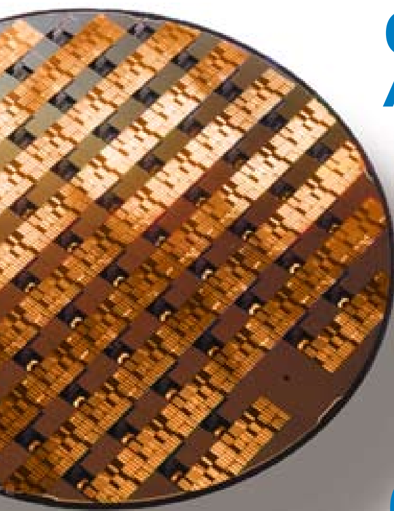

COPPER
APPLICATION GUIDE

MICROELECTRONICS
PERFORMANCE PRODUCTS

High Performance Chemicals for Cleaning and Surface Preparation

Mallinckrodt Baker, Inc. produces the J.T.Baker® brand of high-purity chemicals used in cleaning and surface preparation in a wide range of manufacturing processes. The J.T.Baker line of microelectronic chemicals features high-performance photoresist strippers and residue removers which are used in various manufacturing applications. Manufacturing applications include: integrated circuits, flat panel displays, and MEMS.

	Integrated Circuits (Al, SiO_2)			Flat Panel Displays	Packaging	MEMS
	FEOL	BEOL	Far-BEOL			
CLk™-888	●	●		●	●	
CLk-820	●	●		●		
CLk-870		●				●
CLk-222	●	●	●		●	●

Products

Our diverse line of CLk™ brand copper compatible performance products offers the versatility needed to meet the toughest integration challenges in the most advanced cleaning processes. Whether you need to remove bulk photoresist on a post etch process or a rework process, or residual polymer removal after a post ash process, Mallinckrodt Baker can help.

CLk-888 photoresist remover

A blend of high performance organic solvents designed to maximize the removal and complete dissolution of bulk photoresist and anti-reflective coatings that are employed in the copper damascene patterning process. CLk-888 photoresist remover also has proven effectiveness in immersion bath and batch spray applications.

CLk-820 photoresist remover

A blend of high performance organic solvents designed to maximize the removal and complete dissolution of bulk photoresist from a patterned wafer. Specifically designed for wet bench applications, CLk-820 photoresist remover has proven effectiveness in immersion tank cleaning with excellent tantalum and tantalum nitride compatibility.

CLk-870 ash residue remover

A blend of high performance organic solvents and semi-aqueous components designed with versatility for post ash residue and polymer removal. Specifically designed for efficient removal of copper oxide residues created during the oxygen plasma strip process, CLk-870 ash residue remover also has proven effectiveness in immersion bath and batch spray applications.

CLk-222 photoresist remover

The first fully aqueous, copper-compatible product capable of removing bulk photoresist and or ash residues created during the dual damascene metal deposition process. CLk-222 photoresist remover has proven effectiveness in immersion tank, batch spray and single wafer tool applications.

Operating Guidelines

Mallinckrodt Baker recognizes the diverse cleaning challenges presented by the different segments of the Microelectronics industry. The general operating guidelines below offer a starting point to begin evaluating the use of the J.T.Baker performance products in your specific application.

Process Equipment Selection Guidelines : Bulk photoresist removal

	Wet Bench	Batch Spray	Single Wafer Tool
CLk-888	●	●	
CLk-820	●	●	
CLk-222	●	●	

Process Equipment Selection Guidelines : Ash residue removal

	Wet Bench	Batch Spray	Single Wafer Tool
CLk-888	●	●	●
CLk-820	●	●	●
CLk-870	●	●	●
CLk-222	●	●	●

Process Information

Suggested Bath Recipe

Suggested Spray Recipe for a Three Manifold Semitool

Step #	Step Name	Time (min)	RPM	M1	M2	M3	Drain
1	RPMSTAB	0:10	50				C1
2	T2DRAIN	0:10	50	T2			C1
3	T2RECL	5–20	50	T2			T2
4	T1TOT2	0:10	50	T1			T2
5	PURGE1	0:05	50	N2			T2
6	RINSE1	1:00	50	CDI			C2
7	PURGE1	0:05	50	N2			IW
8	RINSELO	1:00	300		CDI		IW
9	RINSEHI	2:00	600		CDI		IW
10	PURGE2	0:05	600		N2		IW
11	DRYHI	1:30	1200–1400			N2	IW
12	DRYLO	6:00	600			N2	IW

MICROELECTRONICS
PERFORMANCE PRODUCTS

J.T.Baker®

Process Information (continued)

Suggested SEZ Single Wafer Spray Recipe

Step #	Step Name	Flow (L/min)	RPM	Time (s)
1	Chemical	0.8	540	30-120
2	No Chem		1700	3
3	DI water	0.8	600	30
4	N2		1700	Various

Selectivity/Etch Rate Information

Compatibility Information	CLk-888 (20:1)	CLk-888:H_2O_2 (5:1)	CLk-222	CLk-820	CLk-870
Temperature	55°C	65°C	60°C	75°C	75°C
H_2O_2 Dilutions	20:1	5:1	No Dilution	No Dilution	No Dilution
Substrate Etch Rates	**(A/min)**	**(A/min)**	**(A/min)**	**(A/min)**	**(A/min)**
Cu	1	67.5	0.83	0.76	< 1
SiN	< 0.5	1.5	0.91	0.88	< 1
SiC	< 0.5	0.15	0	0	< 1
Ta	X	0.85	0	0	X
TaN	X	5	0	0.002	X
Al	Not Compatible	405	2712	Not Compatible	Not Compatible
Ti	< 0.5	177	0.01	8.7	< 0.5
TiN	< 0.5	59	0	< 0.5	1
W	X	433	34.9	< 0.5	1.6
TEOS (PECVD)	< 0.5	0.7	0.64	1.31	3
Low k Compatibility					
FSG	7	X	0.22	4	5
Coral®	1.85 @ 65°C	< 0.1	0.97	X	< 1
Black Diamond® 1 (CIP)	X	X	X	X	<1
Black Diamond II	< 0.1	Swells ~0.8	13.4	155	X
BD2X	*	*	*	*	*
Coral 2.5	*	*	*	*	*
CDO	< 0.5	*	0.55	*	< 1
Fox-15	*	*	*	*	*
Fox-16	*	*	*	Not Compatible	< 1
SiLK®	< 0.1	*	*	< 1	< 1

X = Not Tested   * = Available upon request

MICROELECTRONICS
PERFORMANCE PRODUCTS

J.T.Baker®

Application Support

Mallinckrodt Baker's highly qualified Applications Engineers are available to help you implement a total process solution utilizing J.T.Baker chemistries in your existing tools or a new facility. Evaluations can be conducted at your manufacturing site or at one of several Mallinckrodt Baker application laboratories. For additional information, contact us at 1-800-JTBAKER (800-582-2537) or at 1-908-859-9346. You can also e-mail us at micro.mbi@covidien.com.

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