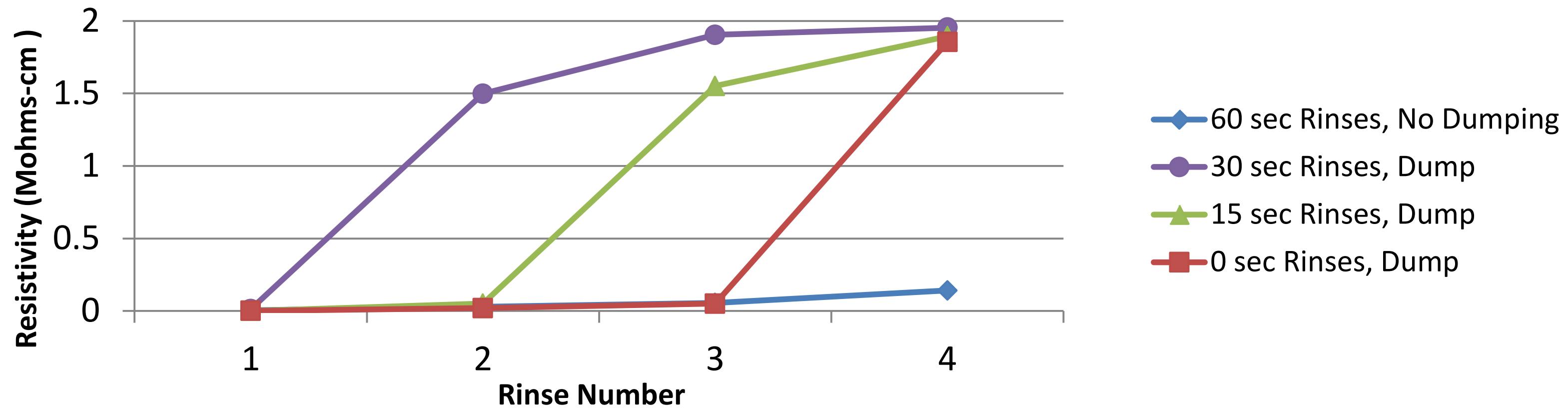
Rinse-and-Dump vs Continuous Flow
Si Wafers in a Clean Room Setting

4" Si Wafers soaked in "Piranha" solution for 5 minutes



Four minutes of continuous rinsing of a Si wafer did not adequately remove Sulfuric Acid, while four shorter rinses (15 & 30 seconds) with dumping the rinsate removed all the acidic ions. Even zero flow, fill-and-dump rinsing returned

	4" Si Wafer (with a SiNx film on top) soaked in Piranha solution (H2SO4:H2O2, 3:1) at 80 C for 5 minutes				
		Rinse Test #1 (Rinse Time=0 s)*	Rinse Test #2 (Rinse Time=15 s)*	Rinse Test #3 (Rinse Time=30 s)*	Rinse Test #4 (Rinse Time=60 s)*
0	Dumping Water?	Yes	Yes	Yes	No
1		0 sec Rinses, Dump	15 sec Rinses, Dump	30 sec Rinses, Dump	60 sec Rinses, No Dumping
2	Resistivity Before Wafer Rinse (MΩcm)	1.89	1.901	1.96	1.901
3	Resistivity After 1st Wafer Rinse (MΩcm)	0.001	0.001	0.012	0.005
4	Resistivity After 2nd Wafer Rinse (MΩcm)	0.02	0.051	1.498	0.029
5	Resistivity After 3rd Wafer Rinse (MΩcm)	0.05	1.551	1.904	0.055
6	Resistivity After 4th Wafer Rinse (MΩcm)	1.855	1.894	1.954	0.141