1 **Description**

The JSM-6610LV is a scanning electron microscope (SEM) comprised of a tungsten electron column and an Oxford Instruments Inca X-Act EDS. It can image and analyze a wide range of conducting and non-conducting samples, as well as provide compositional information using the EDS.

2 **Safety**

   a  Must be a qualified user who has taken the short course and the follow-up with an NFC instructor before operating the machine independently.

3 **Restrictions/Requirements**

   b  Must be a qualified user who has taken the short course and the follow-up with an NFC instructor before operating the machine independently.
4 Required Facilities
a 240 VAC, 30 amps  
b 10 psi nitrogen

5 Definitions
a Working Distance (WD) — physical distance between the sample surface and the pole piece of the e-beam column.  
b Focused Working Distance (FWD or ‘WD’ on Data Bar) — working distance as determined by the electron optics of the column. This value is displayed on the data bar of the image. This value changes as one adjusts the focus knob.

6 Setup
a) Enable system in Coral.  
b) On left computer screen, log into User Acct, password nfc-123.  
c) Click on SEM Main Menu icon on left computer screen.  
d) On right computer screen, log into Inca Operator, password _____ (blank).  
e) Click on Inca icon on right computer screen.  
f) Vent the chamber

1. Click Sample Setting in the Operation menu tub.

2. Click the Removing the specimen button.

3. Click the VENT button.

4. The pressure in the specimen chamber becomes atmospheric pressure in 50 seconds. After the light of the VENT button turns ON, the stage can be opened to remove the specimen holder.

g) Setting the specimen.

1. Click the Setting button.

2. Select the specimen holder used, and click the Selection button (usually Φ51).

3. In case the specimen is protruding, make sure to input the Protruding height in the dialog box.

4. Set the specimen holder onto the specimen stage. Flat side toward back of chamber.
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5. Close chamber door and latch.

i) Choose a recipe.

   1. Click the **Recipe** tab.

   2. From the displayed list of **Standard** recipe, select a recipe applicable to the sample.

   If you are not sure which recipe is applicable to the sample to be observed, select **Universal**. The standard observation conditions will be set.

   3. The operation navigation is changed to the setup observation condition menu.

   4. Set observation conditions according to the questions you will be asked.

   If the specimen is not electrically conductive, not coated and High Vacuum is being selected, Acc. voltage is automatically set at 1kV. Under this condition EDS analysis question becomes grayed out, because the amount of signals for EDS analysis is insufficient.

   5. Click the **OK** button. The observation condition will be set.

j. Evacuate the specimen chamber.

   1. Go back to the **Sample Setting** tab.

   2. Click the **Evacuating the Chamber** button.

   3. Close the specimen chamber, and click the **EVAC** button. Evacuation in the specimen chamber will start.

k. Click the **Navigation** button.

   1. Click the **Snap** (or **SNS Capture**) button to capture the image.
m. After the ‘HT Wait’ icon turns disappears, and the HT Off icon appears you can start image observation, but it is better to wait 2 min. as this will improve the vacuum and extend the life of the filament.

7 Operating Instructions

a. Click the HT icon to get HT ON.

b. Click on the Stage tab.

c. Double left click on your sample in the captured photo (may have to use SNS Switch). Set T = 0 if T is still at -10°.

d. Minimize the user interface application window (upper right corner of screen).

e. Double left click on IR Camera icon.

f. Maximize user interface application window.

g. Drag user interface application window up slightly so desktop tray can be viewed.

h. Single left click on Z.

i. Set Z = desired working distance (10 mm recommended first. Can reduce Z later when it is determined to be safe.)

k. Double left click on WD. Set to 10 mm for proper focus.

l. Click the ACB the AF icons to observe the image.

m. Double-click the left mouse button at any position in main screen. The double-clicked position moves to the center of the screen.
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8 Shut Down Instructions

a. Set Tilt = 0, Rotation = 0, X = Any, Y = Any

b. Double left click on Z.

c. Set Z to 80 mm.

d. Click the HT icon to get HT OFF.

e. Click on the Vent icon.

f. Open door when vented.

g. Remove holder with fork.

h. Remove sample(s) from holder.

i. Leave holder on table.

j. Close chamber door and latch.
20k. Click on **EVAC**.

1. You can leave SEM user interface open.

m. If Inca EDS computer was used (right-side computer), close Inca user interface application (upper right corner of window).