

Ev1

STANDARD OPERATING PROCEDURE

CORAL

Name: *ev1*

Model: Electronic Visions Model EV620 Mask Aligner

Number:

Location: TRL

What it does: mask aligner

Introduction: The EV620 aligner is a precision mask alignment and expose system, incorporating conventional as well as back-to-front alignment capabilities. The optical system employs a splitfield revolving microscope with 5x, 10x, and 20x top-side objectives, and 10x bottom-side objectives, with joystick position and focus control.

The exposure system uses a 350-watt high pressure mercury lamp and has an exposure controller with 3 channels (constant power, or constant intensity(CI) 1 or 2); the wavelengths are 365-405 nm. We always use CI 1, set at 10mW/cm²/sec.

Mask sizes, including 7" masks for 6" wafers, 5" masks for 4" wafers, and a small pieces chuck are provided, and the chucks are available in both MTL's "Au" and "CMOS" contamination control standards.

Multiple mask-wafer contact modes are supported, and alignment accuracy on smooth wafers with a good mask design should be about 1u on the frontside, and 2u's on the backside. For backside alignment, we recommend you confirm alignment accuracy with a tool like the TBM-8.

Safety: The system employs a high-pressure mercury lamp. This lamp is to be changed only by an MTL staff member. If a catastrophic failure of the lamp should occur, avoid touching glass debris or inhaling mercury vapor fumes. Notify a staff member at once.

The UV light produced by the lamp can cause erythema of the skin (similar to sunburn), conjunctivitis and possible retinal burn that could result in blindness. Though the operator is protected from direct exposure to UV light it is recommended that the operator does not look at the mask/wafer assembly at the time of the exposure; indirect UV light may also harm the eye retina.

Broken wafers also represent a potential eye hazard. Wear safety goggles/glasses when Using the aligner and when removing wafer pieces from the equipment.

- Procedure:
1. Check Equipment Reservations in CORAL to insure that you reserved the correct machine in the correct facility for the correct date. Another user may have reservations; it is your responsibility to honor them, if this is the case.
 2. Use the "Engage" command in CORAL for the equipment that you are about to use; use this command BEFORE you start the operation. Insure that the correct facility is set (TRL) and that your lot name is entered correctly. Enter the quantity of wafers that you are processing in the comment field.
 3. Never turn off the RED "Power" switch except in an emergency. If this is turned off, notify staff to re-start the machine.
 4. Turn on the power switch of the PC if it is not already on, then double-click the icon "EV620"
 5. Click "login" and enter login name and password. For login and password, use "guest"
 6. When you log in the aligner goes through an initialization procedure.

7. After the initialization is complete, open a recipe window such as the one pictured here.

At this point you can set the process parameters in the recipe window.

Mask size:

Input as appropriate

Exposure time:

Approximately, you may have to optimize some:

1 micron OCG 825-20 resist 1.5 - 3 sec. exposure

10 microns AZ 4620 resist 15 - 30 sec. exposure

1.5 microns AZ 5214 resist 1.5 - 3 sec. initial exposure, 1 - 2 min. flood exposure

Contact mode:

Depends on required reproduction accuracy required. In increasing levels of resolution and wafer-mask contact force: proximity, soft contact, hard contact, vacuum contact, and vac+hard contact. Choose process appropriate mode.

Process mode:

Transparent for top-side alignment

Crosshair for bottom-side alignment

Flood for image reversal flood exposure

Exposure mode:

Continuous, normal mode

Interval for exposures over 20 sec, which can be broken up into 2 or more intervals, with a cool down time between exposures to prevent the resist from bubbling.

Separation distance:

Depends on wafer surface smoothness. If rough surface, thick resist, try 50u+ separation, but on smooth wafers with thin resist, use less, maybe 25u, for better alignment accuracy. This can be changed during the alignment phase, if needed.

After you have set the process parameters click on "Run", and follow screen prompts.

Alternate masks and chucks are kept in slotted holders by the machine. Leave the tooling used in place at the end of a run.

Note the joystick has multiple functions, including focus, by rotating the knob, and of x and y mask alignment for both the left and right optic, by choosing L or R. The joystick has a two-stage sensor, for slow movement, angle 2-5 degrees, and fast at 5-10 degrees; if you "tap" the joystick, you will go immediately to the fast setting and get large, irregular movements. Note: the joystick in the frontside y-direction moves both left and right optics together, so you will need to correct for "theta" with the micrometer.

Wafer stage movement, for alignment of the wafer to the mask, is controlled by mechanical micrometers, in x, y and theta, and is done after the mask has been loaded, and aligned.

When you have finished exposing your wafers click "Undo" to unload your mask. After you unload your mask, click "Exit" to return to the main window. "Park" the tray when you are done Using the machine to protect it from being bumped. Leave the machine "on" and do not exit the program.