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EV 620 Bond Aligner

Equipment Standard Operating Procedure

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1. **Purpose**
   1.1. This tool is used for the ailment of substrates prior to bonding on the EV501 bonder.

2. **Reference Documents**
   2.1. EV 620 Mask Aligner operator manual
   2.2. EV 620 Mask aligner maintance manual

3. **Equipment**
   3.1. Tweezers
   3.2. Log Book

4. **Materials**
   4.1. 4 inch substrates
   4.2. 5 inch mask plates

5. **Protective Equipment**
   5.1. Eye Protection: safety glasses must be worn at all times.
   5.2. Hand Protection: latex-free gloves.

6. **Engineering and/or Administrative Controls**
   6.1. The EV 620 is located in the Lithography room.
   6.2. The tool owner and check off person is Greg Allion, gallion@eecs.umich.edu
   6.3. Only authorized user may operate this piece of equipment.

6.4. This tool must be reserved in advance for use. The tool can be reserved using the scheduler. Failure to use the scheduler may forfeit your lithography privileges.
6.4.1. If you sign up for a time slot and cannot make it, then be considerate and remove your name from the scheduler.
6.4.2. If you are 15 minutes late for your time slot, you can lose that time slot to someone else.

7. **Procedure**
7.1. Ensure that no one is using the tool.
7.2. If you are 15 minutes late for your time slot, it may be forfeited.
7.3. Do not go over the time you allocated for yourself.
7.4. Always remember to complete the logbook.
7.5. Substrate material (except silicon)
7.5.1.1.You must clean the wafer chuck after use.
7.5.1.1.1. Clean chuck by wiping with IPA and N2 dry.
7.5.1.1.2. Wipe chuck until the clean room wipe shows no discoloration.
7.6. Mercury Arc Lamp
7.6.1. The lamp operates in constant intensity mode.
7.6.2. The intensity of the lamp is calibrated to 20mJ, 405nm.
7.6.3. During exposure, do not look at the ultra violet light; it can be harmful to your eyes over time.
7.6.4. The wavelength is 365nm and 405nm and is 10mW/cm^2, 365nm and 20mW/cm^2, 405 nm total dose equals 30mJ/s.
7.6.5. If the lamp should break, avoid picking up glass debris; call the on-call number.
7.6.6. Microscope movement
7.6.6.1.Y-Direction
7.6.6.1.1. Move joystick in front or back direction.
7.6.6.1.2. If topside is selected, the whole optic moves forward or backward.
7.6.6.1.3. If bottom side is selected, the corresponding objective moves in the Y direction.
7.6.6.2.X-Direction
7.6.6.2.1. Move joystick in left or right direction.
7.6.6.2.2. With top as well as bottom microscope selected, the corresponding objective moves in the x direction.
7.6.6.3.Z-Direction
7.6.6.3.1. Turn the joystick clockwise or counterclockwise to move the optic in Z-direction (focusing) or the stage in the theta direction.
7.7. Start Up
7.7.1. Turn on key switch.
7.7.2. The ultraviolet lamp power supply should always be on.
7.7.3. Ensure micrometers are in the default position, 5.0
7.7.4. Log on using keyboard located inside front pull down panel.
7.8. Follow instruction on LCD display.

7.9. Set up Bonding tool

7.9.1. Start up is the same.

7.9.2. Move <tray out>

7.9.3. Change to bonding chuck.

7.9.3.1. Carefully remove vacuum line.

7.9.3.2. Remove chuck and replace with bonding chuck.

7.9.3.3. Lift chuck out of frame.

7.9.3.4. Replace vacuum line.

7.9.4. Change mask holder to bond frame tool.

7.9.4.1. Carefully remove mask frame.

7.9.4.2. Double click on the process you want (Si-Gi bond or Si-Si bond)

7.9.5. Click run.

7.9.6. Save changes? Select NO

7.9.7. <Start>, initialization will begin.

7.9.8. >Insert Bond tool>

7.9.8.1. Insert bond tool into holder, ensure writing is facing up and towards you.

7.9.8.2. Press <continue>

7.9.9. Load the first wafer

7.9.9.1. Load bond glass and the first wafer on the chuck using the ruler.

7.9.9.1.1. Position bond glass with the writing up and to the right.

7.9.9.1.2. Load first wafer on the bond glass with the structure side down.

7.9.9.1.3. Position them against the ruler, with the wafer flat to the right.

7.9.9.2. Press <continue>

7.9.9.2.1. Ensure that the vacuum is holding.

7.9.9.2.2. Remember to remove the ruler!

7.9.9.3. Move <tray in>

7.9.9.3.1. Ensure that the flags are out.

7.9.9.4. <Please wait>

7.9.9.5. <Adjust microscope>

7.9.9.5.1. Use the micrometer spindles to center the bond glass.

7.9.9.5.2. Press scan optic in the position menu and you can move the microscope using the joystick.

7.9.9.5.3. Press <continue> when the target has been found and focused.

7.9.9.6. <Adjust crosshair/Adjust overlay>

7.9.9.6.1. Move the crosshair using the trackball.

7.9.9.6.2. Move the cursor with the trackball to a crosshair, then press the left button and you can move the cross hair.

7.9.9.6.3. For overlay, you can freeze a stored picture of the alignment marks of the mask.

7.9.9.7.Press <continue>.

7.9.9.8.<Please wait>.

7.9.9.9.Move <tray out>

7.9.10. Load second wafer

7.9.10.1. Load bottom wafer on the bond glass with ruler (structure side up).

7.9.10.2. Position them with the flat against the ruler and to the right.

7.9.10.3. Press <continue> to activate the vacuum. Check the vacuum.

7.9.10.4. Remove the ruler!

7.9.10.5. Move <tray in >.

7.9.10.6. <Preadjust substrate>.

7.9.10.6.1. Use the micrometer to center the bond glass.

7.9.10.7. Press <continue>.

7.9.10.8. <Insert separation flags>.

7.9.10.9. Press <continue>.

7.9.10.10. <Adjust stage> and press continue or sep/con to move into contact.

7.9.10.11. Align second wafer using the micrometer.

7.9.10.12. <Clamp wafer>.

7.9.10.13. Press <continue>.

7.9.10.14. <Remove bond tool>

7.9.10.14.1. The entire bond tool can be removed and transported carefully to the 501 bonder.

7.9.10.15. Press <continue>.

7.9.11. Move <tray out>

7.9.12. <Press continue or exit>

7.9.12.1. Pressing continue will start the process again.

7.9.12.2. Pressing exit will exit the process.

7.9.13. < End of process>

7.9.14. Shut down

7.9.14.1. Change chuck back to the standard alignment chuck.

7.9.14.2. Carefully lift out bond tool frame and replace mask holder.

7.9.14.3. Select “park”. Move tray in? Click YES and move tray in.

7.10. Trouble Shooting

7.10.1. Call tool owner.

8. **Waste Products**

8.1. N/A

- **Report all accidents (injuries, spills, fires) to the SSEL/MNF On Call or other SSEL/MNF staff. For emergencies during non-business hours, call the**

SSE/MNFL Emergency Response Team at (734) 764-4127 or Department of Public Safety at (734) 763-1131.