

ALD IV (1)

General information

- **ALD IV has no loadlock**
- **Copper, Gold and organics compatible**
- **ALD IV is a thermal ALD system only**
- **Ozone (O₃) available**
- **2 layers available Al₂O₃ and HfO₂**

Al₂O₃ : Chamber: **200 or 250°C (to be set)**

Liquid precursor 2 (TMAI): 40°C by default

Liquid precursor 1 (H₂O): 40°C by default

Depositon rate @ 200°C : xxxx A/cycle

Depositon rate @ 250°C : 1,05 +/- 0,05 A/cycle

HfO₂ : Chamber: **90°C (to be set)**

Hot source precursor 2 (TDMAHf): **80°C (to be set)**

Liquid precursor 1 (H₂O): 40°C by default

Depositon rate : 1.50 +/- 0,05 A/cycle

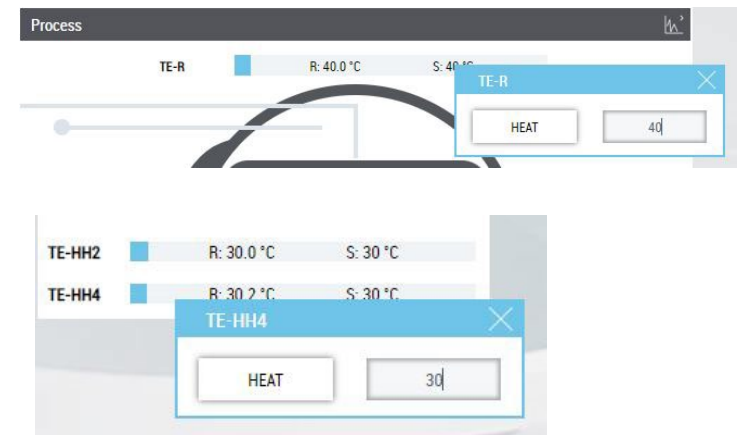
HOW TO USE THE SYSTEM (1)

I. Login / logout

1. Login on the PC zone 4
2. Login on Beneq PC
 - Account : **Process**
 - Password : **process**
3. Click on « Dashboard » to have an overview of the system

Once all your depositions are finished, the equipment come back in idle mode:

1. Set the chamber temperature at 40°C (TE-R)
2. Set the Hot source 2 at 30°C (TE-HH2 & TE-HH4)
3. Pump down the chamber
4. Fill the notebook
5. Log out on the PC zone 4




HOW TO USE THE SYSTEM (2)

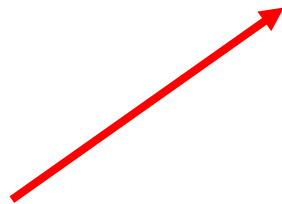
II. Wafer loading (1)

1. From the dashboard, select the mode maintenance

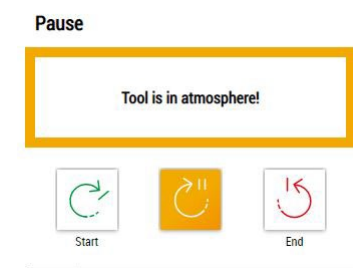
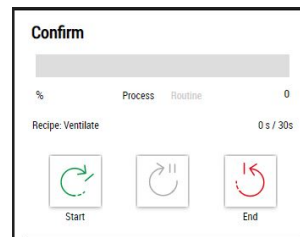


2. Select the recipe « Ventilate » and double click

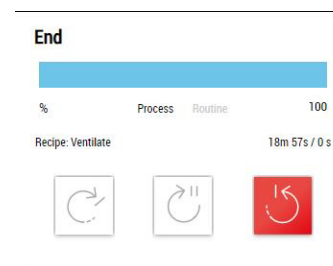
Title	Time
Pumpdown	2024-09-19 12:03:27.931
 Ventilate	2024-09-19 12:03:17.756



3. Press « Start » and wait for the message «Tool is at atmosphere»



4. Release the recipe by pressing « End »

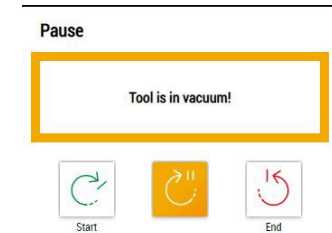
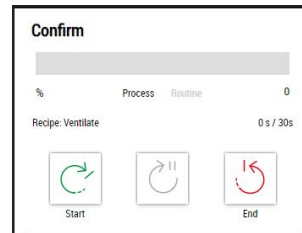
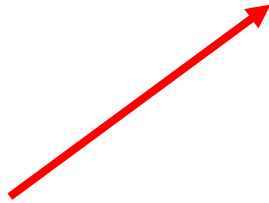


HOW TO USE THE SYSTEM (3)

II. Wafer loading (2)

5. Open the door and load your wafer/samples and close the door

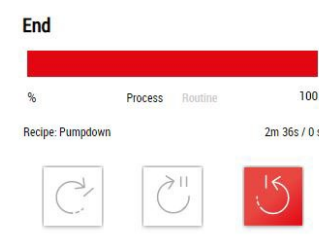
7. Press « Start » and wait for the message «Tool is in vacuum»



6. Select the recipe «Pumpdown» and double click

Release the recipe by pressing « End »

Title	Time
Pumpdown	2024-09-19 12:03:27.931
Ventilate	2024-09-19 12:03:17.756



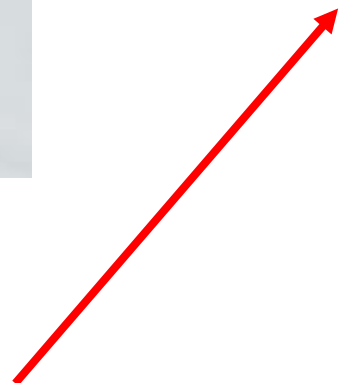
HOW TO USE THE SYSTEM (4)

III. Starting a recipe (1)

1. From the dashboard, select the mode "Production"



2. Select your recipe in the recipe folder on the left and double click to start the recipe



Idle

% Process Routine 0

Title	Time
HfO2-TDMAHf 90C	2025-04-17 16:04:14.323
HfO2-TDMAHf 90C 18nm	2025-04-16 14:17:09.787
HfO2-TDMAHf 90C 10nm	2025-04-16 13:43:52.189
HfO2-TDMAHf 90C	2025-04-16 08:32:58.517
HfO2-TDMAHf 90C	2025-01-15 14:21:49.667
Al2O3 250C (1000 cycles)	2024-12-17 11:20:52.559
Al2O3 200C	2024-09-24 11:31:38.842
Al2O3 03 300C (EXAMPLE)	2024-09-19 13:11:12.993
HfO2-HyALD 250C	2024-09-19 13:10:03.804
Al2O3 250C	2024-09-19 12:58:11.000
Template	2019-12-03 11:01:56.294

ID: 2470 - HfO2-TDMAHf 90C



Confirm

% Process Routine 0

Recipe: HfO2-TDMAHf 90C 0 s / 1h 53m

Start End

```

1 * HfO2 recipe
2 TITLE HfO2-TDMAHf 90C
3 CLASS PROCESS
4
5 * -----
6 * Preparation
7
8 * Close all valves, set nitrogen
9 CLOSE ALL
10
11 WPRES FT-P2 < 20
12 PT-P3 < 2
13
14 OPEN DV-VP1
15 DV-SN1
16
17 FLOW MPC-SN1 600
18 WFLOW MPC-SN1
19
20 * Open hand vavles of needed sou
21 STOP Open hand vavle of n
22
23 * Open lift and set heating valu
24
25 CLOSE DV-L1
26 OPEN DV-L2
27
28 HEAT TE-R 90
29 TE-L1 0
30 TE-L2 40
31 TE-L3 40
32 TE-HH2 80
33 TE-HH4 80
34
35 WHEAT TE-R > 85
36 TE-L1 >=0
37 TE-L2 >=0
38
    
```

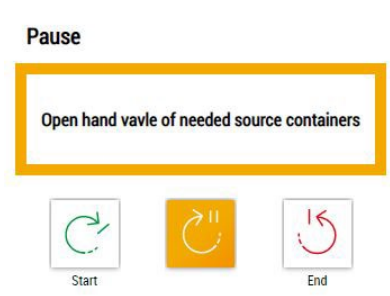
HOW TO USE THE SYSTEM (5)

III. Starting a recipe (2)

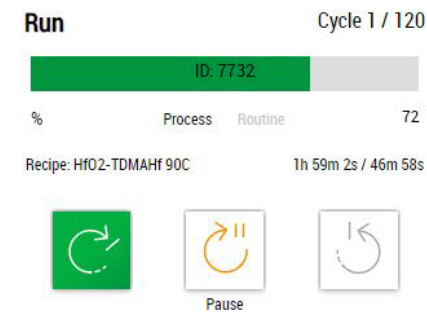
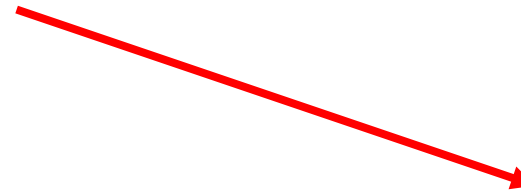
3. Open the precursor hand valves when requested



4. Press "Start" to continue the deposition



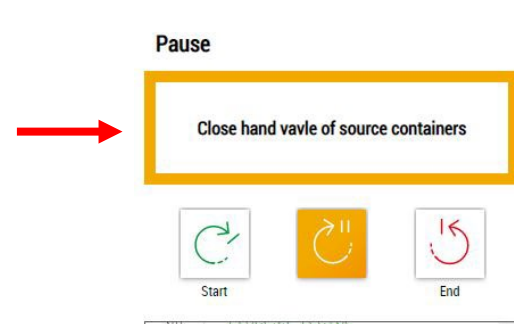
5. Once the cycling start, set the number of pulses you need by clicking on the cycle number and press enter to validate



HOW TO USE THE SYSTEM (6)

III. Starting a recipe (3)

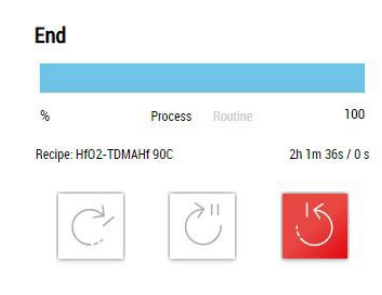
5. At the end of the deposition, close the hand valves when requested



6. Press "Start" to continue the process



7. Release the recipe by pressing « End »



8. Put the system in standby

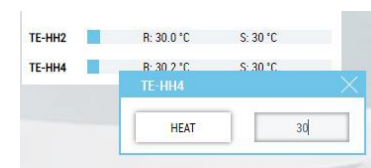
- Set the chamber temperature @ 40°C

(double click on the TE-R line, enter the temperature in the pop window and press heat)



- Set the precursor temperature TDMAHf @ 30°C

(double clic on the TE-HH2 and TE-HH4 lines, enter the temperature in the pop window and press "HEAT")



HOW TO USE THE SYSTEM (7)

Valves setting during deposition

HfO₂ : Open the hand valves of liquid precursor 1 (H₂O) & hot source precursor (TDMAHf)
(Liquid sources cabinet is on the left of the chamber)
(Hot sources cabinet is on the right of the chamber)

Open the cap
of the hot
source



Unscrew the
valve
(2 turns)



Close position



Open position



HOW TO USE THE SYSTEM (8)

Valves setting during deposition

Al_2O_3 : Open the hand valves of liquid precursor 1 (H_2O) & liquid precursor 2 (TMA)
(Liquid sources cabinet is on the left of the chamber)

Turn counter-clockwise to
open the precursor

Close position

Open position

