

Fiducials for BM1 Std. Vac. Chamber

BM1005

Date:

4/30/02

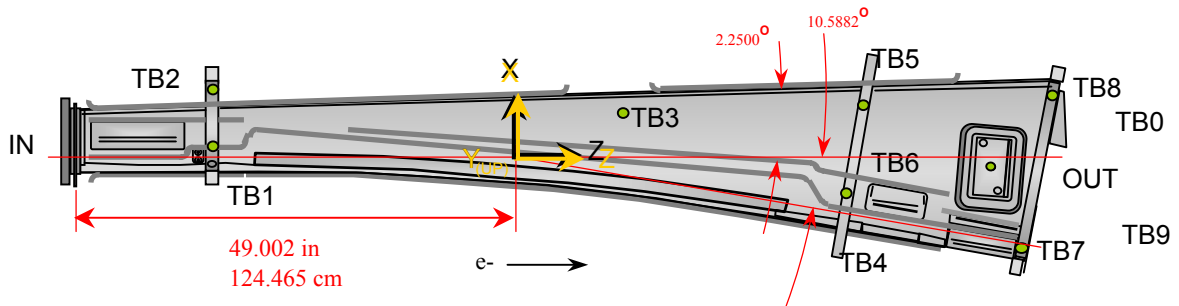
Chamber:

BM1005

Operator(s):

C. Banuelos
M. Gaydosh

Notes:



Fiducial Coordinates for BM1 Standard Vacuum Chamber: (inches)

Fiducial	Z	X	Y
TB1	-34.845	1.535	4.381
TB2	-34.940	8.460	4.403
TB3	10.915	4.152	2.360
TB4	34.550	-4.944	4.365
TB5	36.646	6.256	4.326
TB6	52.476	-1.868	2.230
TB7	55.653	-11.156	3.013
TB8	59.459	9.004	2.941
TB9 (V4)	74.670	-20.346	4.372
TB0 (V4)	76.940	-8.207	4.367

inches inches inches

Nominal Deltas For H3 Absorber (TB6)		
Z	X	Y
52.470	-1.869	2.247
52.493	-1.891	2.242
-0.023	0.022	0.005

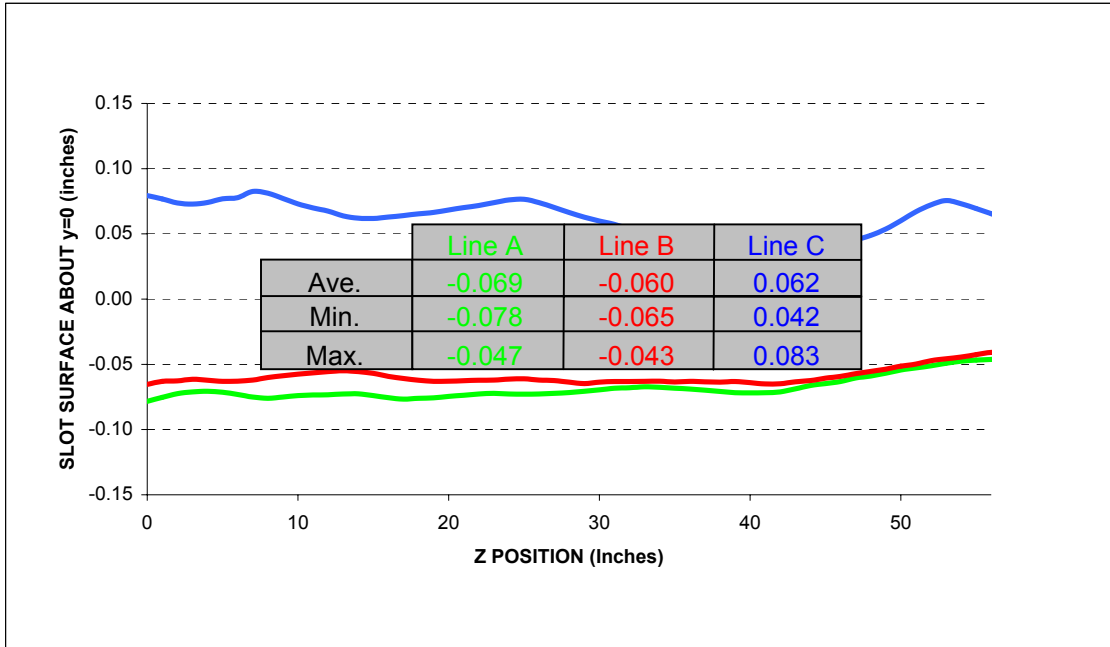
Source **V4 Step**

Description:

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

Fiducialization Step: (Traveler Step # 1380)

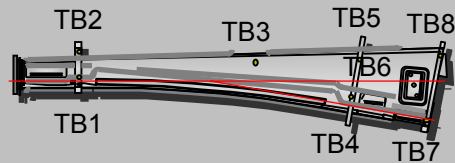
Slot Calibration	
Ideal	0.511
Meas.	0.135
Delta	-0.376



BM1005

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

Fiducial	Z	X	Y
TB1	-34.851	1.535	4.383
TB2	-34.957	8.457	4.374
TB3	10.907	4.162	2.348
TB4	34.539	-4.938	4.366
TB5	36.640	6.260	4.322
TB6	52.470	-1.869	2.247
TB7	55.684	-11.167	3.040
TB8	59.468	9.004	2.937
	inches	inches	inches

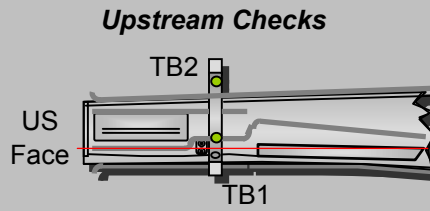


Description:

Fiducial values based on internal chamber datum.

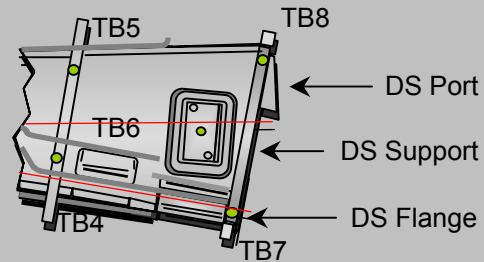
End Surface Attitudes for BM1 Std. Vac. Chamber

Upstream Face		
	yaw	pitch
Measured	1.2	-7.1
Nominal	0.0	0.0
Difference	1.2	-7.1
	mrad	mrad



Downstream Port		
	yaw	pitch
Measured	24.1	4.0
Nominal	25.3	0.0
Difference	-1.2	4.0

Downstream Checks



Downstream Support		
	yaw	pitch
Measured	-185.4	-1.1
Nominal	-184.8	0.0
Difference	-0.6	-1.1

Downstream Flange		
	yaw	pitch
Measured	-191.7	1.8
Nominal	-184.8	0.0
Difference	-6.9	1.8
	mrad	mrad

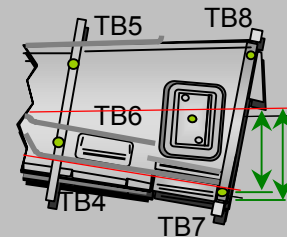
Description:

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

Datum Verification

DS Support	
	x
Measured	-11.906
Nominal	-11.912
Diff.	0.006
	inches

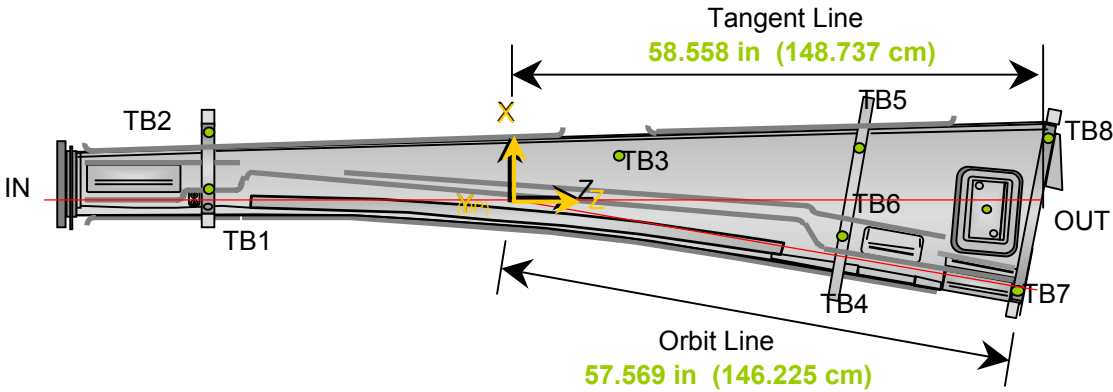
DS Flange	
	x
Measured	-11.949
Nominal	-11.958
Diff.	0.009
	inches



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 58.578 inches	without SMR	58.558 OK
Orbit Line:	Length 57.506 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	-34.840	1.537	4.386	0.011	0.002	0.003
TB2	-34.939	8.461	4.374	0.018	0.003	0.001
TB3	10.916	4.147	2.343	0.009	-0.015	-0.005
TB4	34.550	-4.946	4.363	0.010	-0.007	-0.003
TB5	36.644	6.255	4.319	0.003	-0.004	-0.003
TB6						
TB7	55.647	-11.149	3.042	-0.037	0.018	0.002
TB8	59.453	9.008	2.942	-0.015	0.005	0.006
	inches	inches	inches	Compared to Step 1 Fiducial Coords.		

DS Port Level Check

OK ? (YES or NO)

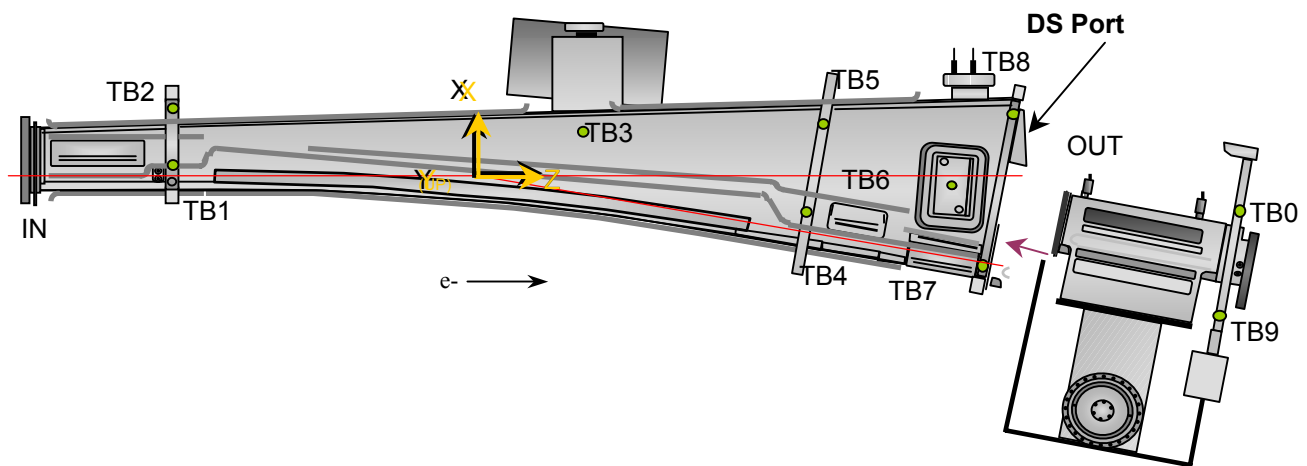
Level Status: OK

US Flange Roll Check

OK ? (YES or NO)

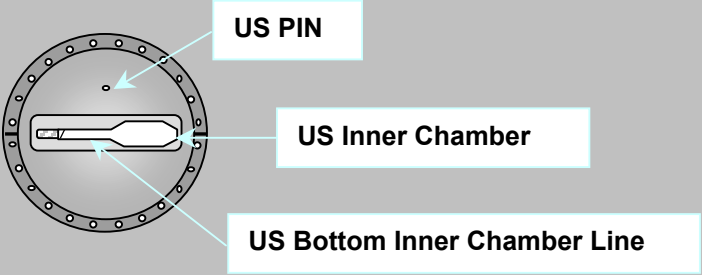
Roll Status: UPDATE

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 Position



The diagram shows a top-down view of a circular flange with a central rectangular chamber. A small dot is labeled 'US PIN'. The central chamber is labeled 'US Inner Chamber'. A horizontal line at the bottom of the inner chamber is labeled 'US Bottom Inner Chamber Line'.

US PIN	Z	X	Y
Measured	-50.873	1.892	2.288
Nominal	-51.000	1.836	2.282
Difference (inches)	0.127	0.056	0.006

US Inner Chamber	Z	X	Y
Measured	-50.557	-1.361	0.055
Nominal	-51.000	-1.404	0.000
Difference (inches)	0.443	0.043	0.055

US Bottom Inner Chamber Line	ROLL	(FINAL)
Measured	-0.925	
Nominal	0.000	
Difference (mrads)	-0.925	

Roll Status **OK**

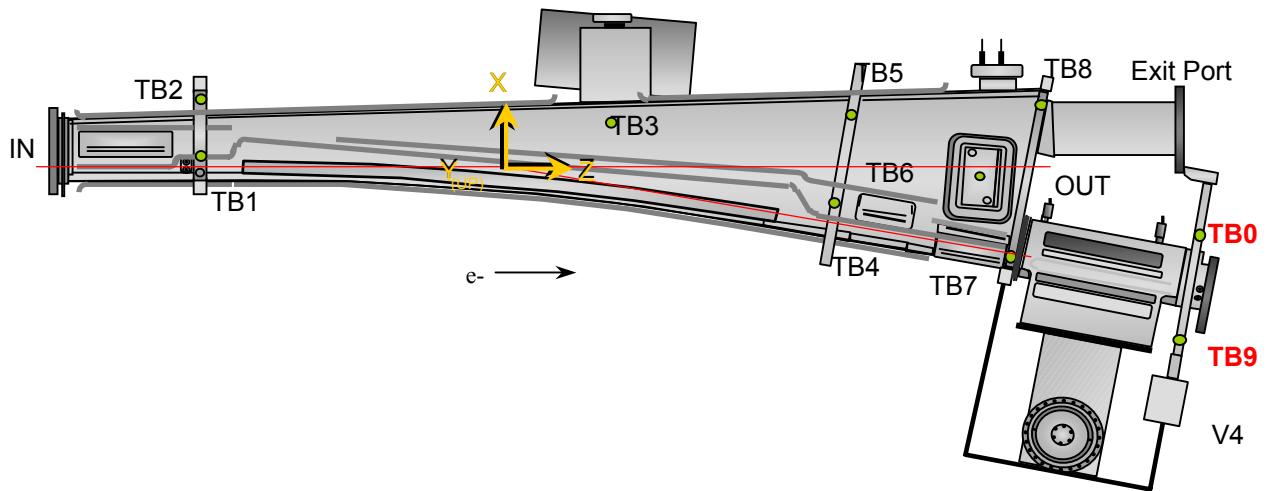
Description:
 Measured vs. nominal values for US flange expressed in the PART coordinate system.
 Fiducial values are updated (using those from Step A-1) if ROLL delta is not within 1 mrad.

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

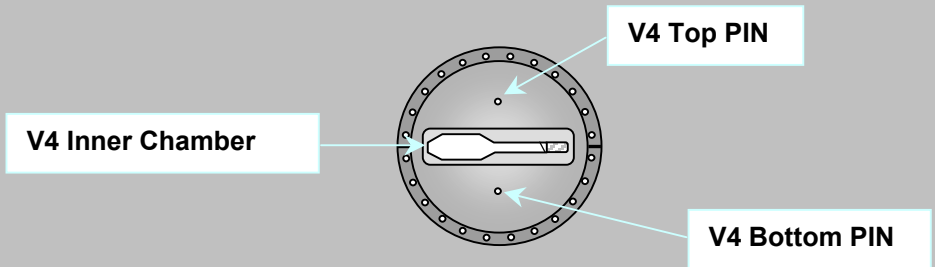
Fiducial	Z	X	Y
TB9 (V4)	74.671	-20.362	4.369
TB0 (V4)	76.951	-8.225	4.371
	inches	inches	inches

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	80.218	-0.002	2.276
Nominal	80.000	0.000	2.282
Difference (inches)	0.218	-0.002	-0.006

V4 Bottom PIN	Z	X	Y
Measured	80.222	-0.003	-2.290
Nominal	80.000	0.000	-2.282
Difference (inches)	0.222	-0.003	-0.008

V4 Inner Chamber	Z	X	Y
Measured	79.968	-1.408	0.052
Nominal	80.000	-1.404	0.000
Difference (inches)	-0.032	-0.004	0.052

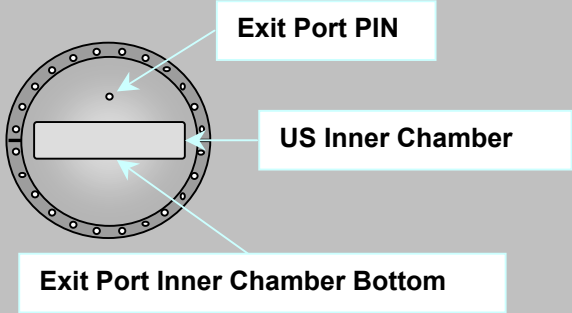
V4 Downstream Z Value	Z
Measured	80.752
Nominal	80.764
Difference (inches)	-0.012

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



The diagram shows a top-down view of a circular flange with a central rectangular chamber. Three callout boxes with arrows point to specific features: 'Exit Port PIN' points to a small dot on the top edge, 'US Inner Chamber' points to the central rectangular area, and 'Exit Port Inner Chamber Bottom' points to the bottom edge of the chamber.

Exit Port PIN	Z	X	Y
Measured	75.316	4.190	2.264
Nominal	75.000	4.168	2.282
Difference (inches)	0.316	0.022	-0.018

Exit Port Inner Chamber Side	Z	X	Y
Measured	74.764	7.447	-0.181
Nominal	75.000	7.418	0.000
Difference (inches)	-0.236	0.029	-0.181

Exit Port Inner Chamber Bottom	Z	X	Y
Measured	74.933	4.138	-0.389
Nominal	75.000	0.000	-0.366
Difference (inches)	-0.067	4.138	-0.023

Exit Port DS Z Value (PART Frame)	Z
Measured	75.866
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	-34.845	1.535	4.381	-0.005	-0.002	-0.005
TB2	-34.940	8.460	4.403	-0.001	-0.001	0.029
TB3	10.915	4.152	2.360	-0.001	0.005	0.017
TB4	34.550	-4.944	4.365	0.000	0.002	0.002
TB5	36.646	6.256	4.326	0.002	0.001	0.007
TB6	52.476	-1.868	2.230			
TB7	55.653	-11.156	3.013	0.006	-0.007	-0.029
TB8	59.459	9.004	2.941	0.006	-0.004	-0.001
TB9 (V4)	74.670	-20.346	4.372	-0.001	0.015	0.003
TB0 (V4)	76.940	-8.207	4.367	-0.011	0.018	-0.004
	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)

