

Brookhaven National Laboratory National Synchrotron Light Source		Number: LS-OPS-0040	Revision: B
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Subject: VACUUM PROCEDURES FOR BEAMLINE U3C			
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*Document must contain approved signatures for validity.

The following procedures must be followed when bleeding up different beam line sections and when returning these sections to operation .

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, MONOCHROMATOR

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 1C, the Front-End High Vacuum Valve, and downstream Valve 2C.
3. Coordinator places Yellow Tag on Valve 1C and the Front-End High Vacuum Valve.
4. Hook up Turbo Pump to this section and isolate turbo.
5. Slowly bleed-up with boil-off N₂ 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 pressure $<2 \times 10^{-9}$ Torr downstream of valve.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes Yellow Tag from Valve 1C and the Front-End High Vacuum 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 , FOCUSING MIRROR M3

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 2C, Valve 1C and downstream Valve 3C.
3. Coordinator places Yellow Tags on Valve 2C and Valve 1C.
4. Hook up Turbo Pump to this section and isolate turbo.
5. Slowly bleed-up with boil-off N₂ while Coordinator monitors Monochromator pressure.

B. Return to Operation

1. Bake and pump to $<2 \times 10^{-9}$ Torr.

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

IV. SECTION BETWEEN VALVE 3C AND VALVE 4C, DIAGNOSTICS CHAMBER

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 3C, Valve 2C, and downstream Valve 4C.
3. Coordinator places Yellow Tags on Valve 3C and Valve 2C.
4. Hook up Turbo Pump to this section and isolate turbo.
5. Slowly bleed-up with boil-off N₂ while Coordinator monitors Focusing Mirror 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 3C and then Valve 2C if pressure $<2 \times 10^{-9}$ Torr downstream of these valves.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes Yellow Tags from Valve 3C and Valve 2C.
7. Remove any unprotected Turbo Pump from this section or valve off turbo pump and place a Yellow Tag on the valve.**

V. SECTION BETWEEN VALVE 4C AND VALVE 6C, UPSTREAM CHAMBER ON DIFFERENTIAL PUMPING STATION

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 4C, Valve 3C and downstream Valve 6C. Leave Valve 5C open.
3. Hook up Turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 4C and Valve 3C.
5. Slowly bleed up with boil-off N₂ while Coordinator monitors pressure between Valve 4C and Valve 3C (Diagnostics Chamber).

B. Return to Operation

1. Pump to $< 2 \times 10^{-9}$ Torr.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valves 5C and 4C. If pressure $< 2 \times 10^{-9}$ Torr downstream of Valve 3C (Diagnostics Chamber), open Valve 3C.
5. Perform RGA scan*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes

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Yellow Tags from Valve 4C and Valve 3C.

7. Remove any unprotected Turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

VI. SECTION BETWEEN VALVE 6C AND VALVE 7C, DOWNSTREAM CHAMBER ON DIFFERENTIAL PUMPING STATION

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valve 6C, Valve 4C and downstream Valve 7C. Leave Valve 5C open.
3. Hook up Turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 6C and Valve 4C.
5. Slowly bleed up with boil-off N₂ while Coordinator monitors pressure between Valve 6C and Valve 4C (Upstream Chamber on Differential Pumping Station).

B. Return to Operation

1. Pump down Downstream Chamber on Differential Pumping Station.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valves 6C and 5C. If pressure < 2 x 10⁻⁹ Torr downstream of Valve 4C (Upstream Chamber on Differential Pumping Station) open Valve 4C.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes Yellow Tags from Valve 6C and Valve 4C.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

VII. SECTION DOWNSTREAM OF VALVE 7C, END STATION

A. Bleed-Up

1. Notify the Coordinator (Beeper 5824).
2. Close and seal Valves 7C, 6C and 4C. Leave Valve 5C open.
3. Hook up turbo pump to this section and isolate turbo.
4. Coordinator places Yellow Tags on Valve 7C and Valve 4C.
5. Slowly bleed up with boil-off N₂ while Coordinator monitors pressure between Valve 7C and Valve 6C (Downstream Chamber on Differential Pumping Station).

B. Return to Operation

1. Pump down End Station.
2. Notify the Coordinator (Beeper 5824).
3. Prepare for RGA scan.*
4. Open Valves 7C, 6C and 5C. If pressure < 2 x 10⁻⁹ Torr downstream of Valve 4C (Upstream Chamber on Differential Pumping Station), open Valve 4C.
5. Perform RGA scan.*
6. If RGA scan or pressure reading (if no RGA scan required) is satisfactory, Coordinator removes Yellow Tags from Valve 7C and Valve 4C.
7. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

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VIII. SECTION DOWNSTREAM OF VALVE 7C, END STATION

** EXPERIMENTS REQUIRING FREQUENT BLEED-UPS ONLY**

A. Bleed-Up

1. Notify the LANL Beamline Operator.
2. Close Valves 7c, 6C, and 4C. Leave Valve 5C open.
3. Disconnect Valve 4C actuation signal line at the valve.
4. Hook up turbo pump to this section and isolate turbo.
5. Slowly bleed up with boil-off N₂ while monitoring pressure between Valve 7C and Valve 6C (Downstream Chamber on Differential Pumping Station).

B. Return to Operation

1. Pump down End Station.
2. Notify the LANL Beamline Operator.
3. Reconnect Valve 4C actuation signal line at the valve.
4. Open Valves 7C, 6C and 5C. If pressure $< 2 \times 10^{-9}$ Torr downstream of Valve 4C (Upstream Chamber on Differential Pumping Station), open Valve 4C.
5. Remove any unprotected turbo pump from this section or valve off the turbo pump and place a Yellow Tag on the valve.**

* NSLS POLICY FOR RGA SCANS (24 HOUR NOTICE REQUIRED)

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 and the Front End pressure remains $< 2 \times 10^{-9}$ 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 contiguous vacuum with the Front End.**

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