

Glyclean™ eGA

Electronics Grade Glycolic Acid

Product Information

New environmentally friendly residue removers and surface preparation products based on Glyclean™ eGA have been developed to support existing and next generation silicon manufacturing processes.

Glyclean™ eGA is a new product produced by Chemours exclusively for use in applications that require extremely low levels of metallic impurities. This product, which combines the unique properties of an organic acid with low ppb level trace metal content, has found application in several new generations of wafer processing technology.

Semiconductor Processing Applications

Glyclean™ eGA has many beneficial attributes, including good complexing of aqueous ions, low corrosion rates, and an efficient pH adjustment profile, as well as good environmental, safety, and handling properties that make it an attractive building block with potential to enable formulations that may find use in many areas of semiconductor manufacture, including but not limited to:

- Wafer cleaning and surface preparation
- Front end of line cleaners (FEOL)
- Back end of line cleaners (BEOL)
- Post-etch residue removers/cleaners
- Post-photoresist removal cleaners
- Chemical mechanical planarization (CMP) slurry formulations
- Post-CMP cleaners

Product Specification

Assay 68 ± 2% Total Acid

Trace Metals

Sodium	35	ppb max.	Copper	25	ppb max.
Iron	25	ppb max.	Chromium	25	ppb max.
Calcium	25	ppb max.	Nickel	25	ppb max.
Magnesium	25	ppb max.	Manganese	25	ppb max.
Potassium	25	ppb max.	Lead	25	ppb max.
Aluminum	25	ppb max.	Zinc	25	ppb max.

Physical Properties

	Glyclean™ eGA
Boiling Point	112 °C (233.6 °F)
Density at 15.6 °C (60 °F)	1.27 g/mL
Viscosity at 15.6 °C (60 °F)	11.28 MPa/sec
pH at 25 °C (77 °F)	0.1
Dissociation Constant at 25 °C (77 °F)	1.5E-4

Environmental Factor

Glyclean™ eGA offers an environmentally friendly alternative to replace many of the organic solvents currently used in formulations for cleaning and surface preparation products.

Other Benefits of Glyclean™ eGA

- Not an ozone depleting compound
- Nonflammable
- Low volatility
- Not on the U.S. list of hazardous air pollutants
- Low toxicity
- Easy to handle

Methodology for the Determination of Complexing Efficiency

A 5% solution of each complexing agent was prepared in water. A 100 mL sample of this solution was treated with 10 g of the specified salt and stirred for 20 min.

The resulting mixture was filtered through a preweighed Whatman filter paper under vacuum. In the case of the ferric oxide, a vacuum filtration through silica bed method was used.

The filter paper and solid material filtered was placed in a petri dish and kept in a drying oven at 100 ± 5 °C (212 ± 9 °F) for 2 hr or until a constant weight was obtained.

Calculations

In order to calculate complexing efficiency, the salt solubilized was calculated as per the equation given below:

Salt solubilized (SS, g) = $W_s + W_p + W_f - W_c$, where:

W_s = Amount of salt taken for test, g

W_p = Weight of empty petri dish, g

W_f = Weight of filter paper, g

W_c = Constant weight of petri dish comprising of filter paper and salt achieved after drying, g

Complexing efficiency was calculated using the formula given as under:

Salt solubilized per gram acid (CE_1) = SS/W_a , where W_a

SS = Salt solubilized, g

W_a = Amount of complexing agent in 100 mL solution

Note: A negative number is possible, because the complex made is also insoluble and weighs more than the original per mol weight.

Complexing Efficiency Glycolic Acid vs. Other Acids

Salt Solubilized per g of Acid

No.	Type of Salt	Glycolic Acid	Citric Acid	Oxalic Acid	Sulfamic Acid	Sulfuric Acid	Acetic Acid	Lactic Acid	Gluconic Acid	Urea-HCl	HCl	Na ₂ EDTA	NTA	H ₃ PO ₄
1	CaSiO ₃	0.2793	0.2444	-0.2020	0.3665	-0.2606	0.2440	0.2560	0.1861	0.2628	0.4710	0.2510	0.1786	0.2597
2	MgCO ₃	0.5602	0.7551	-0.2349	0.4183	0.8562	0.7045	0.3422	0.1996	0.2065	1.0051	0.2957	0.3066	-0.1418
3	CuO	0.0626	0.0365	-0.5360	0.4274	0.8337	0.0778	0.0470	0.0390	0.2174	1.1893	0.0543	0.0296	0.3346
4	ZnO	0.5926	-0.0597	-0.5710	0.4326	0.3271	0.6952	0.5050	0.2110	0.2117	0.8388	0.2311	0.0406	-0.8372
5	Al ₂ O ₃	0.0310	0.0325	0.0325	0.0186	0.0757	0.0367	0.0168	0.0218	0.0263	0.3614	0.0396	0.0398	0.0363
6	SiO ₂	0.4988	0.5029	0.5161	0.5204	0.5409	0.5067	0.4977	0.4996	0.0487	0.6634	0.5051	0.4626	0.4831
7	Fe ₂ O ₃	0.0383	0.0368	0.0394	0.0378	0.0357	0.0216	0.0055	0.0162	0.0234	0.0262	0.0273	0.0389	-0.0392

Corrosion Data for Glycolic and Other Acids, % Weight Loss (48 hr at 23 °C [73 °F])

Metal	% Acid	Glycolic	Citric	Gluconic	Sulfamic	Lactic	Phosphoric	Sulfuric	HCl	Acetic	Nitric	Oxalic
Al	1	0.010	0.003	0.011	0.060	0.007	0.360	0.120	5.60	0.005	0.44	0.110
Cu	1	0.009	0.017	0.009	0.012	0.006	0.020	0.012	0.03	0.007	0.01	0.013
Al	5	0.010	0.005	0.019	0.086	0.007	0.940	0.200	28.5	0.007	0.77	0.110
Cu	5	0.018	0.018	0.011	0.017	0.009	0.019	0.013	0.02	0.008	7.92	0.009
Al	10	0.009	0.005	0.021	0.100	0.008	1.390	0.270	55.5	0.008	0.95	0.090
Cu	10	0.020	0.018	0.011	0.022	0.011	0.022	0.013	0.02	0.007	26.6	0.014

For more information, visit glycolicacid.chemours.com or call (800) 441-9593.

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