

Brewer Science® ProTEK® B3

Alkaline-Resistant Coating



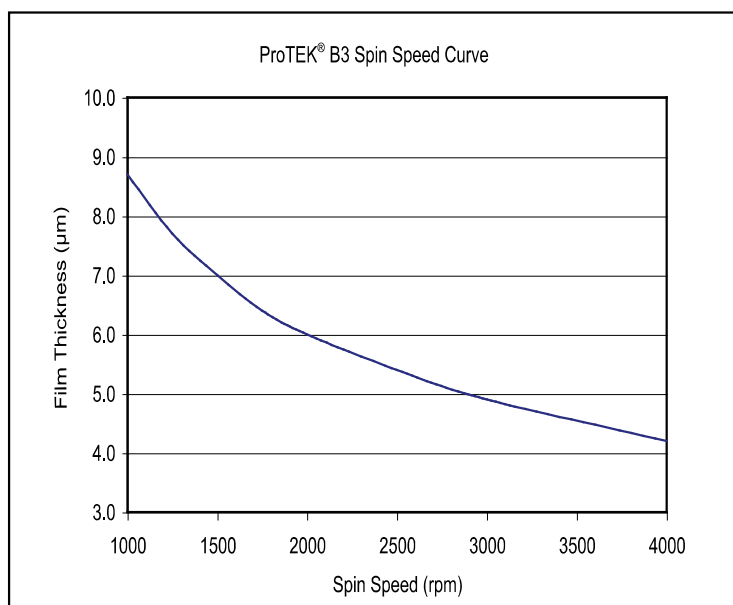
brewer science

ProTEK® B3 coating protects front-side circuitry during deep backside alkaline bulk micromachining while increasing throughput and yield.

Benefits

- ▶ Protect delicate front-side circuitry during backside bulk micromachining
- ▶ Increase yield by minimizing front-side damage caused by alkaline etch solution punch-through during wet etching
- ▶ Improve throughput by
 - Reducing labor and process time associated with mechanical clamps
 - Increasing the number of wafers per etch bath

ProTEK® B3-25 Coating Spin Speed Curve



Processing Recommendations

ProTEK® B3 Primer

Spin coat: 1500 rpm for 60 s, acceleration: 1000 to 10,000 rpm/s
Bake (hot plate): 205 °C for 60 s

ProTEK® B3 Protective Coating

Various film thicknesses of ProTEK® B3 coating can be achieved by varying the spin speed. We suggest using a spin speed of 1000 to 4000 rpm.

Spin coat: > 1000 rpm (customer set) for 60 s, acceleration:
> 5000 rpm/s

Bake (hot plate), (all bakes required):

Bake 1: 100° to 140 °C for 120 s

Bake 2: 205 °C for 60 s

Alternative Oven Bake Method

Hot plate bake: 130 °C for 120 s

Oven bake: 200 °C for 30 min

Remove wafer from oven and cool to room temperature.

Storage Conditions

ProTEK® B3 Coating: Room temperature (16 °C to 26 °C)

ProTEK® B3 Primer: Room temperature (16 °C to 26 °C)

Shelf Life

ProTEK® B3 Coating: 365 days

ProTEK® B3 Primer: 180 days

ProTEK® Remover 100: 365 days

Removal Guidelines

Recommended Wet Removal Process

ProTEK® Remover 100

Puddle (Spin) Dispense Process:

| Step 1 | Process | Spin (rpm) | Time (s) | Spray (s) |
|--------|---------|------------|----------|-----------|
| 1 | Puddle | 0 | 60 | 0 |
| 2 | Spin | 500 | 15 | 15 |
| 3 | Spin | 2000 | 10 | 0 |
| 4 | Puddle | 0 | 30 | 0 |
| 5 | Spin | 500 | 15 | 15 |
| 6 | Spin | 2000 | 10 | 5 |
| 7 | Spin | 500 | 15 | 15 |
| 8 | Spin | 2500 | 15 | 0 |

Bath Process (two baths):

Bath 1: 23 °C, 20 min (room temperature)

Bath 2: 23 °C, 20 min (room temperature)

Rinse: With isopropanol (IPA) (room temperature) for 5 min

Rinse: With deionized (DI) water (room temperature) for 2 min

Dry: Air dry

Spray Solvent Tool (SST) Process:

| Step | Time | rpm | Drain/Recycle Tank |
|------|---------------------------|------|--------------------|
| 1 | 20 s | 0 | Drain |
| 2 | 3 min | 50 + | Tank |
| 3 | 3 min | 1000 | Tank |
| 4 | 3 min | 50 - | Tank |
| 5 | 3 min | 1000 | Tank |
| 6 | 3 min | 50 + | Tank |
| 7 | 3 min | 1000 | Tank |
| 8 | 3 min | 50 - | Tank |
| 9 | 3 min | 1000 | Tank |
| 10 | 3 min | 50 + | Tank |
| 11 | 3 min | 1000 | Tank |
| 12 | 15 s | 50 - | Drain |
| 13 | IPA rinse | | |
| 14 | DI H ₂ O rinse | | |
| 15 | N ₂ dry | | |

The wet removal processes may leave a monolayer thin film of ProTEK® coating depending on the device type, structure, and complexity. This film is a transparent and non-reactive film. The remaining film can generate particles when exposed to acid. To prevent particles from forming, a short O₂ plasma etch step should be performed as follows:

Power: 300 W
 Gas: O₂
 Gas flow: 50 sccm
 Temperature: 20 °C
 Pressure: 50 mTorr
 Time: 20 s

Recommended Dry Removal Process

Power: 400 W
 Gas: 20% CF₄
 Gas Flow: 80 sccm
 Pressure: 75 mTorr
 Time: Approximate etch rate is 2 µm/min