

BEAM TUBE VACUUM LEAK TEST

REV.	DESCRIPTION	ORIGIN	DATE
		APP.	DATE

1.0 SCOPE

1.1 Vacuum Leak Test, Internal Evacuation of Long Tubular Shapes

2.0 TEST EQUIPMENT

2.1 Mass Spectrometer Leak Detector calibrated to American Vacuum Society⁽¹⁾ (A.V.S.) Std. 2.1. Calibration shall be done daily during an active period of the day shift with the aim of establishing the Minimum Detectable Signal (M.D.S.). The Leak Detector shall have a Minimum Detectable Leak Rate of better than 2×10^{-9} Atm. cc/sec of Helium, and shall be equipped with a strip chart recorder per A.V.S. Std. 2.1, A Calibrated Leak. Use Helium gas, high purity grade or better. Leak Test Vacuum Systems with provisions for attaching a calibrated leak to the test item at the furthest point from the M.S.L.D. Sealing caps and plugs. Internal Vacuum Supports. Leak Test Label #MA-103015.

3.0 HANDLING REQUIREMENTS

3.1 Wear clean, lint-free cotton, nylon, dacron cloth, or polyethylene film gloves when handling the beam tube in the localized test area. Keep work surfaces, work tables, fixtures, tools, etc. used for the beam tube assembly clean and grease-free. DO NOT use copper, zinc, cadmium, lead, tin or any alloy of these metals on the surfaces of fixtures or tools used to work on the beam tube. Chrome-plated surfaces are acceptable. Keep tools used to work on the beam tube segregated from other tools, use only on beam tubes, and do not allow them to come in contact with any of the above listed metals.

<small>UNLESS OTHERWISE SPECIFIED:</small> 1. ALL DIMENSIONS ARE IN MILLIMETERS. 2. TOLERANCES: ±1 MM. 3. DIMENSIONS BASED UPON ANSI Y14.5M-1982. 4. INCH DIMENSIONS ARE FOR REFERENCE ONLY. 5. BREAK ALL SHARP EDGES. 6. DO NOT SCALE DRAWING. 7. MAX. ALL MACH. SURFACES 8. DIMENSION IDENTIFICATION: MILLIMETER; MILLIMETER/INCH INCH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>ORIGINATOR</td> <td>V. A. HIGINOTHAM</td> <td>9/24/91</td> </tr> <tr> <td>DRAWN</td> <td>P. A. WINTERS</td> <td>9/24/91</td> </tr> <tr> <td>CHECKED</td> <td><i>[Signature]</i></td> <td>255687</td> </tr> <tr> <td>APPROVED</td> <td><i>[Signature]</i></td> <td>10 B-71</td> </tr> <tr> <td>USED ON</td> <td colspan="2" style="text-align: center;">N/A</td> </tr> <tr> <td>MATERIAL</td> <td colspan="2" style="text-align: center;">N/A</td> </tr> </table>	ORIGINATOR	V. A. HIGINOTHAM	9/24/91	DRAWN	P. A. WINTERS	9/24/91	CHECKED	<i>[Signature]</i>	255687	APPROVED	<i>[Signature]</i>	10 B-71	USED ON	N/A		MATERIAL	N/A	
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FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY SSC																			
<h3>SSC 50MM DIPOLE COLD MASS</h3> <h3>BEAM TUBE VACUUM LEAK TEST</h3>																			
SCALE	DRAWING NUMBER	SHEET																	
<i>N</i>	0102-ES-292456	1 of 3																	
CREATED WITH I-DEAS 5.0		USER NAME: RCAVAX																	

⁽¹⁾ American Vacuum Society, 335 East 45 St., New York, NY.

REV.	DESCRIPTION	ORDER	DATE
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4.0 PROCESS REQUIREMENTS

4.1 Thoroughly clean test area externally and the entire beam tube internally with denatured alchohol to insure no residue is remaining on the surface. Air dry.

5.0 TEST PROCEDURE

5.1 Insert Vacuum Supports. Evacuate the inside volume of the test item.

5.2 Open M.S.L.D. and hold at a steady state (constant scale reading) for 60 seconds. Machine shall have been "warmed up" per manufacturer's instructions, and test shall be run only when the gauge reads less than 85% of the most sensitive scale.

5.3 Enclose the area to be tested in a polyethylene bag and completely surround the area with Helium gas. Per SSC Specification M80-000001, Section 3.6.2.1.2.1, Beam Tube Vacuum, "AT NO TIME IS HELIUM GAS TO BE INTRODUCED INTO THE BEAM TUBE FOR LEAK CHECKING OR ANY OTHER PURPOSES."

5.4 Open Calibrated Leak at the furthest end of the system from the M.S.L.D. and wait for M.S.L.D. to reach steady state response.

5.5 Completely remove any vacuum grease using the specified cleaning and handling procedure for the test item.

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	APPROVED	<i>[Signature]</i>	10-8-91
	USED ON	N/A	
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SSC 50MM DIPOLE COLD MASS BEAM TUBE VACUUM LEAK TEST			
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6.0 TEST REPORTS

- 6.1 Record the following data on the Q.C. Traveller Label:
- Part Number
 - Date and Time
 - Operator's Last Name
 - Scale units before enclosure is Helium flooded
 - Scale units while enclosure is Helium flooded
 - The Minimum Detectable Signal (M.D.S.) obtained from the latest calibration. (Scale Units)
 - The background before Test Procedure, Item 3 above. (Scale Units)
 - The steady state gauge reading response to the calibrated. (Scale Units)
 - The temperature corrected value of the Calibrated Leak. (Std. cc/sec Helium)

6.2 Calculate the Minimum Detectable Leak (M.D.L.) using data recorded above and enter on Q.C. Traveller Label.

7.0 TEST RESULTS

7.1 A leak, as evidenced by an increase in the scale reading during Test Procedures 3 and 4, shall be cause for rejection.

7.2 A Calculated Minimum Detectable Leak greater than 2×10^{-9} Atm. cc/sec of Helium shall be cause for rejection.

7.3 Strip chart records from the M.S.L.D. calibrations shall be retained by vendor for inspection by cognizant Fermilab personnel.

7.4 Insert the label (DO NOT PEEL OFF BACKING) into the part's packaging bag, if applicable.

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