

SUSS SB6E BONDER SOP

Revised May 2020

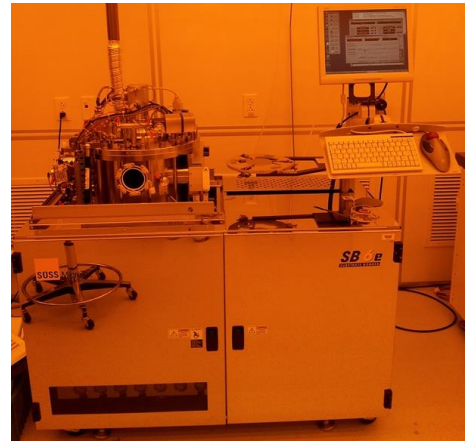
The SUSS SB6 bonder is capable of anodic, silicon fusion and eutectic bonding. There are two separate heads; one for anodic bonding and another for fusion bonding.

Anodic head

This head has two (2) electrodes and can go up to 2000 volts.

Fusion head

This head is used for fusion and eutectic bonding that has a membrane that applies up to 3 bar of pressure.



Startup Procedure

1. Log into FOM.
2. Open the lower chrome panel door on the right and the small black panel. Push the momentary switch to turn on the computer.
3. When prompted press the green **START** button under the keyboard.
4. Click on the **SB6e icon** and wait approximately 2 minutes for the system to come online. Click on **Login** in the navigation bar and select **Customer Master**. There is no password to enter.

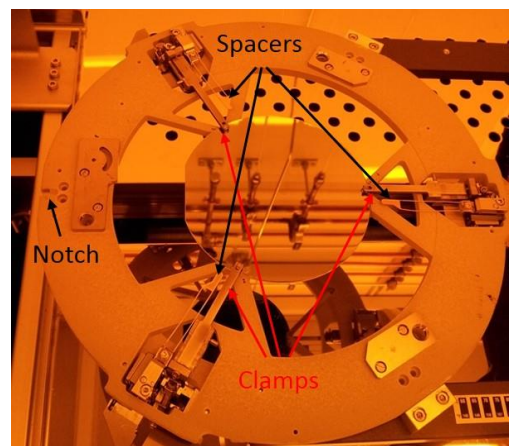
Downloading a Recipe

1. Click the **Control Center** icon.
2. Click on **DONWLOAD RECIPE** and a recipe window will open.
3. Browse through the recipes and select the appropriate recipe for your process. Click **OPEN**. The recipe has to be verified prior to running the recipe. This is described in Recipe section.

Loading Samples

1. Prepare your wafers and place them in the fixture per the image. Wafers can be loaded into the fixture by two methods.

Method 1: The first method is to load both wafers that do not require alignment or alignment that has large features and can be performed by hand. Place the first wafer with the face to be bonded facing up with the flat of the wafer towards the notch. Place the second wafer with the face to be bonded facing down on the second wafer. Align by the two wafers



by sight. Push clamps onto the wafers to hold them in place. For anodic bonding, the borofloat glass wafer must be placed on top of the silicon.

Method 2: The Suss mask aligner sitting next to the bonder can align 2 silicon wafers that have exterior alignment marks (the aligner does not have IR capabilities), 2 glass wafers or a silicon and a glass wafer using the bonder's fixture. See the MNTC staff for this operation.

2. Carefully place the fixture with the clamped wafers into the mechanical slide. The notch on the fixture should point towards the process chamber.
3. Click **PREPARE** in the control window.
4. Wait until the chamber door opens and push the load arm into the chamber when prompted.
5. Click **MOVE** in the Control window and wait until the fixture is lifted from the loading slide.
6. When prompted verify the fixture has been lifted from the loading arm. Pull the loading arm from the process chamber and click **FINISH** in the control center window.
7. Click **RUN** in the Control Center window to run the recipe.

Monitoring the Process

1. Click on the **STATUS** icon in the navigation bar to bring up the status window.
2. In this window, chuck temperature, chamber pressure, voltage, current, etc. are monitored and continually updated. Choose **Show** in the lower right corner to display plots of various parameters.

NOTE: If you need to abort a process due to a system malfunction, do not use the Abort command on the control center window. Click **PAUSE** and **SKIP** through each of the remaining steps to the end of the recipe.

3. A data file is automatically generated after execution of a recipe. This file can be reviewed from **Data** icon on the navigation bar and is only available after the process is finished.

Creating / Editing a Recipe

1. To create/review a recipe, click on the **RECIPE** icon located in the navigation bar.
2. Select a recipe and click **EDIT** in the upper right corner. For a new recipe click **NEW**. This brings up a separate recipe edit screen. A typical recipe follows the order below.
 - a. Bring the electrodes in contact with the wafers and apply pressure.
 - b. Removing clamps and spacers.
 - c. The bonding process per recipe parameters.
 - d. Remove the electrodes and move fixture into position to be unloaded.
 - e. Cool the wafers to 200°C and return the chamber pressure to ambient conditions.

NOTE: The chamber door will not open if the tool temperature is above 200°C or if the chamber pressure is not near atmospheric pressure.

Each of the steps can be edited by clicking on the desired parameter (i.e. pressure, temperature, etc.). If the user wishes to change the temperature for a specific step double click on the set point temperature and temperature edit window will open. The user can set the temperature, tolerance, and ramp time. After changing the parameters, click **OK** to save. Click **NEXT ALL** to apply the settings to subsequent steps.

An alarm time must be set for each recipe step. This is the amount of time the machine has to reach the specified parameters before aborting the process. The alarm time must be longer than any ramp time in that particular step. For example, if a certain step calls for an increase to 500°C with a ramp time of 90 minutes, the alarm time must be at least 91 minutes.

The recipe will proceed to the next step when the parameters have been met within the specified tolerances. If the user desires the recipe to hold at a particular step, a wait time must be entered.

3. When finished editing the recipe, click **CHECK** in the upper right corner of the recipe edit window. The software will identify any errors or warnings that must be corrected before the recipe will run correctly.
4. When all errors have been corrected, press **RECIPE** to return to the main recipe window. Choose either **SAVE** for an edited recipe or **SAVE AS** for a new recipe. Once it has been saved, this recipe can now be loaded in the control center window.

Recipe Writing Tips

- Specify an alarm time at least 30 minutes longer than the anticipated time needed to complete the step. (Up to 1-2 hours longer for warm-up and cool-down steps.)
- The machine will attempt to complete the step in the specified time, but occasionally this is not possible. For example, a 300°C cool-down will take more than an hour, even if the ramp time is set at 15 minutes. Make sure ample ramp time is given for large pressure and temperature increases. Going from 500 to 5000 mbar with no ramp is likely to break the sample—do this over a few minutes instead.

Unload and Shutdown Procedure

1. Wait for the chamber to cool down to 100°C (This setting can be written into the recipe).
2. Click **PREPARE** in the control center window to initiate the unloading process.
3. Push the load into the process chamber.
4. Click **MOVE** to lower the fixture onto the load arm.
5. When prompted verify the fixture is sitting on the load arm. Move the load arm out of the chamber.
6. Click **FINISH** to close the chamber door. The machine will return to its idle state.
7. Choose **LOGOUT** and **EXIT** on the navigation bar.
8. Shut down the computer. This is an older operating system and it will ask you if it is ok to shut down. Click **YES**. When prompted that it is safe to turn off the computer, press the red **STOP** button on the console and turn the main switch to the **OFF** position.
9. Log out from the tool in your FOM account.