

Equipment type: Electroplating machine

Equipment model: Sabre XT

Manufacturer : NOVELLUS

Date of manufacture: 2000

1 Novellus/Sabre-XT

2 Wafer Size: 200mm

3 Integrated frame with at least two (2) Plating Modules and Phase 3 Anode Chamber

4 200mm Clamshell Drive Unit

5 196mm Clamshell Cup and Cone (Phase 1A Ceramic Cup)
6 Pulse Plating Capability; Advanced Energy Pulse Power Supply
7 Three Additive Dosing System with Nowpak
8 Bath Chemistry control algorithm

9 Central Bath Reservoir (150 L) servicing all three plating modules

10 At least two Post-Electrofill Modules; capable of Edge Bead Removal (EBR)

11 At least two-chamber anneal capability: 50-400 C, H2/forming gas
12 Brooks 4-axis atmospheric dual-end effector robot (process robot)
13 Brooks Accutran front-end robot
14 Main Power Panel
15 Secondary containment with splash guards and leak detection
16 Dual waste stream plumbing for dedicated plating solution reclaim and dilute rinse
17 Pentium or better-based CPU
18 Graphical User Interface (GUI)
19 SECS/GEM compatibility

Process Parameter	Units	Specification	Observed Performance
Plating Thickness For All Items Below	μm	1.0	1.0
Sheet Resistance			
Within Wafer Uniformity (49-pt map, 1σ value, 5 mm edge exclusion)	%	<2.0	< 1.7
Wafer-to-Wafer Mean Rs Variability (49-pt map, 5 mm edge exclusion)	%	<1.0	< 1.0
Within Die Uniformity	Å	<2500Å on 0.5 μm wide × 0.5 μm pitch trenches	<2500Å on 0.5 μm wide × 0.5 μm pitch trenches

Process Parameter	Units	Specification	Observed Performance
Bulk Resistivity Pre Anneal	μΩ-cm	< 2.2	< 2.2
Bulk Resistivity Post Anneal	μΩ-cm	< 1.8	< 1.8
Stress (< 1hr after deposition)	Mpa	< 120	< 120
Steady State Throughput	wafers/hour	>65	>65
Coulombs Between Anode Change	Millions of Coulombs	15	15
Fill (using 1500Å Novellus HCM Seed, dependent on shape of via).	Aspect Ratio, min size	0.20 μm × 1.0 μm via	0.2 μm × 1.0 μm via 0.15 μm × 0.7 μm via
Front-side Mechanical Particle Addition (> 0.16 μm)	Adders/cm^2	≤0.05	≤0.05
Front-side In-film defect Addition Measured using AIT-II 1.0 mm film thickness)	Adders/ wafer	<100	<100 on HCM wafers
Backside Cu Concentration (TXRF)	atoms/cm^2	$<1.0 \times 10^{11}$	$< 1.0 \times 10^{11}$