

1.0 F300S Ultraviolet Flood Exposure System

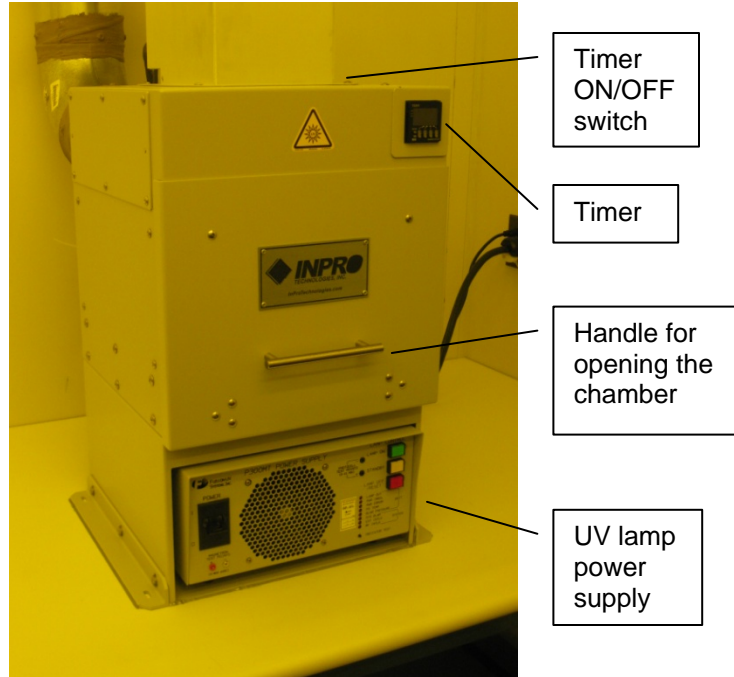


Figure 1: F300S Ultraviolet Flood Exposure System.

1.1 Introduction

F300S is a UV exposure system designed to expose wafers up to 6" in diameter that are coated with photoresist. Approval from staff is required to use any other samples in this system. Samples are loaded on a horizontal shelf that has seven vertical positions (1" apart); the higher the shelf is, the higher is the UV intensity but poorer the uniformity over the surface. The intensity values are given in the appendix. The chamber interior is divided into two sections via quartz window to separate lamp cooling air from part irradiation zone. The system uses electrodeless lamp that is powered by microwave energy. An RF detector shuts down the system if microwave energy is in excess of permissible level in the work environment.

Only trained and approved (qualified) users may use this tool.

1.2. Features and Specifications:

- a) Designed to accommodate wafers up to 6" in diameter.
- b) Timer to control the exposure time
- c) Seven shelf positions, 1 inch apart
- d) UV Mercury Electrodeless Lamp
- e) Chamber door interlock
- f) RF detector

1.3 Applicable Documents

- a) F300S Installation, operation, and maintenance manual
Hardcopy located at the tool.

1.4 Safety

- UV light present that can cause eye and skin damage. Do not bypass the interlocks or open panels. Do not look at it when it is on.
- RF radiation present in this tool. Do not open panels
- High voltages present. Do not touch any cable connections. Do not open any panels.

1.5 Operating Procedure



Figure 2: Power supply for the UV lamp.

1.5.1 Startup

- Activate the equipment in FOM.
- Turn the timer on. Its ON/OFF switch is on the back of the system on the same corner as the timer (Figure 1). This will light up the timer.
- Turn the power on for the UV power supply using the black POWER switch on the left (Figure 2). The red button (on the right) will light up.
- Press the yellow STANDBY button. It will blink several times. Wait until it lights up solid.
- Press the green LAMP ON button after the yellow button is lit solid. It won't light up or turn the UV light lamp on.

1.5.2 Setting the Exposure Time

- Adjust the exposure time by using buttons 1, 2, 3, and 4 as shown in Figure 3. It can be adjusted up to a tenth of a second.

1.5.3 Loading Samples and Exposure

- Open the chamber by pulling on the handle marked in Figure 1. If you pull the handle all the way, you will see the time that you just adjusted and that is displayed in green would also show up on bigger red display (Figure 3).
- Adjust the shelf height if necessary as described in section 1.5.6.
- Place your wafer centered between the marks on the shelf (Figure 4).

- d) Close the chamber gently. The green button will blink several times before lighting up solid and exposure will begin. You will see the timer counting down. As it reaches zero, the exposure will stop and the green button light will go off.
- e) If exposure does not start after closing the door, RST button (Figure 3) can also be pressed to start it.



Figure 3: Exposure timer.

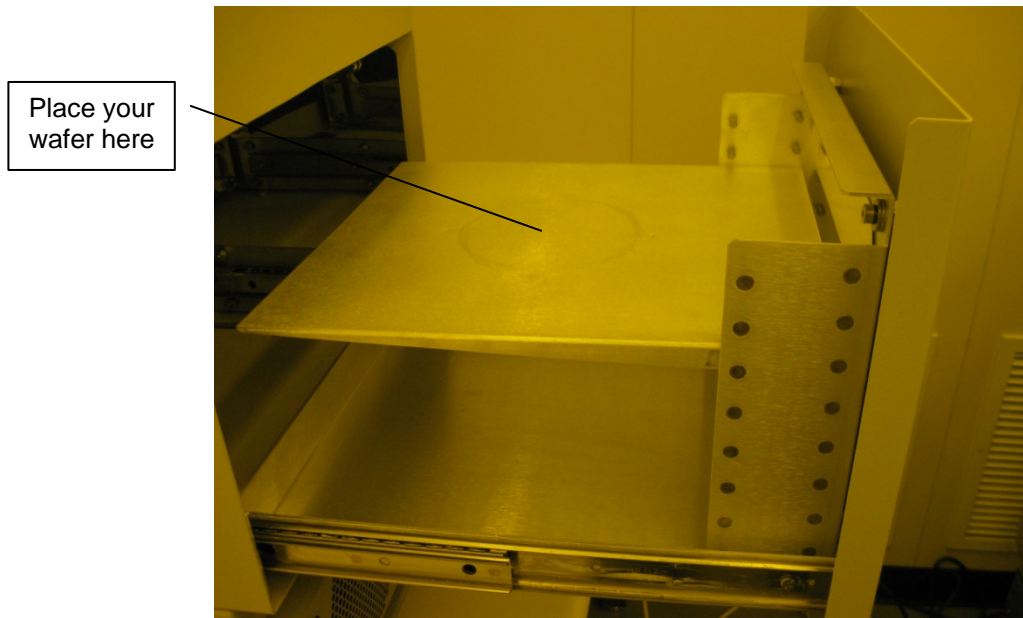


Figure 4: Open chamber.

1.5.4 Unloading

- a) When the lamp turns off and the timer goes to zero, the chamber can be opened and the sample removed. If we are not loading another sample, the door should not be pulled all the way. This way, the timer won't reset to the set time and exposure won't start after closing the door.
- b) Close the chamber door gently.

1.5.5 Shutdown

- a) Press yellow STANDBY button (Figure 2). It will stay lit.
- b) Press the red LAMP OFF/RESET button (Figure 2). The yellow STANDBY button will go off.
- c) Turn the black POWER switch (Figure 2) off.
- d) Turn the timer off. Its ON/OFF switch is on the back of the system on the same corner as the timer (Figure 1).
- e) Provide required information and deactivate the equipment in FOM.

1.5.6 Adjusting Shelf Height

The shelf has seven positions that are 1 inch apart. The higher the shelf is the higher is the UV light intensity but the light uniformity is worse. The best uniformity of $\pm 15\%$ over entire shelf surface is achieved at the lowest shelf position. The light intensity at the center of the shelf for different shelf heights is given in Figure 5 with no screen and 25% open screen. Currently, 25% open screen is installed.

Follow this procedure to change the shelf height.

- a) Open the chamber by pulling on the handle marked in Figure 1.
- b) Note that the shelf has two notches on each side marked 1 and 2 in Figure 5.
- c) Lift the shelf a little to release notch 1 and pull it straight out towards the chamber until it is clear of both columns of pins. Now it can be removed. Note the both columns of pins are not aligned.
- d) Select the new height and insert the shelf between the two pins on the left column.
- e) Push the shelf all the way in until notch 2 is engaged. Then lower the shelf slightly to rest the notch 1 on the left pins.

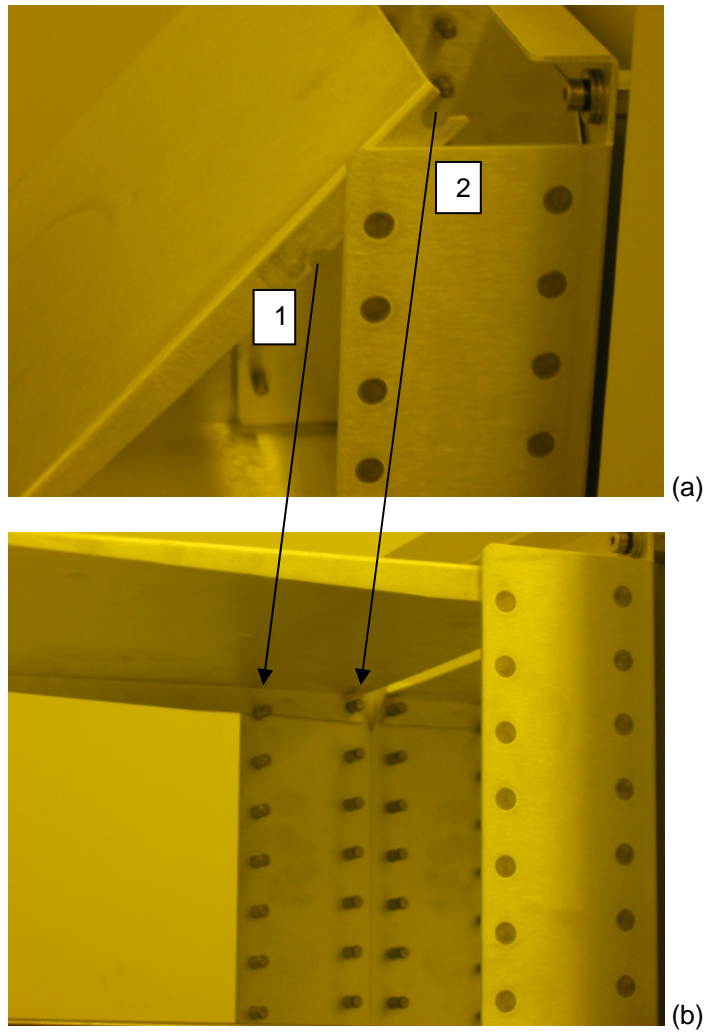


Figure 5: Shelf height adjustment. In (a) shelf is placed tilted for illustration only.

APPENDIX

UV intensity values at different shelf heights.

Distance from bottom of Quartz Window	No Screen			
	UVA (320-390nm) mw/cm2	UVB (280-320nm) mw/cm2	UVC (260-2700nm) mw/cm2	UVV (390-445nm) mw/cm2
2.0"	745	1052	157	811
5.0'	380	446	71	433
8.0"	344	241	39	401
10.5"	240	151	24	276

Distance from bottom of Quartz Window	25% Open Area Screen			
	UVA (320-390nm) mw/cm2	UVB (280-320nm) mw/cm2	UVC (260-2700nm) mw/cm2	UVV (390-445nm) mw/cm2
2.0"	426	341	52	473
5.0'	153	165	25	174
8.0"	110	79	12	130
10.5"	75	48	8	89