

Brookhaven National Laboratory/National Synchrotron Light Source				
<b>Subject:</b>	<b>VACUUM PROCEDURES FOR BEAMLINE X-24C</b>			
<b>Number:</b>	LS-OPS-0081	<b>Revision:</b>	B	<b>Effective:</b> 01/28/05
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\*Approval signatures on file with master copy.

The following procedures must be followed when bleeding up different beam line sections and when returning these sections to operation (refer to Beam Line Layout Drawing):

## **I. FRONT END (PROCEDURE TO BE PERFORMED BY NSLS VACUUM GROUP ONLY)**

### **A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Refer to Front End Vacuum Procedures (SLS-07.19-13-1)

### **B. Return to Operation**

1. Notify the Coordinator (Beeper 5824).
2. Refer to Front End Vacuum Procedures (SLS-07.19-13-1)

## **II. SECTION BETWEEN VALVE 1C AND VALVE 2C, MIRROR BOX 1**

### **A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1C and Front-End GP Valve.
3. Coordinator places Yellow Tag on Valve 1C and the Front-End GP Valve.
4. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors Front-End pressure.

### **B. Return to Operation**

1. Bake and pump to  $< 2 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 1C provided that pressure  $< 2 \times 10^{-9}$  Torr downstream of valve.
5. Perform RGA scan.\*
6. If RGA scan or pressure reading (if no RGA scan is required) is satisfactory, Coordinator removes Yellow Tag from Valve 1C and the Front-End GP Valve.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.\*\*

## **III. SECTION BETWEEN VALVE 2C AND VALVE 3C, MONOCHROMATOR**

### **A. Bleed-Up**

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 2C and Valve 1C.
3. Coordinator places Yellow Tag on Valve 2C and Valve 1C.
4. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 1C and Valve 2C, (Mirror Box 1).

### **B. Return to Operation**

1. Pump to  $< 9 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 2C and Valve 1C provided that pressure  $< 2 \times 10^{-9}$  Torr downstream of these

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valves.

5. Perform RGA scan.\*
6. If RGA scan or pressure reading (if no RGA scan is required) is satisfactory, Coordinator removes Yellow Tag from Valve 2C and Valve 1C.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.\*\*

#### IV. SECTION BETWEEN VALVE 3C AND VALVE 5C, MIRROR BOX 2

##### A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 3C and Valve 2C.
3. Coordinator places Yellow Tag on Valve 3C and Valve 2C.
4. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 2C and Valve 3C (Monochromator Chamber).

##### B. Return to Operation

1. Bake and pump to  $<4 \times 10^{-9}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 3C and Valve 2C provided that pressure  $<4 \times 10^{-9}$  Torr downstream of these valves.
5. Perform RGA scan.\*
6. If RGA scan or pressure reading (if no RGA scan is required) is satisfactory, Coordinator removes Yellow Tag from Valve 3C and Valve 2C.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.\*\*

#### V. REFLECTOMETER CHAMBER

##### A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 5C and Valve 3C.
3. Coordinator places Yellow Tag on Valve 5C and 3C.
4. Withdraw all the beamline filters.
4. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> while Coordinator monitors pressure between Valve 5C and Valve 3C (Mirror Box 2).

##### B. Return to Operation

1. Pump to  $<5 \times 10^{-7}$  Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.\*
4. Open Valve 5C provided that pressure  $<5 \times 10^{-7}$  Torr downstream of Valve 5C.
5. Open Valve 3C provided that pressure  $<4 \times 10^{-9}$  Torr downstream of valve 3C. Check Front-End pressure to see that it remains  $<2 \times 10^{-9}$  Torr.
6. Perform RGA scan.\*
7. If RGA scan or pressure reading is satisfactory, Coordinator removes Yellow Tag from Valve 5C and Valve 3C.
8. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.\*\*

##### C. Partial Return to Operation:

Alignment of chamber **at atmospheric pressure** using synchrotron visible light through

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sapphire window in Valve 5C.

1. Notify the Coordinator (Beeper 5824).
2. Open Valve 3C provided that pressure  $< 4 \times 10^{-9}$  Torr downstream of this valve.
3. Verify that Front-End pressure does not exceed  $2 \times 10^{-9}$  Torr.
4. If pressure reading is satisfactory, Coordinator enables beamline, but Yellow Tag remains on Valve 5C.

## VI. BBB FILTER CHAMBER

### A. Bleed-Up

1. Always close the hand-operated Valve 6C.
2. Close Valve 7C.
3. Withdraw all the BBB filters.
4. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> until pressure between Valve 7C and the hand-operated Valve 6C is ~ atmospheric pressure.

### B. Return to Operation

1. Pump to  $< 5 \times 10^{-6}$  Torr.
2. Open Valve 7C, provided that pressure is  $< 5 \times 10^{-6}$  Torr downstream of this valve.
3. **Any filter from the filter chamber must be inserted before opening the hand-operated Valve 6C.**
4. Verify that the pressure in the reflectometer upstream of Valve 6C is still  $< 5 \times 10^{-7}$  Torr.

## VII. DIODE CHAMBER

### A. Bleed-Up

1. Always close the hand-operated Valve 6C.
2. Close Valve 8C and Valve 7C.
3. Hook up Turbo Pump to this section.
4. Slowly bleed-up with boil-off N<sub>2</sub> until pressure between Valve 8C and Valve 7C is ~ atmospheric pressure.

### B. Return to Operation

1. Pump to  $< 5 \times 10^{-6}$  Torr.
2. Open Valve 8C and Valve 7C, provided pressures downstream of Valve 8C and upstream of Valve 7C are  $< 5 \times 10^{-6}$  Torr.

## VIII. LARGE CALIBRATION (BBB) CHAMBER

### A. Bleed-Up

1. Always close the hand operated valve 6C.
2. Close the main gate Valve 9C, Valve 8C, and Valve 7C.
2. Hook up Turbo Pump to this section.
5. Slowly bleed-up with boil-off N<sub>2</sub> until pressure downstream of Valve 8C is ~ atmospheric pressure.

### B. Return to Operation

1. Pump to  $< 5 \times 10^{-5}$  Torr and interlock before opening to any sections upsteam of Valve 8C.

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### **\*NSLS POLICY FOR RGA SCANS**

An RGA scan is required before returning to operation if there is a major change of hardware in the vacuum system, i. e. changing of samples, mirrors, windows, monochromator crystals or gratings, manipulators, detectors, etc., with the following two exceptions:

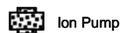
1. After UHV sample chambers have been bled up for replacing components, an RGA scan will not be required if the chamber pressure is returned to  $< 2 \times 10^{-9}$  Torr when vacuum sections upstream of the chamber are opened into the Front-End.
2. If any vacuum section upstream of the bled-up section remains at a pressure of  $< 9 \times 10^{-10}$  Torr as read using a hot-filament ion gauge, when the entire beamline is opened into the Front-End, and the Front-End pressure does not increase, no RGA is required.

### **\*\*NSLS TURBO PUMP POLICY**

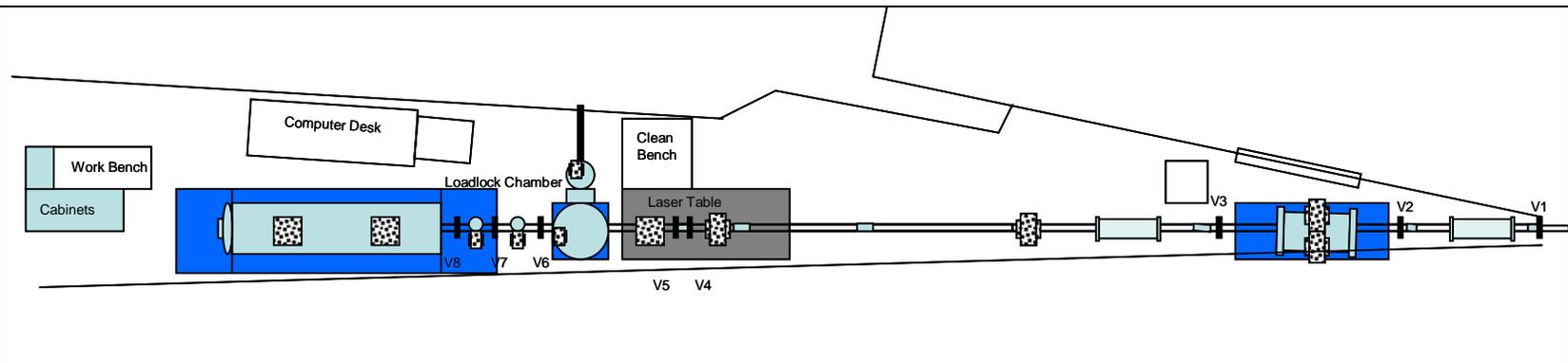
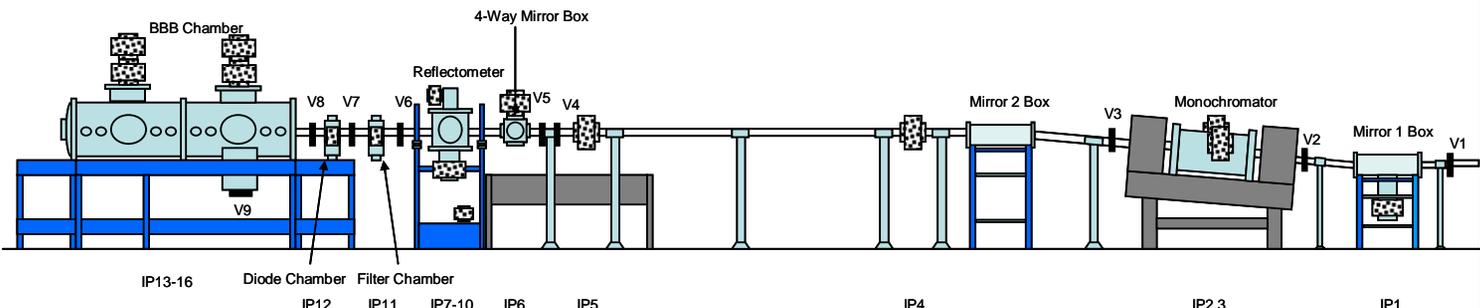
An unprotected turbo pump is one not separated from the Front-End by a beamline valve which automatically closes in the event of a power loss or a pressure increase at the turbo pump. **No unprotected turbo pump can share a continuous vacuum with the Front-End.**

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## BEAMLINE X24C LAYOUT



Valve



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> See NSLS Quality Control Coordinator for review signatures <

<b>REVISION TABLE</b>		
<b>Rev</b>	<b>Description</b>	<b>Date</b>
B	Addition of Sections VI, VII & VIII. Initial release into controlled document system.	01/28/05