

## Accounting for DRY-WET-DRY Oxidation Programs

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Simply running the calculator for a “standard” 950°C wet oxidation for 15 minutes, we get 788Å.

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Initial Oxide Thickness:  Å

Temperature:  ▼

Hours : Minutes  
 ▼ :  ▼

<100>     <111>

wet     dry

Calculate thickness  Å

However, the CIS “WET” programs (such as WET950) include a dry O<sub>2</sub> step both before and after the actual pyrogenic steam step to improve oxide quality. So, how to account for these extra steps using the calculator?

Begin by running a DRY 950 step for 10 minutes, and note the resulting oxide thickness:

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Initial Oxide Thickness:  Å

Temperature:  ▼

Hours : Minutes  
 ▼ :  ▼

<100>     <111>

wet     dry

Calculate thickness  Å

In this case, after pressing “Calculate thickness” we get 36Å. This is the thermal oxide grown during the dry oxidation step preceding the actual wet step. Transfer this number (36) up to the “Initial Oxide Thickness” field, and change the other parameters to your intended parameters for the wet anneal (in this case, wet ambient, 15 minutes):

Initial Oxide Thickness:  Å

Temperature:  ▼

Hours : Minutes  
 ▼ :  ▼

<100>     <111>

wet     dry

Calculate thickness  Å

After pressing “Calculate thickness” we get 817Å. This represents the thickness of our oxide following the wet step. The wet step is followed by another dry step, so we account for that by transferring the result of this calculation (817Å in this case) up to the “Initial Oxide Thickness” field, and setting the other parameters for the final dry step (in this case, dry, 950°C, 10 minutes):

Initial Oxide Thickness:  Å

Temperature:  ▼

Hours : Minutes  
 ▼ :  ▼

<100>     <111>

wet     dry

Calculate thickness  Å

After pressing “Calculate thickness” again, we get a final oxide thickness of 840Å. This is a more accurate thickness estimation than if we had simply calculated for the wet step (which gave us only 788Å).

While thin, dry oxides are not well predicted by the Deal-Grove model, any effort to account for the dry steps should improve our overall estimate for these DRY-WET-DRY programs.