

# Operating Procedure for Vega SEM

A video recording of the procedure is on the Vega instrument page on MIC website: <https://microscopy.tamu.edu/instrument/tescan-vega-sem/>

## Prior to Loading Sample

- Start the Kiosk session, fill in the log sheet
- Login into Tescan software. The software should be running already. If the previous user exited the software, make a note in the log book, they will be re-educated.
- Check vacuum status on the vacuum panel. Make sure that the **Gun Pressure, Column Pressure** and **Chamber Pressure** are showing green and read “vacuum ready.”

## Loading Sample

- Open the Nitrogen cylinder main valve. Do NOT adjust the regulator.
- Click **VENT** on the vacuum panel and wait for the chamber to reach atmospheric pressure, then close the nitrogen cylinder valve.
- Wear gloves if you need to touch anything going into the specimen chamber and open the chamber door slowly.
- Insert sample stubs and secure them by gently tightening the Allen screw in the stage.
- Close the chamber door **slowly**.
- Click **PUMP** in the vacuum panel. Press on the door (top left side) to get a seal, until a red Chamber vacuum bar appears on the screen, then you may let go of the door. Wait until the vacuum reader bar turns green and the “vacuum ready” message appears.

## Getting Started with Electron Beam (SEM)

- a. Turn on the chamber camera (icon in the main toolbar)
- b. If you do not see the stage controls, click on the “**Stage Control**” icon in the main toolbar to open the stage control window.
- c. Click the “<<” on the **Stage Control** window to display the stage carousel and Faraday’s cups
- d. Select one of factory preset accelerating voltages on the **Electron beam** panel (2, 5, 10, 20), then set the desired voltage within this range.
- e. Click **BEAM ON** to turn on the electron beam.



### Getting an SEM Image

- a. The Stage Control should show the stage Z position around 85 mm (= far enough to be safe).
- b. Locate your sample (click on the corresponding carousel position)
- c. Right click the mouse and select **Minimum Magnification**.
- d. Right-click the live window and select "Auto Brightness/Contrast".
- e. Find the tallest feature on the sample and bring it to center (use joystick or click with the middle mouse button). Increase magnification and focus on the tallest part of the sample. You should be in the RESOLUTION mode.
- f. The WD&Z in the stage control shows the focal distance of the beam.
- g. In **Stage control**, set WD&Z to 25mm to move stage to 25mm working distance. **Be ready to stop the movement** in case your focus was incorrect. If you hit the column or the detectors with your sample, it may be an expensive repair.
- h. Turning the mouse wheel changes the scanning speed (fast scan for quick response, slower scan for less noise)
- i. Set up the parameters for scanning and image: go to SEM Menu and select **Image Parameters**, set the window size, pixel resolution, desired averaging mode, etc. Go to Options Menu and select **Autosave**, set path and file name for image files.
- j. Find your feature, adjust magnification and fine tune the focus.
- k. For higher resolution, you may go to smaller WD&Z (15, or even 10 mm). Be very careful not to run into the column with your sample.
- l. Go to higher magnification, say 2k x, check for image shift as you go through focus.
- m. If there is image shift, Click the **Manual Column Centering** button. Follow the wizard to correct the image shifting.
- n. Recheck focus and if you then see there is astigmatism, correct it by clicking on **STIG** on the SEM floating window and use the L & R knobs on the control panel
- o. Acquire and save images.

### When Finished

- a. Move the stage to home position (WD&Z = 85 mm)
- b. Turn the beam off by clicking the **HV** button on the Electron Beam panel
- c. Open the Nitrogen cylinder valve, Vent the chamber, then close the nitrogen gas valve again
- d. Remove samples
- e. PUMP the chamber. Wait until you see that the vacuum is improving.
- f. **Do not exit the software completely, just log off.**
- g. Copy your files and tidy up.
- h. Write the end time in the log book, stop the kiosk session