

Berkeley Lab Materials Sciences Division

TEM (JEM 2100) driver's license checklist

To be administered by a supervisor / superuser : \_\_\_\_\_

1. Safety:

Understand emergency shut down procedure	
Know emergency contact numbers	
Know where Liquid N <sub>2</sub> protective equipment is	

2. Prepare the TEM for your session.

Check vacuum IGP/SIP readings ( $< 2.5 \times 10^{-5}$ Pa)	
Demonstrate working knowledge of vacuum diagram	

3. Start HT with normal HT conditioning process.

Turn HT on and wait until it ramps up to 180kV	
Start AUTO HT by ramping HT up to 200kV at 0.1kV/1sec	

4. Fill up LN<sub>2</sub> in ACD

Check screen covered	
Wear protective gear (goggles, mask, gloves) refill every 3-4 hours	

5. Load specimen in holder

Place holder properly on provided stand	
Loosen the screw holding the clamp without pressing down on it or causing the stage to deflect	
Load sample and tighten the screw holding the clamp without pressing down on it or causing the stage to deflect	
Check sample snugness by gently pushing the clamp or sample	

## 6. Insert holder

Align pin with notch and insert stage to pump down position	
Set switch to pump, wait for green light to come on and then wait additional 1-3 minutes PIG4 Vacuum window $\leq 36\mu\text{A}$	
Insert stage one step further with a slight CW turn and slight insertion	
Pause, wait for vacuum valves to open , insert sample the rest of the way	
Check column IGP reading after insertion and vacuum diagram	

## 7. Start Filament

Check "Filament Ready" light	
Turn on beam by pressing the FILAMENT button in the HT window	

## 8. Carry out alignments

Find beam	
Condenser aperture centering	
Eucentric height adjustment	
Current center, voltage center (beam tilt)	
Condenser stigmation	
Objective stigmation	
Direct method, FFT assisted method	

## 9. Basic TEM operations (if using double tilt DT holder)

Bright field imaging	
SA diffraction	

## 10. Using CCD camera

Check that the CCD is properly cooled	
Check camera setup on computer	
Block central diffraction spot for DP	
Record image	

11. Shut down

Stop live camera image and Unclick the "Camera inserted" box	
Turn off beam by pressing the FILAMENT button	
Center holder positions and tilts	
Remove holder properly, unload sample properly, store holder properly	
HT shut off (if no one is coming within 3 hours) Lower HT setpoint to 180kV before shutting off HT	
Insert and turn on ACD heater (if shutting down instrument)	

12. Record session in log-book

Record filament time, adviser, and any problems	
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Signature of Supervisor / Superuser administering the test

\_\_\_\_\_ DATE \_\_\_\_\_

Signature of New JEM 2100 User:

\_\_\_\_\_ DATE \_\_\_\_\_

Minimum of 2 trouble-free weekday sessions before using evening/weekend sessions