

Fiducials for BM1 Std. Vac. Chamber

BM1015

Date:

4/23/02

Chamber:

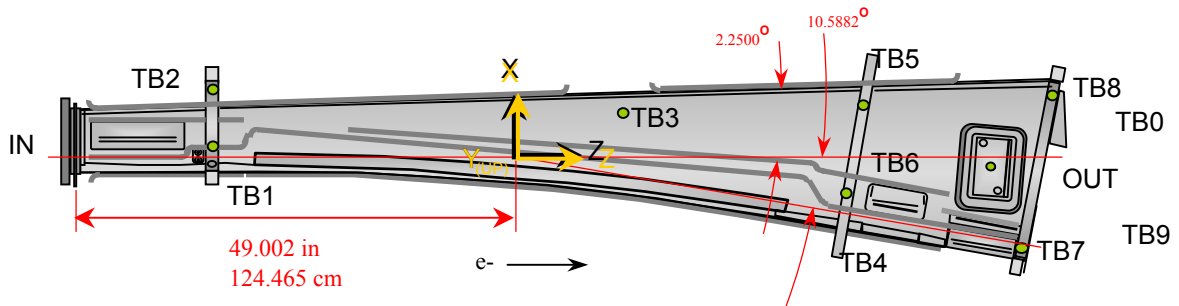
BM1015

Operator(s):

J. McDougal
H. Imfeld

Notes:

US pins not measured. Single support on final check measurement.



Fiducial Coordinates for BM1 Standard Vacuum Chamber: (inches)

Fiducial	Z	X	Y
TB1	-34.851	1.471	4.364
TB2	-34.859	8.437	4.383
TB3	10.908	4.154	2.343
TB4	34.533	-4.879	4.376
TB5	36.587	6.292	4.378
TB6	52.468	-1.900	2.318
TB7	55.659	-11.195	3.078
TB8	59.447	8.985	3.050
TB9 (V4)	74.651	-20.316	4.380
TB0 (V4)	76.924	-8.223	4.398

inches inches inches

Nominal Deltas For H3 Absorber (TB6)		
Z	X	Y
52.467	-1.912	2.311
52.493	-1.891	2.242
-0.026	-0.021	0.069

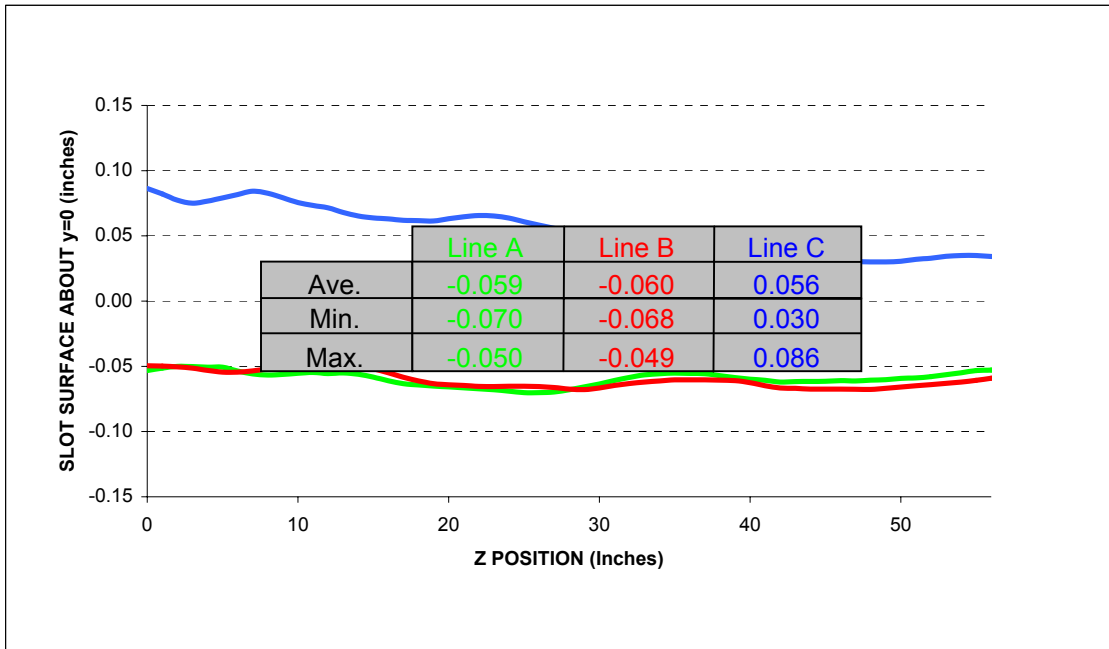
Source **V4 Step**

Description:

Fid. vals based on internal chamber datum. Source="V4 Step" indicates final data.

Fiducialization Step: (Traveler Step # 1380)

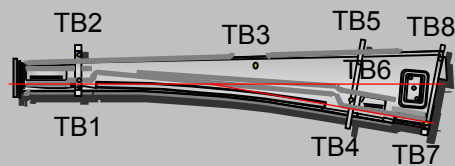
Slot Calibration	
Ideal	0.511
Meas.	0.134
Delta	-0.377



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Step 1: Fiducial Coordinates for BM1 Std. Vac. Chamber

Fiducial	Z	X	Y
TB1	-34.850	1.470	4.386
TB2	-34.867	8.438	4.383
TB3	10.906	4.171	2.345
TB4	34.530	-4.880	4.376
TB5	36.595	6.290	4.378
TB6	52.467	-1.912	2.311
TB7	55.653	-11.212	3.066
TB8	59.437	8.971	3.044
	inches	inches	inches

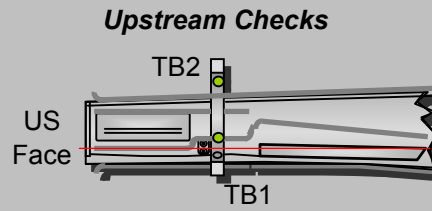


Description:

Fiducial values based on internal chamber datum.

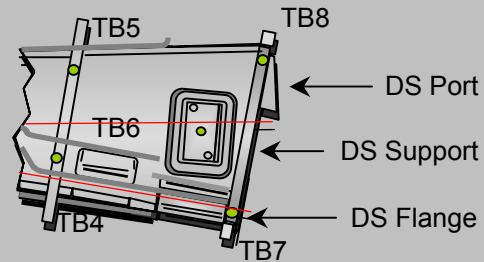
End Surface Attitudes for BM1 Std. Vac. Chamber

Upstream Face		
	yaw	pitch
Measured	2.0	8.0
Nominal	0.0	0.0
Difference	2.0	8.0
	mrad	mrad



Downstream Port		
	yaw	pitch
Measured	26.6	-3.1
Nominal	25.3	0.0
Difference	1.3	-3.1

Downstream Checks



Downstream Support		
	yaw	pitch
Measured	-185.2	2.0
Nominal	-184.8	0.0
Difference	-0.4	2.0

Downstream Flange		
	yaw	pitch
Measured	-190.8	2.0
Nominal	-184.8	0.0
Difference	-6.0	2.0
	mrad	mrad

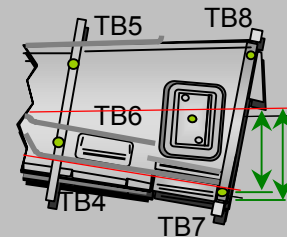
Description:

Orientation of the upstream and downstream surfaces compared to nominal values. Tol +/- 3 mrad

Datum Verification

DS Support	
	x
Measured	-11.901
Nominal	-11.912
Diff.	0.011
	inches

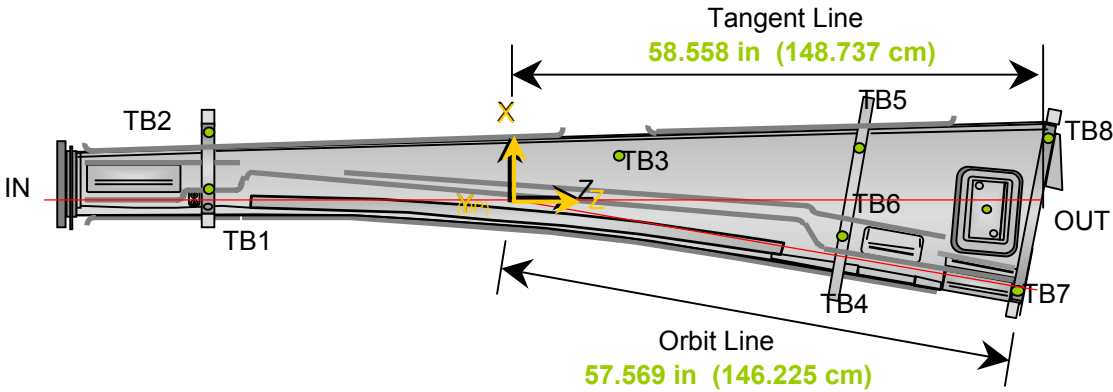
DS Flange	
	x
Measured	-11.943
Nominal	-11.958
Diff.	0.015
	inches



Description:

The x-distance from the center-line to the projection of the measured DS inside curve point on either of the DS surfaces. Tolerance values +/- 0.020 in.

<u>BM1 Chamber Lengths</u>			Nominal Length
Tangent Line:	Length 58.568 inches	without SMR	58.558 OK
Orbit Line:	Length 57.507 inches	without SMR	57.569 OK
<p>Description: Both lengths are to the faces of the weld flanges. Length tolerance +/- 0.125 in.</p>			



V4 Step A: Survey and Check of BM1 Standard Vacuum Chamber Fiducials Before Attaching V4 and the Exit Port:

Step A-1: Remeasurement of Fiducial Coordinates for BM1 Std. Vac. Chamber

Fiducial	Z	X	Y	del Z	del X	del Y
TB1	-34.850	1.471	4.385	0.000	0.000	-0.001
TB2	-34.860	8.437	4.384	0.008	-0.001	0.000
TB3	10.907	4.151	2.342	0.001	-0.020	-0.003
TB4	34.532	-4.881	4.376	0.002	-0.001	0.001
TB5	36.586	6.291	4.378	-0.009	0.001	-0.001
TB6						
TB7	55.665	-11.195	3.077	0.011	0.017	0.011
TB8	59.426	8.994	3.057	-0.011	0.023	0.013
	inches	inches	inches	Compared to Step 1 Fiducial Coords.		

DS Port Level Check

OK ? (YES or NO)

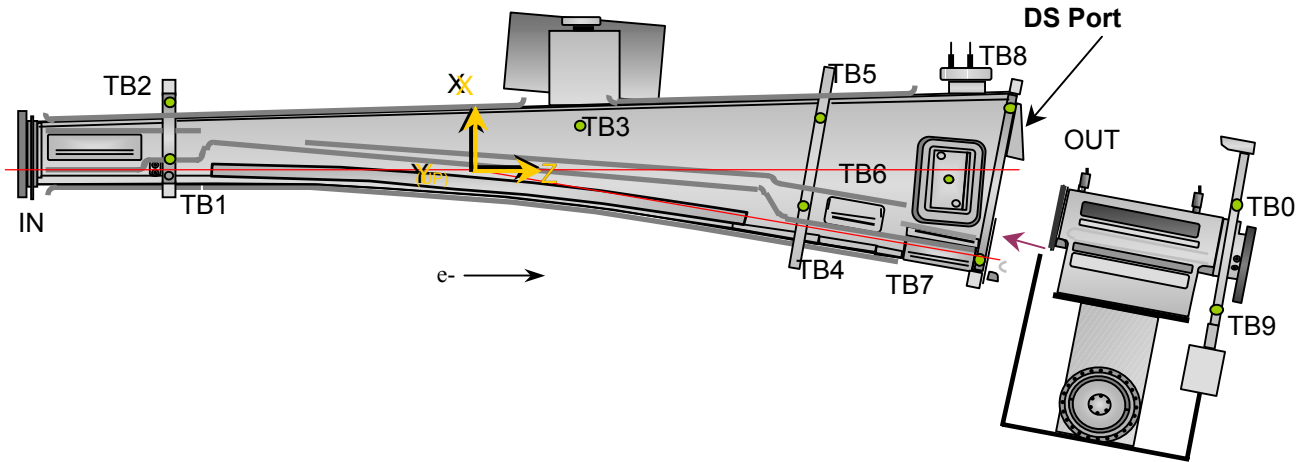
Level Status: OK

US Flange Roll Check

OK ? (YES or NO)

Roll Status: UPDATE

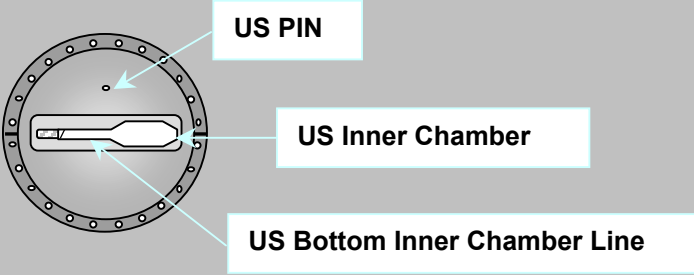
Description:
Fid. vals based on internal chamber datum.



V4 Step A: Check of US Flange Prior to V4 Installation

Step A-2: Pre-Installation Check of UpStream Flange Postion

Metrology Dept:
 Pins did not get remeasured after the roll corrected.



US PIN	Z	X	Y
Measured			
Nominal	-51.000	1.836	2.282
Difference (inches)	-----	-----	-----

US Inner Chamber	Z	X	Y
Measured			
Nominal	-51.000	-1.404	0.000
Difference (inches)	-----	-----	-----

US Bottom Inner Chamber Line	ROLL	(FINAL)	
Measured	-0.929		
Nominal	0.000		
Difference (mrads)	-0.929		

Roll Status
OK

Description:
 Measured vs. nominal values for US flange expressed in the PART coordinate system.
 Fiducial values are updated (using those from Step A-1) if ROLL delta is not within 1mrad.

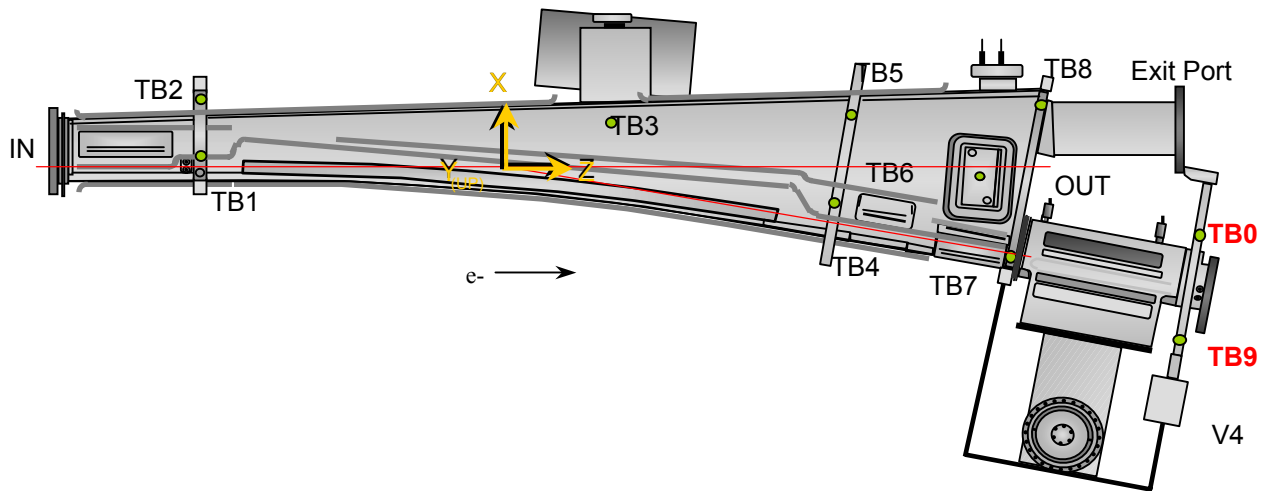
V4 Fiducialization Step: Survey of Fiducial Coordinates for BM1 Standard Vacuum Chamber with V4 and the Exit Port Attached:

Step Fid-1: Position of Added Tooling Balls TB9 and TB0

Fiducial	Z	X	Y
TB9 (V4)	74.679	-20.316	4.380
TB0 (V4)	76.964	-8.223	4.398
	inches	inches	inches

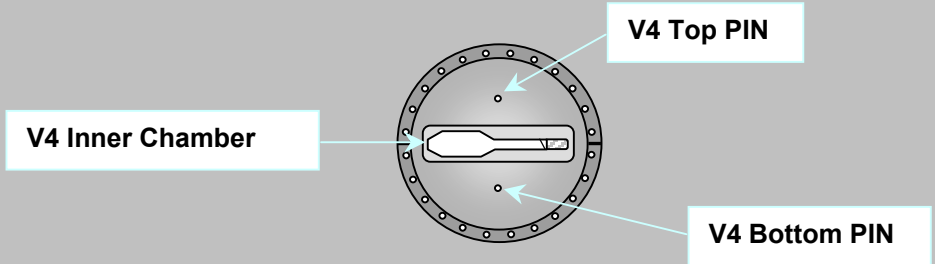
Description:

Fid. vals after V4 and exit port attached.



V4 Fiducialization Step: V4 Flange

Step Fid-2: Set Position of V4 Flange Position



V4 Top PIN	Z	X	Y
Measured	80.213	-0.002	2.281
Nominal	80.000	0.000	2.282
Difference (inches)	0.213	-0.002	-0.001

V4 Bottom PIN	Z	X	Y
Measured	80.187	-0.002	-2.280
Nominal	80.000	0.000	-2.282
Difference (inches)	0.187	-0.002	0.002

V4 Inner Chamber	Z	X	Y
Measured	79.762	-1.412	0.019
Nominal	80.000	-1.404	0.000
Difference (inches)	-0.238	-0.008	0.019

V4 Downstream Z Value	Z
Measured	80.734
Nominal	80.764
Difference (inches)	-0.030

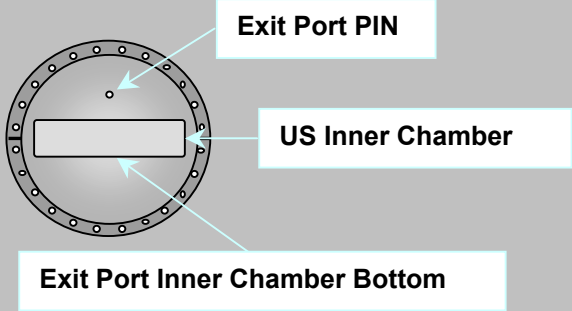
Description:

Measured vs. nominal values for V4 flange expressed in the V4 coordinate system.
 Tol +/- 10mils except for the V4 Z-value. Values in **BOLD** or **RED** are most critical.

V4 Fiducialization Step: Exit Port

Step Fid-3: Post-Installation Check of Exit Port Flange Position

Metrology Dept:
Measurements taken with single support on downstream end.



Exit Port PIN	Z	X	Y
Measured	75.326	4.225	2.290
Nominal	75.000	4.168	2.282
Difference (inches)	0.326	0.057	0.008

Exit Port Inner Chamber Side	Z	X	Y
Measured	75.151	7.473	0.127
Nominal	75.000	7.418	0.000
Difference (inches)	0.151	0.055	0.127

Exit Port Inner Chamber Bottom	Z	X	Y
Measured	74.954	4.194	-0.354
Nominal	75.000	0.000	-0.366
Difference (inches)	-0.046	4.194	0.012

Exit Port DS Z Value (PART Frame)	Z
Measured	75.865
Nominal	75.768
Difference (inches)	0.097

Description:
 Measured vs. nominal values for Exit Port flange expressed in the EXIT PORT coordinate system.
 Tol +/- 10mils except for the V4 Z-value. Values in **BOLD** or **RED** are most critical.

V4 Final Step: Re-Survey of all Ten Fiducials

Fiducial	Z	X	Y	del Z	del X	del Y
TB1	-34.851	1.471	4.364	-0.001	0.000	-0.022
TB2	-34.859	8.437	4.383	0.001	0.000	0.000
TB3	10.908	4.154	2.343	0.001	0.003	0.001
TB4	34.533	-4.879	4.376	0.001	0.002	-0.001
TB5	36.587	6.292	4.378	0.001	0.001	0.001
TB6	52.468	-1.900	2.318			
TB7	55.659	-11.195	3.078	-0.005	0.000	0.001
TB8	59.447	8.985	3.050	0.020	-0.009	-0.007
TB9 (V4)	74.651	-20.316	4.380	-0.029	0.000	0.000
TB0 (V4)	76.924	-8.223	4.398	-0.041	0.000	0.000
	inches	inches	inches			

Description:
 Final survey of BM1 standard vacuum chamber. (With V4 and exit port attached.)
 Note that all comparisons are relative to the most current fiducial values.
 (I.e. deltas are computed using values from Steps A-1 and Fid-1)

