

Standard Operating Procedure for the YES-310TA HMDS Oven
Version: 1 DEC 2020

1. Utility Requirements

- a. System power is provided by a 208 VAC 20 A wall outlet. A disconnect switch is on the back of the instrument control panel, on the left side near the top.
- b. The HMDS oven currently uses UHP nitrogen cylinders (in the chase behind the tool) for venting and pneumatics.
 - The nitrogen venting supply pressure is set to ~30 psig by the line regulator mounted to the wall next to the cylinders.
 - The pneumatics supply is regulated to 90 - 100 psig by the regulator on the blue panel above the cylinders.
- c. Vacuum is provided by the rotary vane pump in the chase behind the tool. Activated carbon and sodasorb foreline filters remove HMDS and ammonia (a degradation product.) The pump is operated by a rotary timer switch mounted to the table.

2. General Precautions

- a. In an emergency, press the **EMERGENCY STOP** button—located on the left side of the control panel—to stop all processes. If possible, run Program #8 to purge the chamber of residual HMDS after aborting a process. See Section 5 for details.
- b. This vacuum oven uses Hexamethyldisilazane (HMDS) as a process chemical to promote photoresist adhesion to silicon-based substrates. HMDS is a colorless, clear liquid with an ammonia-like odor detectable at low concentration. It is a stable compound when not exposed to air. HMDS reacts slowly with water, but vigorously with alcohol and mineral acids, giving off ammonia. Avoid skin and eye contact when handling HMDS. It is a corrosive and can cause burns to the skin and eyes as well as irritation to the upper respiratory system. A respirator and goggles or a face shield, in addition to normal gowning, should be worn by all personnel handling HMDS.
- c. Alert Adams Nanofab personnel if the HMDS flask is below the REFILL line (about 100 mL.) Do not attempt to fill the flask.
- d. Immediately alert Adams Nanofab personnel and/or KU-EHS (785-864-4089) if an ammonia odor is present.
- e. Immediately alert Adams Nanofab personnel if a major fault is indicated by the red light on the light tower. Take note of any warning messages on the screen. It is okay to silence the alarm.
- f. The yellow light on the light tower will illuminate at the end of each recipe. This is normal and does not indicate an error or fault.
- g. The oven should be set to 150 °C. Do not adjust the oven temperature without notifying Adams Nanofab personnel.
- h. Do not touch the cassette(s) at the end of a process. They will be very hot. Use the provided handle to remove hot cassettes.

3. General Information

- a. Enter your information in the provided log book.
- b. HMDS monolayer coatings will remain functional for at least two weeks, depending on storage conditions.
- c. The HMDS deposition recipe includes three dehydration steps prior to deposition.
- d. Substrates must be clean and free of contaminants prior to processing.
- e. While capable, the YES-310TA is not currently configured for image reversal processes.

4. Putting a Substrate in the Chamber for Dehydration or HMDS Deposition

- a. Start the vacuum pump using the rotary timer switch mounted to the table leg.
- b. Load your clean wafer(s) into the provided stainless steel cassette(s).
- c. Open the door and place the loaded cassette(s) inside. Close the door.
- d. Select your Process Recipe from the table below

Process Number:	Description:	Total Duration:
1	HMDS Deposition (P-type)	31 min.
2	HMDS Deposition (N-type)	36 min.
4	30 min. Vacuum Bake (no N2)	45 min.

NOTE: Wafers sold by the KUNF are P-type.

- e. Enter the appropriate recipe number to start the process.
 - Press **Enter Recipe Number** on the touch screen operator panel.
 - Press the number for your corresponding recipe, then **ENT**.
 - Press **Press To Start**.
- f. Once the process is complete and the chamber has reached atmospheric pressure, press **Press To Reset** to close all valves.



The cassette(s) will be very hot! Do not touch them with gloved hands, as the gloves may fuse to your skin!



- g. Open the door and remove the cassette(s) using the provided handle. Close the door. Wait several minutes for the cassette(s) to cool.
- h. Turn off the vacuum pump using the switch mounted to the table leg.



If the HMDS deposition process was aborted, leave the vacuum pump on and reset the instrument to an idle state. **DO NOT OPEN THE DOOR!** Run **Process #8** to purge the chamber of residual HMDS with nitrogen. Contact Adams Nanofab personnel if assistance is desired.

