Lab 1: System Overviews, Device ID-ing, Venting, Pump-down, Safety (Includes CR Gowning and procedures overview)

CLEAN ROOM SAFETY

There are many different types of sophisticated tools in the UTD Clean Room, which can have many lethal hazards. Some of these hazards may include Lethal Voltages, Gases, Acids, Solvents, Trip Hazards and Pinch Points. While in the Clean Room you should exercise caution, pay attention to detail and obey the clean room safety rules. If you observe unsafe acts or see unsafe conditions report them at once.

CLEAN ROOM SAFETY RULES

1: NO RUNNING.
2: NO HORSE PLAY.
3: IF YOU ARE NOT FAMILIAR WITH IT DON’T DO IT. (ASK FOR TRAINING)
4: DO NOT TOUCH LIQUIDS AROUND MACHINES.
5: BE AWARE OF VOLTAGE SOURCES AND USE CAUTION AROUND THEM.
6: KEEP BODY PARTS AWAY FROM PINCH POINTS.
7: OBSERVE CHEMICAL SAFETY.
8: WATCH FOR TRIP HAZARDS.
9: EXIT CLEAN ROOM IMMEDIATELY IF ALARM SOUNDS.
10: WEAR APPROPRIATE PPE (PERSONAL PROTECTIVE EQUIPMENT) WHEN NEEDED.

SAFETY IS EVERYONES RESPONSIBILITY!!!!!
CLEAN ROOM GOWNING PROCEDURE

In a clean room environment we try to protect the product (wafers, substrate and micro devices) from particles. The human is a particle generator. For this reason we wear special clothing while in the clean room. The following is the proper sequence for clean room gowning for the UTD clean room.

Outer Gowning Area:
1: Place shoe covers over street shoes.

Inner Gowning Area:
2: Place hairnet or hood over hair. Make sure no hair is exposed.
3: Put on smock or overall suit.
4: Put on gloves.
5: Wear appropriate eye protection.

When leaving clean room remove in reverse order.
**CAPPY PUMPDOWN**

1) Make sure vent valve is closed.
   A) From the front panel press the CHAMBER VENT button. You should see
   the light turn off. Refer to figure 1.
2) Make sure front door is latched.
3) Turn on the Roots Pump Package and the oil recirculation pump
   A) From the front panel press the PUMP button. You should see the PUMP
   and ROOTS light turn on. Refer to figure 2.
   B) From the front panel press the OIL button. You should see the OIL light
   turn on. Refer to figure 2.
4) Pump chamber down.
   A) From the front panel press the SOFT PUMP button. You should see the
   SOFT PUMP light turn on. Refer to figure 2.
5) Monitor the chamber pressure (channel 4 on the MKS 146)
   A) Enter the Normal Mode on the MKS 146 by pressing DISPLAY MODE
   until you are in the Normal Mode. Press 4 to bring channel 4 to the main
   display. Refer to figure 3.
   B) When the chamber (channel 4 on the 146) reaches 20 torr press the SOFT
   PUMP button on the front panel. You should see the SOFT PUMP light
   turn off. Refer to figure 1.
6) Open the Baratron Isolation valve.
   A) From the front panel press the BARATRON ISOLATION button. You
   should see the BARATRON ISOLATION light turn off. Refer to figure 1.
7) Open the Throttle/Gate valve.
   A) Enter the Control Mode by pressing the CONTROL MODE button on the
   MKS 146 then arrow up to OPEN and press enter. Refer to figure 3. This
   should open the Throttle/Gate valve.
Figure 1: CHAMBER VENT, BARATRON ISOLATION, AND SOFT PUMP control buttons.

Figure 2: Pump control and indicator lights.

Figure 3: MKS 146 Control System in the Normal Mode.
VENTING CAPPY

1) Close the Baratron Isolation valve.
   A) From the front panel press the BARATRON ISOLATION button. You should see the light turn off. Refer to figure 1.

2) Unlatch front door.

3) Close Throttle/Gate valve.
   A) Enter the Control Mode by pressing the CONTROL MODE button on the MKS 146 then arrow down to CLOSE and press enter. Refer to figure 3. This should close the Throttle/Gate valve.

4) Vent the chamber.
   A) From the front panel press the CHAMBER VENT button. You should see the light turn on. Refer to figure 1.
   B) When chamber has vented (front door will open) press the CHAMBER VENT button. You should see the light turn off. Refer to figure 1.

If system is not going to be used pump chamber down by using the pump down procedure and close the Throttle/Gate valve then turn off the Pump Package and Oil recirculation pump by pressing the OIL button and then the PUMP button. You should see the OIL, PUMP, and ROOTS light turn off.
VENTING MAGGIE

1: Place key switch on the APC to the Auto position. Figure 1
2: Turn Ion Gauge off on the MKS 146 Control System. Figure 2.
   A: Figure 2 shows a sample window the Normal Mode. Repeatedly press the
   “DISPLAY MODE” key until the MKS is in the Normal Mode.
   B: From the Normal Mode on the MKS 146 press “OFF” and then press 4. You should
   see the filament in the glass Ion Gauge located on top of the chamber turn off.
3: Make sure the front door is unlatched.
4: Press the Vent button on the APC. Figure 1. Chamber will come to atmospheric
   pressure after a few minutes.

PUMPING DOWN MAGGIE

1: Place key switch on the APC to the Auto position and press STANDBY. Figure 1.
2: Latch front door and press Start on the APC.
3: When the Start light stops flashing on the APC turn on the Ion Gauge on the MKS 146.
   A: From the Normal Mode on the MKS 146 press “ON” then press 4. Figure 2. You
   should see the filament in the glass Ion Gauge located on top of the chamber turn on.
Figure 1: Auto Pumpdown Control

Figure 2: MKS 146 CONTROL SYSTEM
VENTING INDY

1: Place key switch on the APC to the AUTO position. Figure 2.
2: Turn off Hot Cathode Ion Gauge on the MKS 146 control system. Figure 3.
   A: Figure 3 shows a sample window for the Normal Mode. Repeatedly press the “DISPLAY MODE” key until the MKS 146 is in the Normal Mode.
   B: From the Normal Mode on the MKS 146 press “OFF” and then press 4, this will turn off the Hot Cathode Ion Gauge. You should see the filament on the glass Ion Gauge located on bottom left of the chamber turn off.
3: Press Control Mode on the MKS 146, arrow down to the “CLOSE” and press enter. The THROTTLE/GATE should close. Make sure it has closed before proceeding.
4: Make sure front door is unlatched.
5: Press the “VENT” button on the APC. Figure 2. System will vent after a few minutes.

INDY PUMP DOWN

1: Place key switch on the APC to the AUTO position and press STANDBY. Figure 2.
2: Latch front door and press start button on the APC.
3: After start light stops flashing enter Control Mode on the MKS 146 control system and arrow up to “OPEN” and press enter. The THROTTLE/GATE should open.
4: When the “NORMAL” light stops flashing on the Turbo Control (refer to Figure 1) enter the normal mode on the MKS 146 (refer to Figure 3). Press “ON” and then press 4, this will turn on the Hot Cathode Ion Gauge. You should see the filament on the glass Ion Gauge located on bottom left of the chamber turn on.
Figure 1: Turbo Control

Figure 2: Auto Pumpdown Control

Figure 3: MKS 146 Control System
VENTING HOLLY

*WARNING*
The Hollow Cathode source is very sensitive to moisture. Only vent this chamber when absolutely necessary. After system is pumped down, outgas Hollow Cathode for at least one hour.

1: Plug in Chamber Vent Pilot Valve on the Pilot Valve Manifold. Figure 1.
2: Place key switch on the APC to the AUTO position. Figure 3.
3: Turn off Cold Cathode Ion Gauge on the MKS 146 control system.
   A: Figure 4 shows a sample window for the Normal Mode. Repeatedly press the “DISPLAY MODE” key until the MKS 146 is in the Normal Mode.
   B: From the Normal Mode on the MKS 146 press “OFF” and then press 3.
4: Press Control Mode on the MKS 146, arrow down to the “CLOSE” and press enter. The THROTTLE/GATE VALVE should close. Make sure it has closed before proceeding.
5: Make sure front door is unlatched.
6: Press the “VENT” button on the APC. Figure 3.
7: When system is vented unplug the chamber vent on the pilot valve manifold. Figure 1.

HOLLY PUMP DOWN

1: Place key switch on the APC to the AUTO position and press STANDBY. Figure 3.
2: Latch front door and press START button on the APC.
3: After START light stops flashing enter Control Mode on the MKS 146 control system and arrow up to “OPEN” and press enter. The THROTTLE/GATE should open.
4: When the “NORMAL” light stops flashing on the Turbo Control (refer to Figure 2) enter the normal mode on the MKS 146 (refer to Figure 4). Press “ON” and then press 3, this will turn on the Cold Cathode Ion Gauge.
Figure 1: Pilot Valve Manifold

Figure 2: Turbo Control

Figure 3: Auto Pumpdown Control

Figure 4: MKS 146 Control System