Zinc (Zn)	<= 400.0 ppb	80.1
Particle Count - 0.5 µm and greater	<= 200 par/ml	7
Particle Count - 1.0 µm and greater	<= 10 par/ml	3

For Microelectronic Use

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

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.573.2600  
Avantor™ Performance Materials Inc.

3477 Corporate Parkway, Suite #200, Center Valley, PA 18034, U.S.A. Phone: 610.573.2600 . Fax: 610.573.2610