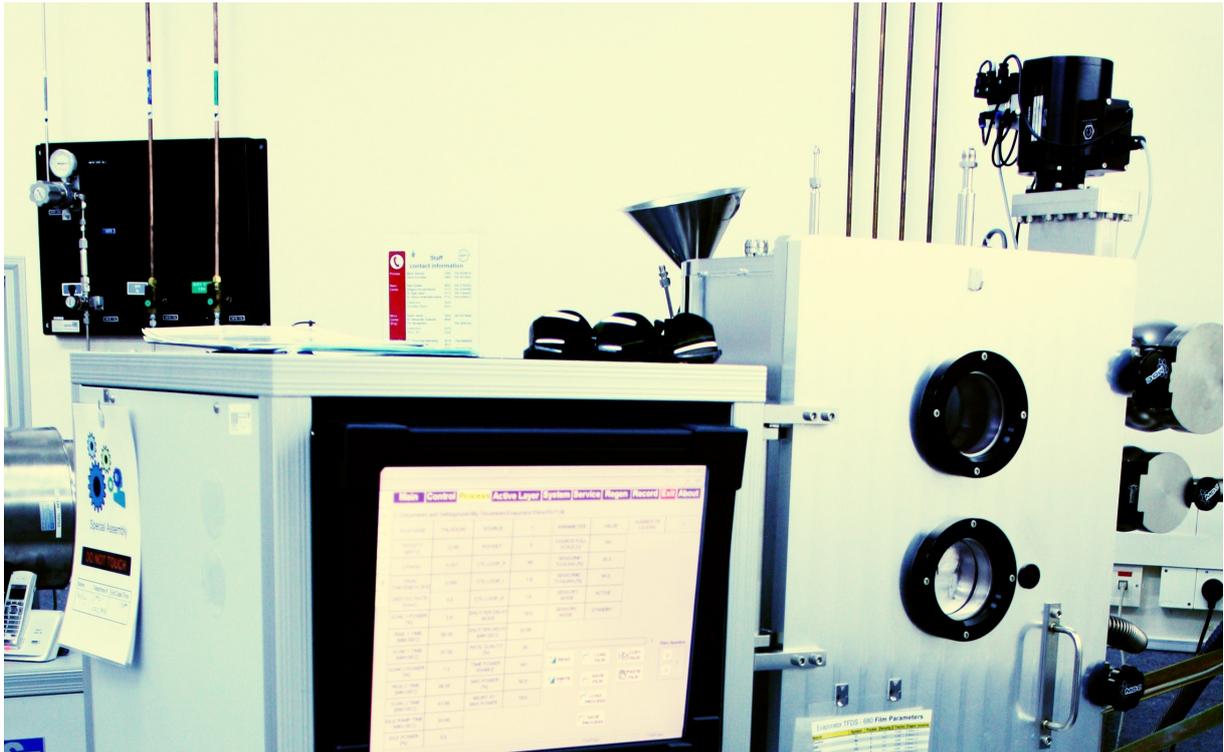
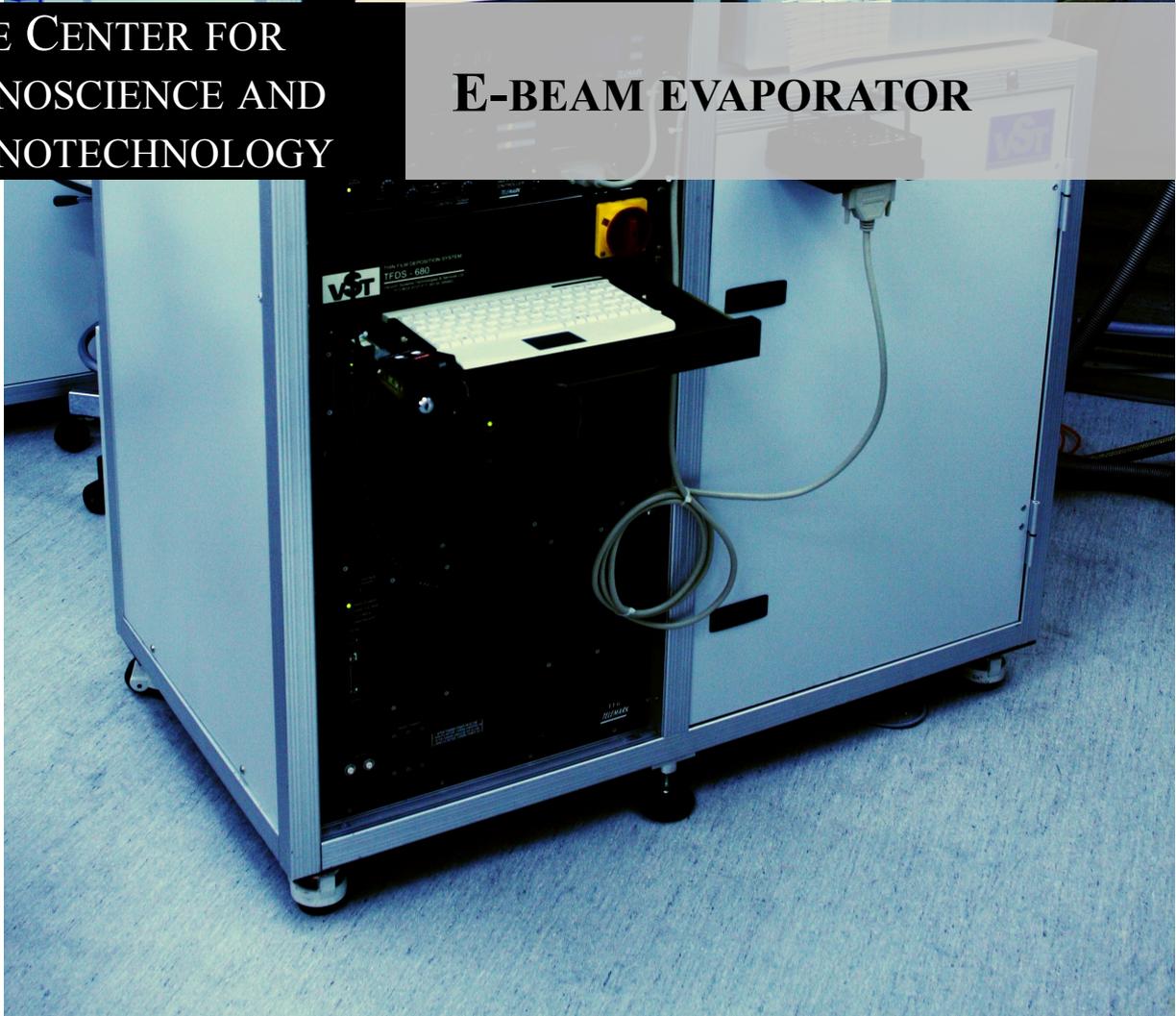


User's Guide



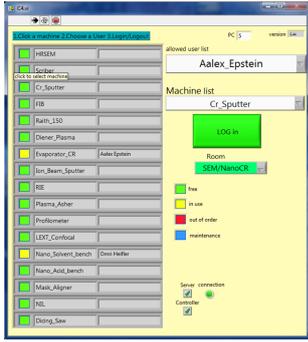
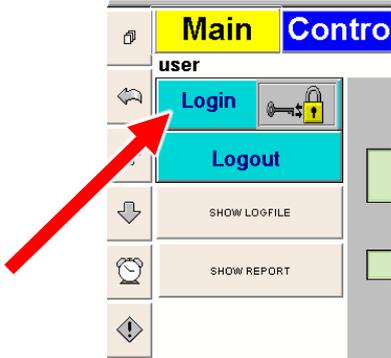
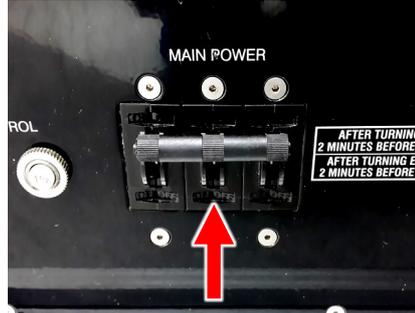
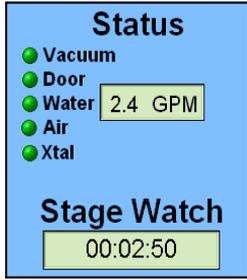
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E-BEAM EVAPORATOR



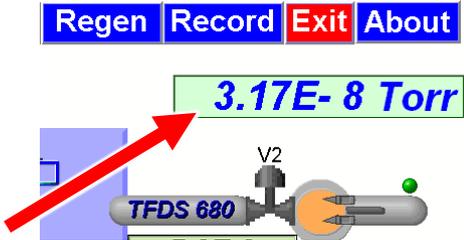
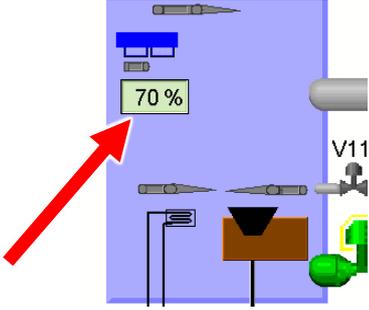
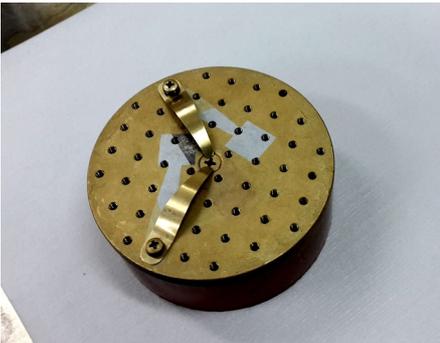
VST evaporator User's guide

Initial Checks and Mounting (1)

<p>1</p>	<p>Login on the Control System</p>	
<p>2</p>	<p>Log in on the machine : user user</p>	
<p>3</p>	<p>Verify main power switch is up</p>	
<p>4</p>	<p>Verify voltage adjust button is at 1 o'clock</p>	
<p>5</p>	<p>Verify on the screen that all five interlocks are green</p>	

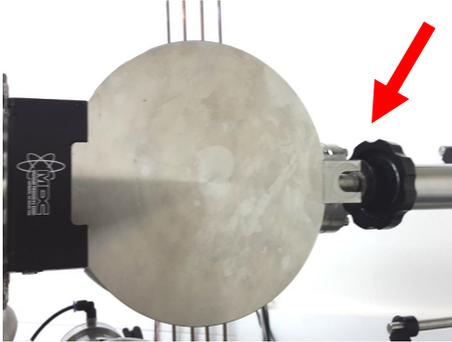
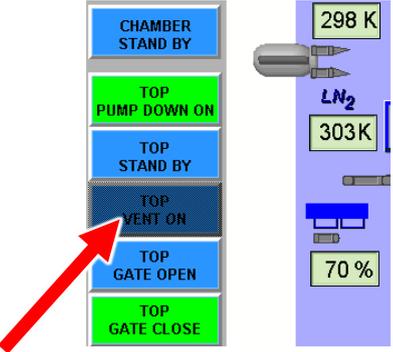
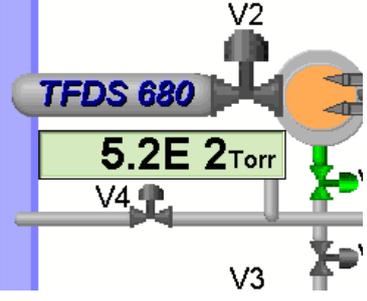
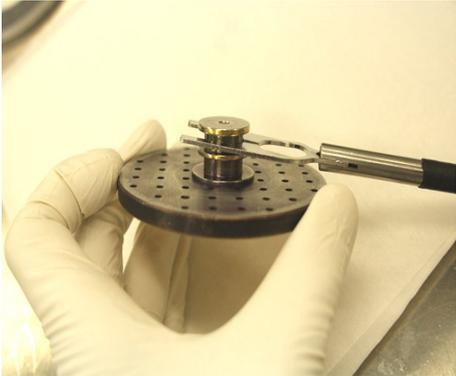
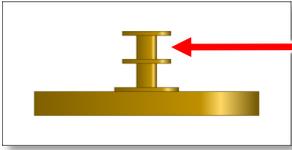


Initial Checks and Mounting (2)

6	Verify chamber pressure is <u>below 5e-7</u>	
7	Verify thickness monitor percentage <u>above 65%</u>	
8	Mount your sample on sample holder using clips or Kapton tape	



Inserting Sample into Loadlock (1)

9	Loosen and rotate the loadlock knob	
10	Go to the control tab and press <i>TOP VENT ON</i>	
11	Wait until the loadlock pressure reaches $5e2$ Open the loadlock door Press the <i>TOP STAND BY</i> button	
12	Hold the sample holder upside down Connect the fork handle to the <u>upper</u> slot of the sample holder	 



Inserting Sample into Loadlock (2)

13

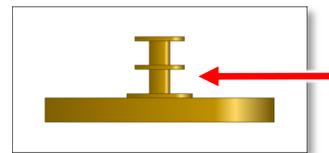
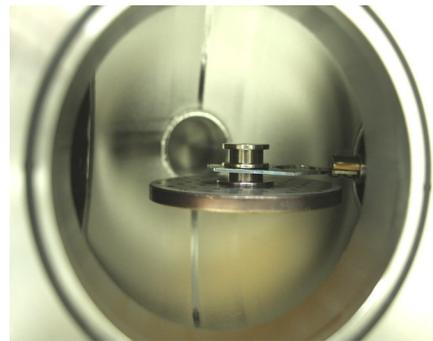
Slide sample holder onto the loading arm fork

—engaging the lower slot of the sample holder—

and pull to release the fork handle

CAUTION!

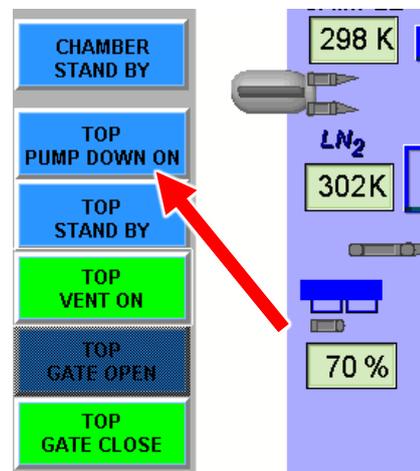
Do not apply any torsion to the loadlock fork. Steady the sample holder with a hand during insertion



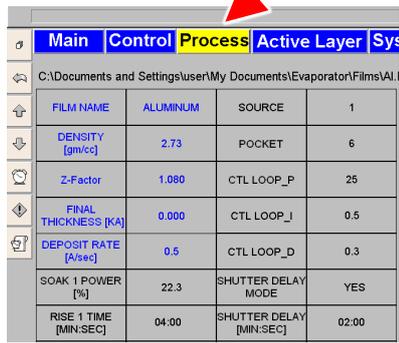
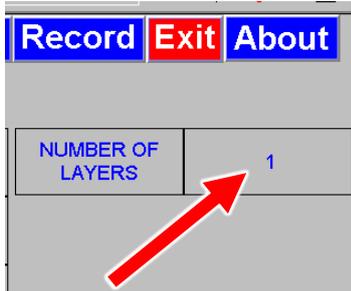
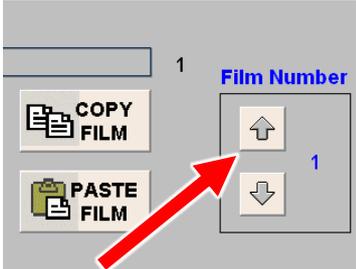
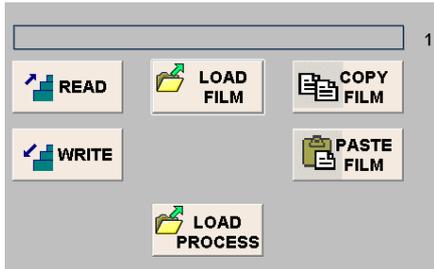
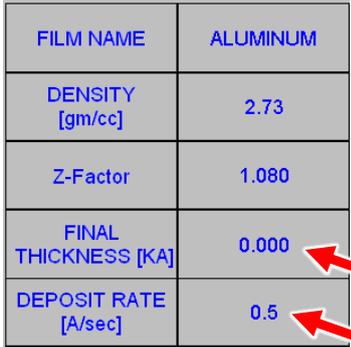
14

Close the loadlock door, tighten the loadlock knob and **immediately** press

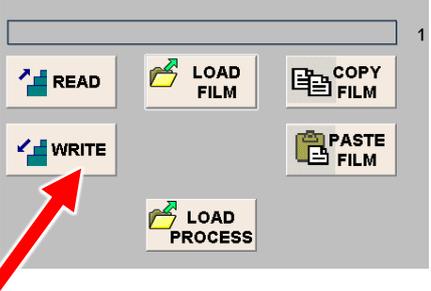
TOP PUMP DOWN ON



Setting the Process (1)

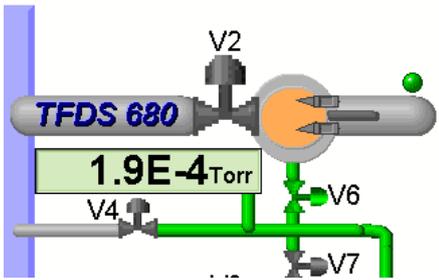
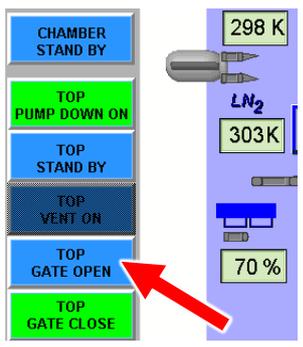
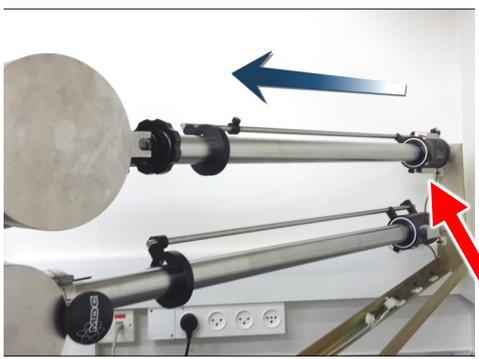
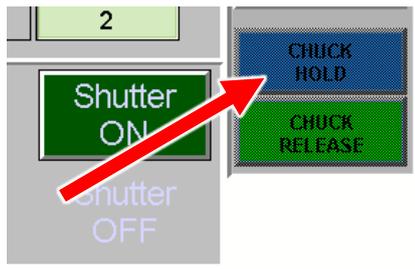
<p style="font-size: 24pt; font-weight: bold;">15</p>	<p>While loadlock is pumping down click the <i>PROCESS</i> tab</p>											
<p style="font-size: 24pt; font-weight: bold;">16</p>	<p>Enter the <i>NUMBER OF LAYERS</i> for the process</p>											
<p style="font-size: 24pt; font-weight: bold;">17</p>	<p>Choose the <i>FILM NUMBER</i> (for example film number 1 is the first deposited layer)</p>											
<p style="font-size: 24pt; font-weight: bold;">18</p>	<p>Press the <i>LOAD FILM</i> button and choose the material for the layer</p>											
<p style="font-size: 24pt; font-weight: bold;">19</p>	<p>Enter the <i>FINAL THICKNESS</i> and <i>DEPOSITION RATE</i> for the layer</p> <p style="text-align: center;">CAUTION! If a value for <i>DEPOSIT RATE</i> is already set, DO NOT CHANGE THE VALUE!</p>	 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>FILM NAME</td> <td>ALUMINUM</td> </tr> <tr> <td>DENSITY [gm/cc]</td> <td>2.73</td> </tr> <tr> <td>Z-Factor</td> <td>1.080</td> </tr> <tr> <td>FINAL THICKNESS [KA]</td> <td>0.000</td> </tr> <tr> <td>DEPOSIT RATE [A/sec]</td> <td>0.5</td> </tr> </table>	FILM NAME	ALUMINUM	DENSITY [gm/cc]	2.73	Z-Factor	1.080	FINAL THICKNESS [KA]	0.000	DEPOSIT RATE [A/sec]	0.5
FILM NAME	ALUMINUM											
DENSITY [gm/cc]	2.73											
Z-Factor	1.080											
FINAL THICKNESS [KA]	0.000											
DEPOSIT RATE [A/sec]	0.5											

Setting the Process (2)

20	Set the <u>material type</u> , <u>thickness</u> and <u>deposition</u> rate for all additional layers after changing the <u>film number</u> accordingly	
21	Press the <i>WRITE</i> button Wait until the bar indicates the process has finished loading (10 seconds)	 A screenshot of the VST evaporator control interface. It features a grey background with several buttons: 'READ', 'LOAD FILM', 'COPY FILM', 'WRITE', 'PASTE FILM', and 'LOAD PROCESS'. A red arrow points to the 'WRITE' button. At the top right, there is a progress bar labeled '1'.

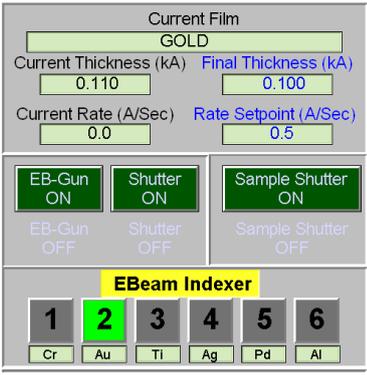
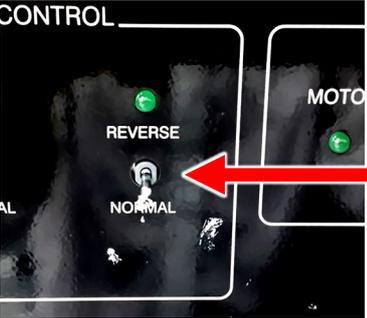
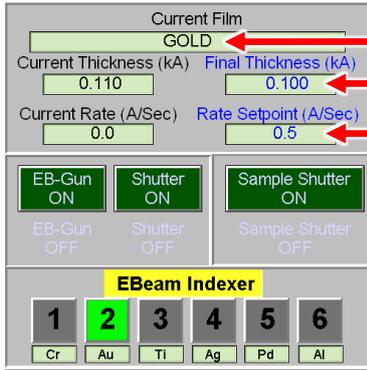


Inserting Sample into Chamber

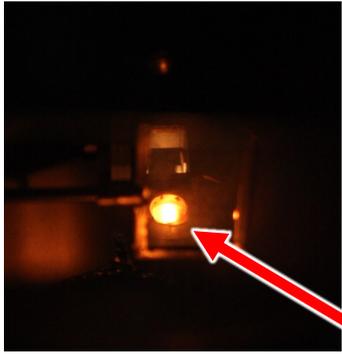
22	<p style="color: blue;">Go back to the control tab and wait until the loadlock pressure is below 2.0e-4</p>	
23	<p style="color: blue;">Press <i>TOP GATE OPEN</i></p> <p style="color: blue;">Wait until the gate is completely open (two kinds of sounds have stopped)</p>	
24	<p style="color: blue;">Pull the slider until it reaches the mechanical stop</p>	
25	<p style="color: blue;">Press <i>CHUCK HOLD</i></p> <p style="color: blue;">Wait a few seconds</p>	
26	<p style="color: blue;">Redraw the slider ~15 cm from the mechanical stop</p> <p style="color: red;">Look through the window to see if the loading arm fork is empty</p>	
27	<p style="color: blue;">If empty, redraw the slider completely</p>	
28	<p style="color: blue;">Press <i>TOP GATE CLOSE</i> and wait a few seconds</p>	



Running the Process

29	Check the required direction of crucible rotation	
30	Flip the <i>NORMAL / REVERSE</i> switch to the appropriate direction	
31	Press the <i>START</i> button	
32	Verify in the <i>CONTROL</i> tab that the correct process was loaded	
33	<p style="text-align: center;">IMPORTANT!</p> <p style="text-align: center;">Monitor the process at ALL TIMES</p> <p style="text-align: center;">See following pages for instructions</p>	

Monitoring the Process

34	<p>Look through window to view crucible and beam spot position</p>	
35	<p>Adjust beam position with <i>POS</i> knobs on sweep controller accordingly</p>	
36	<p>Constantly monitor deposition rate</p> <p>Power (given in %) will often fluctuate to maintain constant deposition rate.</p> <p>Wildly fluctuating <u>deposition rate</u> may indicate problems</p>	
37	<p>Look through chamber window every several minutes to view beam spot position.</p> <p>Look through the chamber window during the final minute to view final beam spot position</p>	
38	<p style="text-align: center;">IMPORTANT!</p> <p style="text-align: center;">Monitor the process at ALL TIMES</p> <p style="text-align: center;">until the process has finished!</p>	



Troubleshooting

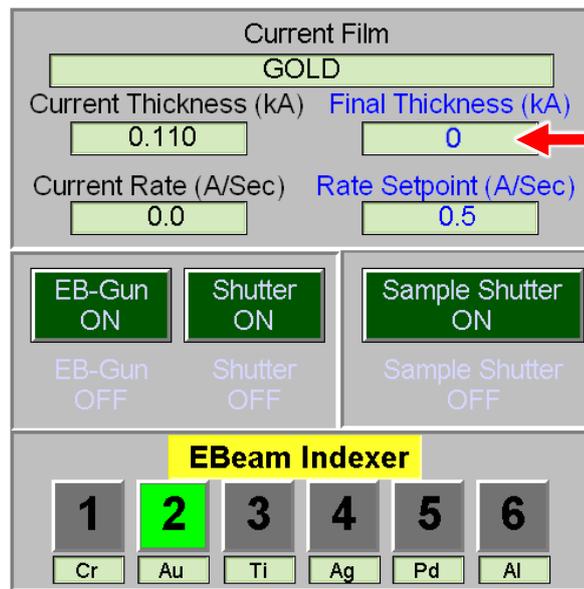
Problem: **Deposition rate suddenly drops**

Solution: Quickly look through window to view beam position. If beam has shifted, reposition beam with sweep controller.

If you have made a hole in the material, reposition beam with sweep controller to an area next to the hole.

If you are not sure, enter "0" (zero) into the *FINAL THICKNESS* field and press enter on the keyboard

39



Current Film
GOLD

Current Thickness (kA) Final Thickness (kA)
0.110 0

Current Rate (A/Sec) Rate Setpoint (A/Sec)
0.0 0.5

EB-Gun ON Shutter ON Sample Shutter ON
EB-Gun OFF Shutter OFF Sample Shutter OFF

EBeam Indexer
1 2 3 4 5 6
Cr Au Ti Ag Pd Al

Report the problem to the MNCF staff!



Troubleshooting

Problem: **Deposition rate suddenly rises**

Solution: Wait several seconds and see if rate begins to decrease. If rate decreases and returns to desired rate DO NOTHING.

If rate does not return after several seconds,
or
if you are not sure, enter "0" (zero) into the
FINAL THICKNESS field and press enter
on the keyboard

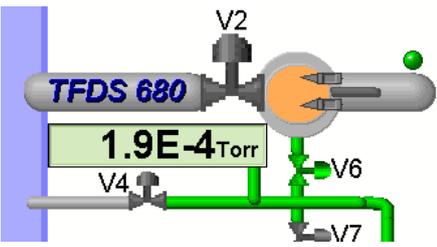
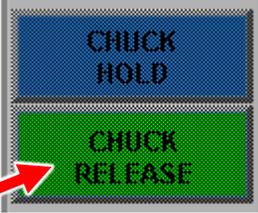
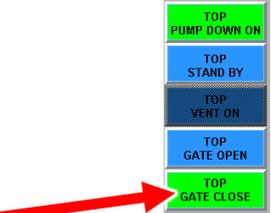
40

Current Film
GOLD
Current Thickness (kA) 0.110 Final Thickness (kA) 0
Current Rate (A/Sec) 0.0 Rate Setpoint (A/Sec) 0.5
EB-Gun ON Shutter ON Sample Shutter ON
EB-Gun OFF Shutter OFF Sample Shutter OFF
EBeam Indexer
1 2 3 4 5 6
Cr Au Ti Ag Pd Al

Report the problem to the MNCF staff!

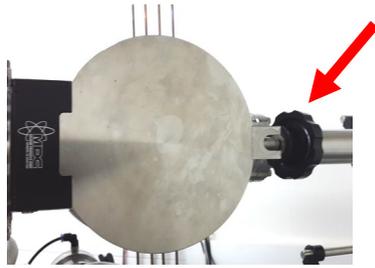
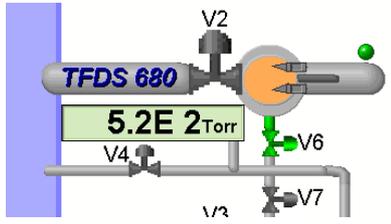
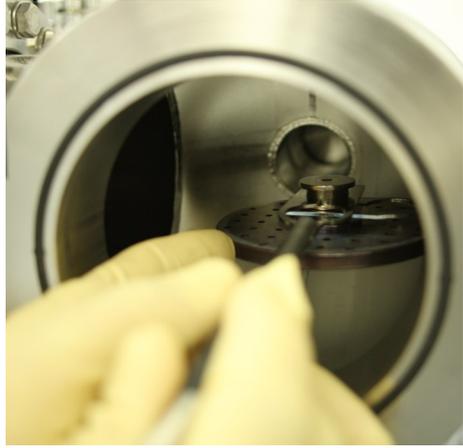


Extracting Sample from Chamber

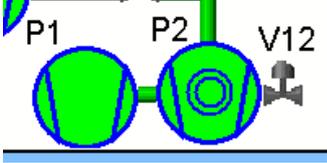
41	<p>Go to the <i>CONTROL</i> tab</p> <p>Press <i>TOP PUMP DOWN ON</i></p> <p>Wait until the loadlock pressure is below 2.0×10^{-4}</p>	
42	<p>Press <i>TOP GATE OPEN</i></p> <p>Wait until the gate is completely open (two kinds of sounds)</p>	
43	<p>Push the loading arm up to the mechanical stop</p>	
44	<p>Press the <i>CHUCK RELEASE</i></p> <p>Wait a few seconds</p>	
45	<p>Redraw the loading arm ~15 cm from the mechanical stop</p> <p>Observe if the sample holder has transferred to the loading arm fork</p>	
46	<p>If transferred, redraw the loading arm completely</p>	
47	<p>Press <i>TOP GATE CLOSE</i></p> <p>Wait a few seconds</p>	



Extracting Sample from Loadlock

48	Loosen and rotate the loadlock knob	
49	<p>Go to the <i>CONTROL</i> tab</p> <p>Press <i>TOP VENT ON</i></p>	
50	<p>Wait until the loadlock pressure reaches $5e2$ and open the loadlock</p>	
51	<p>Slide fork handle into <u>top</u> slot of sample holder</p> <p>Slide sample holder off of the loading arm fork</p> <p>Remove the sample holder from the loadlock</p> <p><u>CAUTION!</u> Do not apply any torsion to the loadlock fork. Steady the sample holder with a hand during extraction</p>	

Extracting Sample from Loadlock

52	<p>Close the loadlock door, tighten the loadlock knob and immediately press</p> <p><i>TOP PUMP DOWN ON</i></p>	
53	<p>Wait for the turbo pump icon to turn green</p> <p>Press the <i>TOP STAND BY</i></p>	
54	<p>Logout from the control system</p>	