



CUS1300 Family Barrier Slurries for Cu CMP

DESCRIPTION

The CUS1300 barrier slurries for copper CMP consists of a pair of slurries for barrier removal during the copper CMP process. These slurries are designed to improve upon the dishing and erosion results obtained after first step polishing while removing any residual copper present after the first step polishing process. Both products give excellent final surface quality with low defectivity and surface roughness.

PERFORMANCE REMOVAL RATES

CUS1331 slurry is designed to give moderate TEOS removal rates and is recommended if minimization of ILD loss is critical. CUS1351 slurry has higher TEOS rate and is preferred when substantial topography correction is required.

Performance Removal Rates				
Film	CUS1331: Typical Blanket Film Removal Rates (Å/min.)		CUS1351 Typical Blanket Film Removal Rates (Å/min.)	
	2 psi	3 psi	2 psi	3 psi
Cu	125	180	150	260
TEOS	225	375	525	825
Carbon-doped oxide (CDO) ILD	150		265	345
TaN	725	1080	825	1190
SiC	215		395	

Typical sheet wafer removal rates are as follows:

Process: 2 or 3 psi/120 rpm platen speed/114 rpm carrier speed; 200 mL/min. flow rate; IC1010™ pad on an Applied Materials Mirra® polisher.

PHYSICAL PROPERTIES

The CUS1300 family slurries are single component, colloidal silica-based products. Less than 1% hydrogen peroxide is added before use. The slurry has a pot life of at least nine (9) days after peroxide addition.

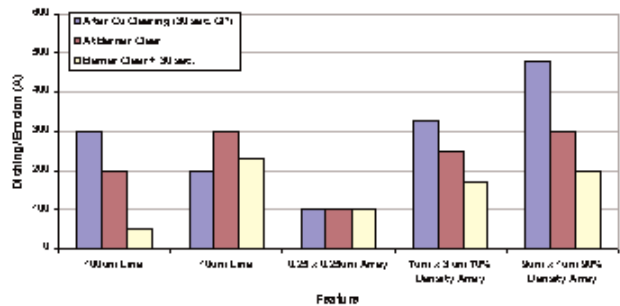
CUS1300 FAMILY PROPERTIES

Family Properties		
Property	CUS1331: Typical Value	CUS1351 Typical Value
Percent Abrasive	8.9%	12.4%
pH	9.0	8.9
Specific Gravity (25°C)	1.05–1.06	1.07–1.08
Cu Static Etch Rate	<1Å/min.	<1Å/min.

Dishing and Erosion

The plot below shows the excellent dishing and erosion performance of CUS1351 following a first step process performed with EPL2360 series copper slurry. Total metal loss for this process was 1000Å, with slightly higher loss in dense features. Metal loss can be decreased by using CUS1300 slurry, though at the expense of reduced topography correction.

CUS1351 Dishing/Erosion Performance



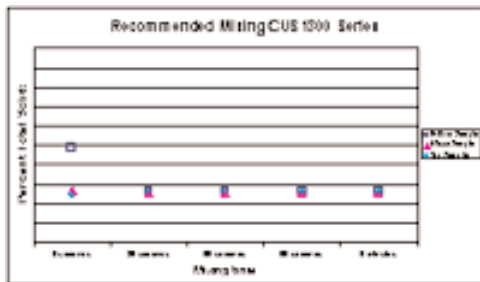
creating the
flawless surface

MIXING AND DISPENSING

Mixing

The incoming slurry abrasive is homogeneous. However, five minutes of stirring @ 250–500 RPM depending upon stirrer type, should be implemented to ensure complete homogeneity and redispersion of abrasive in the container due to differences in undisturbed storage time.

Five minutes of mixing is recommended after hydrogen peroxide addition to prepare the slurry for use.



Dispensing

Storage tanks and distribution piping should be constructed of engineering plastic, such as polyethylene, polypropylene, or PTFE. Materials such as aluminum, copper, brass, and PVC should be avoided.

Avoid leaving slurry containers open for extended periods of time. Leaving containers open may result in drying and crystallization of the silica abrasive component, which can cause wafer scratching. Open daytanks should be humidified to prevent drying.

Rinse all transport lines, flow meters and other equipment with pH adjusted DI water after use and prior to exposing to air.

PACKAGING

CUS1300 family slurries are packaged in 20L and 200L HDPE non-returnable drums and 1040L totes.

STORAGE

Always check the condition of containers and temperature indicators immediately upon delivery. Accept deliveries only if the shipment and recorders are intact and do not indicate exposure to freezing temperatures. If material is damaged (handling or temperature exposure) the shipment should be refused, and a claim should be filed with the carrier handling the delivery.

Storage outside of the recommended conditions may result in irreversible product degradation. Products can be stored up to the expiration date between the temperature range of 5°C – 43°C (41–109°F). Avoid prolonged exposure at temperatures at either extreme. Products can be stored outside of this range for up to 24 hours, provided they do not go below 0°C (32°F) or above 54°C (129°F). In the event of exposure outside of the recommended conditions, please contact your Rohm and Haas Electronic Materials technical representative for recommendations. In all cases the products should be allowed to return to normal room temperatures prior to use.

Storage in aluminum, copper, brass, or PVC is not recommended. Storage equipment should be made of polyethylene, polypropylene, PTFE, or other reinforced engineering plastic. Tanks, piping and handling equipment can be washed and cleaned with water to remove any deposits due to evaporation.

Consult your Rohm and Haas Electronic Materials representative for recommendations when designing equipment or handling systems.

PRECAUTIONARY NOTES

Follow all MSDS and label precautions and use good industrial safety and hygiene practices when handling or using this product. Keep this and all industrial materials away from untrained personnel.

DISPOSAL

Dispose in accordance with all applicable regulations.

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