



Vacuum Group Procedure VA-008.18.1.20  
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Revision 01

**\*\*IMPORTANT\*\***

PRIOR TO THE PERFORMANCE OF ANY WORK WITHIN THE SCOPE OF THIS PROCEDURE, IT IS THE RESPONSIBILITY OF THE SUPERVISOR TO ENSURE THAT ***WORK PLANNING*** HAS BEEN REVIEWED FOR THE PROTECTION OF WORKERS, EQUIPMENT, AND THE ENVIRONMENT.

**1. PURPOSE:**

1.1 To provide an effective procedure for AGS vacuum technicians to safely and effectively leak check an AGS sector.

**2. RESPONSIBILITIES:**

2.1 The AGS vacuum supervisor shall be responsible for the implementation of this procedure.

**3. DISCUSSION:**

3.1 This procedure is written so that trained AGS vacuum technicians will be able to successfully leak check a sector in the AGS ring in a safe and proper manner.

**4. PRECAUTIONS:**

- 4.1 The technician shall be aware of radiation levels in the area and, where required, shall obtain a radiation work permit.
- 4.2 The technician will ensure that he is in fact using a safe and properly functioning gas regulator and bottle cart. Those found to be unsafe shall be returned for repair.
- 4.3 The technician should be aware of what constitutes a vacuum sector. For example, sector "AB" starts at A14 and ends at the B3 main magnet. Sector "B" starts at B4 and ends at the B13 main magnet. A Schematic representing the entire AGS layout is posted in the Vacuum Lab.
- 4.4 The technician shall not remove any materials or equipment from the AGS Ring unless they are first checked by Health Physics.
- 4.5 The technician shall be aware that upon removal of a HV cable from a S.I.P. within the locked out sector, the cable & connector must be properly discharged using an OSHA approved resistive type grounding stick.
- 4.6 Check color code on Kirk Key & verify that it matches that of the HV cables in the locked out sector.
- 4.7 LN2 is extremely cold & should be handled very carefully while wearing safety glasses & gloves.

**5. PREREQUISITES:**

- 5.1 The technician will have been trained in this procedure.
- 5.2 Lockout Tagout 15.17.00.02
- 5.3 Electrical safety 15.17.00.04
- 5.4 AGS Ring Access Training
- 5.5 Activation Worker Training (BNL OH&S Guide 3.5.0)
- 5.6 Safety glasses are required during this procedure. (Use of LN2)
- 5.7 OSHA approved resistive type grounding stick
- 5.8 Technician has been trained to at least a level of knowledgeable in LOTO AGS/HEBT Vacuum Ion Pump Power Disconnect.
- 5.9 Affected Persons Training 15.12.00.01
- 5.10 Technician has been trained in procedure 8.18.1.23 (LD CALIS.)

**6. OPERATIONAL PROCEDURE:**

6.1 Ensure that a radiation survey has been done by the hp group of the area to be worked in.

- 6.2 Close sector valves and disconnect power to those valves U/S and D/S of sector to be vented.
- 6.3 Perform LOTO Procedures for ION Pump HV Supplies
- 6.4 Perform LOTO Procedures for sector CCG.
- 6.5 Perform and or verify LOTO as per AGS OPM 4.1.5.1.1 which states: "If the ring is expected to be open for one hour or more, or if persons entering the ring may be on the inside catwalk, or if they need to touch a ring vacuum chamber, then all the items on the "Ring Sweep/Access Equipment Lockout Tagout Checklist" must be locked, tagged and the keys and tag stubs placed in the "MCR Electrical Safety Keylocker".
- 6.6 Calibrate L.D. as per procedure #8.18.1.23.
- 6.7 Start roughing station as per procedure #8.18.1.53.
- 6.8 Connect L.D. to turbo via metal hose & pump down L.D.
- 6.9 Open sector roughing valve.
- 6.10 Open leak checking valve.
- 6.11 Close rough pump isolation valve.
- 6.12 Using helium probe, gently apply a gentle mist of helium to each seal, joint, or component.

**CAUTION:**

Too much helium spray can result in a "drift" (i.e. = a long gradual rise in the L.D. leak indicator gauge). Helium entering through the component enters the L.D. spectrometer tube where it is detected as a leak.

- 6.13 Once an indication appears, immediately stop spraying the helium. Allow the L.D. to return to its initial leak rate indication. Repeat step 6.12.
- 6.14 If and when possible, "bag" the suspect component with plastic sheet & spray again. When and if it is established that a leak does exist, remove the plastic & probe to pinpoint the exact location of the leak.
- 6.15 Each component & seal **M-U-S-T** be checked. There are no guarantees that only one leak exists in a section where as many as 100 or more seals & components are located.
- 6.16 Upon completion, remove red tags from ion pump P.S. and CCG.
- 6.17 Proceed with sector start-up procedure #8.18.1.53

**7. ACCEPTANCE CRITERIA:**

- 7.1 Every component & seal has been found to be leak tight.
- 7.2 Sector has achieved vacuum integrity.

**8. FINAL CONDITIONS:**

- 8.1 Work area has been cleaned and all equipment and/or tools have been removed from the ring after being checked by h-p personnel.
- 8.2 Dosimeter readings have been logged in the dosimeter log book located in the vacuum lab.