

Tystar Tube 1 Oxidation Tube Operating Procedure

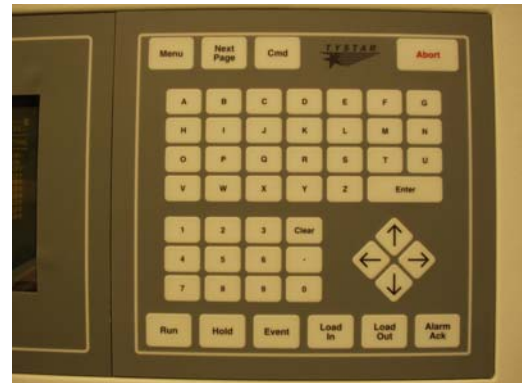
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General Information

- 1) The oxidation tube is the top tube of the Tystar furnace
- 2) The tube computer is the white flat screen instrument on the left of the furnace as shown.
- 3) On the right side of the tube computer there are various buttons that you will need to use:



- a. Abort
- b. Menu
- c. Enter
- d. Alarm Ack
- e. Event
- f. Run



During furnace operation the tube computer will have a display that looks like:

- g. Please note the location of the following information on this screen:
 - i. Recipe name
 - ii. Step name
 - iii. Time left in this step
 - iv. Overall time left in this recipe
- 4) If at any time you see that your recipe is in step **SHLD**, contact staff. This is a special hold and requires a staff person to step out of the program.

Please note the **ABORT** button, which you can press if you believe the furnace is acting incorrectly.

Login in to CRESS

- 1) Goto the cress computer and log into the **Tystar Oxidation** system

Check the tube status on the Tube computer

- 1) Press **MENU**
- 2) On alpha keypad press: **D -- S**
- 3) Press: **ENTER**
- 4) You will now see the status of the system. Look at the Step Name. It should be **IDLE**. If it is not **IDLE** see a staff person. If it is **IDLE** you may continue.
- 5) Check the tube temperature. **ACTUAL** temperature should equal **SETPT** temperature. If not, see staff.

Load your recipe

- 1) Press **MENU**
- 2) On alpha keypad press: **R -- L**
- 3) Press: **ENTER**
- 4) The display will now have a list of recipes available.
- 5) Use the arrow keys to highlight the **>** in front of the recipe that you desire.
- 6) Press: **ENTER**
- 7) Press: **ENTER** (*yes, you do it twice*) **PAUSE**
- 8) The screen will now display the name of the oxidation step and a time next to it.
 - a. Using the number pad and the decimal (.) key. Type in the oxidation time that you want.
 - b. The oxidation time should look like **12.34.56** which means 12 hours, 34 minutes, and 56 seconds (note the decimal point between units, NOT a colon)
 - c. Press **ENTER** to load the time.
- 9) The display will now read "recipe load complete"

List of Recipes:

DRY1050.001
WET950.001
TLC.001 (staff only)
WET1050.001
WET980.001
DRY950.001
DRY900.001
ANL900.001
ANL1000.001

Running the recipe

- 1) Press: **MENU**
- 2) On alpha keypad press: **D -- S**
- 3) Check that the recipe name on the screen is the one that you want
- 4) Press: **RUN**
- 5) The recipe will now start running and the display will now have the step name **STRT**.
- 6) If the system remains in step **STRT**, you did not log into CRESS. Once you log into CRESS, the recipe will proceed.

Loading the wafers

- 1) Once the recipe has started the system will pull the boat out of the tube.
- 2) Wait until you hear the *SONIC* alarm telling you that the boat is fully out of the tube.
- 3) The tube computer should tell you that the system is in step **LDWF**.
- 4) Press **ALARM ACK** to turn off the sonic.
- 5) Let the boat cool on cantilever for 10 minutes.
- 6) Ensure that the wafer-loading table is clear for working with boat.
- 7) Using the boat pick up tool, pick up the boat from the cantilever and place it on the wafer-loading table.



- 8) Let the boat cool on table for 10 minutes.
- 9) Load your wafers into the boat; face the front of the wafers – flat on top – towards **the left, which will be the door of the tube.**



- 10) Pick up the boat with the pickup tool and replace it on the cantilever in the center with the wafer fronts still facing left or away from the tube.
- 11) Once the wafers are back on the cantilever, Press **EVENT**.
- 12) The boat will now go into the tube and the oxidation will occur.
- 13) Note the amount of recipe time remaining; the system will be ready for you to unload your wafers when there is about 11 minutes left in the recipe.
- 14) You may leave the lab until the wafers are ready to be unloaded.

Unloading the wafers

- 1) Check that the *SONIC* is making a noise and the tube computer says that it is step **HLD1**.
- 2) Press **ALARM ACK** to turn off the sonic.
- 3) Press **EVENT**. The cantilever will now pull out of the tube.
- 4) Press **ALARM ACK** to turn off the sonic at the end of the pull.
- 5) Ensure that the wafer-loading table is clear for working with boat.
- 6) Let the boat cool on cantilever for 10 minutes.
- 7) Using the boat pick up tool, pick up the boat from the cantilever and place it on the wafer-loading table.
- 8) Unload your wafers.
- 9) Pick up the boat with the pickup tool and replace it on the cantilever.
- 10) Press **EVENT**
- 11) The boat will be pushed back into the tube.

System Idle

- 1) Wait until the boat is completely back into the tube.
- 2) The tube computer should display that the status of the system is in idle. The Step Name should be **IDLE**.
- 3) After the step name is idle, you may go to CRESS and logout of the **Tystar Oxidation** system.

WET1050.001 recipe growth rate approximately 74Å/min

Example Wet Ox		
STEP	COMMENT	TIME
STRT	1 ST Step & CRESS login	00.00.10
BOUT	Boat OUT	00.15.00
LDWF	Load Wafers	00.01.00
HLDL	Hold to load	00.00.00
BTIN	Boat IN	00.10.00
STB1	TEMP=700	00.20.00
RMPU	Ramp Up TEMP	XX.XX.XX
STB2	Stabilize Temp	00.01.00
DRYO	Dry Oxidation	00.15.00
WETO	Wet Oxidation	YOUR TIME
DRYP	Post Dry Oxidation	00.15.00
ANEL	Anneal 5% O2	00.15.00
RMPD	Ramp Down TEMP	YY.YY.YY
HLD1	Hold for Unload	HOLD
BTOT	Boat OUT	00.10.00
ULWF	Unload Wafers	00.01.00
HLDU	Hold to unload	00.00.00
BIN2	Boat In	00.10.00
ENDP	End Process	00.00.10

Example Dry Ox		
STEP	COMMENT	TIME
STRT	1 ST Step & CRESS login	00.00.10
CRSS	CRESS login Check	00.00.20
BOUT	Boat OUT	00.15.00
LDWF	Load Wafers	00.01.00
HLDL	Hold to load	00.00.00
BTIN	Boat IN	00.10.00
STB1	TEMP=700	00.20.00
RMPU	Ramp Up TEMP	XX.XX.XX
STB2	Stabilize Temp	00.01.00
DRYO	Dry Oxidation	YOUR TIME
ANEL	Anneal 5% O2	00.15.00
RMPD	Ramp Down TEMP	YY.YY.YY
HLD1	Hold for Unload	HOLD
BTOT	Boat OUT	00.10.00
ULWF	Unload Wafers	00.45.00
HLDU	Hold to unload	00.00.00
BIN2	Boat In	00.10.00
ENDP	End Process	00.00.10