Jefferson Lab Alignment Group

Data Transmittal

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DETAILS: data : inspection\hallb\torus12g\150826A

The data below is from the Torus magnet survey of August 25th and 26th, 2015. The twelve found edge fiducial points were used to form a plane and a circle for the upstream and downstream positions. The origin is the coil case design zero as shown on drawing B00000-04-01-1101. The Z axis is determined by the central hub flanges, with the positive Z going from upstream to downstream. Positive X is perpendicular to the beam left from this line and positive Y is perpendicular in the vertical direction (not vertical to gravitiy).

Hub Line Data							
Local System (mm)				Cebaf Coordinate System			
	x[mm]	y[mm]	z[mm]		x[M]	y[M]	z[M]
Design zero	0.00	0.00	0.00	Design zero	-80.60000	103.35526	-401.18852
Upstream	-0.88	-4.07	457.83	Upstream	-80.59912	103.35119	-401.64635
downstream	-0.52	0.66	2508.07	downstream	-80.59948	103.35592	-403.69659
Found Angles	Yaw	Pitch					
	0.0101	0.1322					

In the local system, the found and ideal coordinates, plus their deltas are shown below. Additionally, a plane and circle were formed to the found data. Units are millimeters.

Upstream Points Found				Ideals			Deltas			plane fit results	Planar Error	Radial Error
Coil	x	y	z	x	y	z	x	y	z			
A	0.43	3206.13	-499.99	0.04	3207.24	-507.04	0.39	-1.11	7.05	AUS	0.30	0.30
B	-2777.40	1602.66	-499.61	-2777.63	1603.47	-506.82	0.23	-0.81	7.21	BUS	-0.36	-0.23
C	-2778.45	-1603.77	-498.07	-2777.30	-1604.17	-506.91	-1.15	0.40	8.84	CUS	0.00	-0.10
D	0.25	-3208.87	-497.53	0.77	-3207.36	-507.04	-0.52	-1.51	9.51	DUS	0.40	0.36
E	2776.81	-1604.83	-499.43	2777.59	-1603.67	-507.00	-0.78	-1.16	7.57	EUS	-0.46	-0.28
F	2776.92	1602.40	-500.05	2777.63	1603.66	-507.05	-0.71	-1.27	7.00	FUS	0.10	-0.05
Downstream Points Found				**Ideals**			**Deltas**			**plane fit results**	**Planar Error**	**Radial Error**
Coil	**x**	**y**	**z**	**x**	**y**	**z**	**x**	**y**	**z**			
A	0.62	4212.61	884.76	-0.03	4213.08	878.24	0.65	-0.47	6.52	ADS	0.52	0.05
B	-3649.70	2104.63	885.10	-3648.27	2106.44	878.14	-1.43	-1.81	6.96	BDS	-0.45	-0.03
C	-3647.99	-2108.89	886.87	-3648.72	-2106.07	878.17	0.73	-2.82	8.70	CDS	-0.16	-0.05
D	0.66	-4214.02	887.93	-0.50	-4212.87	878.31	1.16	-1.15	9.62	DDS	0.71	0.10
E	3648.39	-2107.47	885.26	3648.57	-2106.38	878.22	-0.18	-1.09	7.04	EDS	-0.65	-0.07
F	3648.96	2105.25	884.45	3648.62	2106.64	878.22	0.34	-1.39	6.23	FDS	0.03	0.00

The deltas above are relative to the coordinate system with a + z being too far downstream, +x being to the beam left from ideal, and +y above the ideal point. The planar errors are deltas from the determined plane. The planes normal angle is downstream and a positive value is the amount downstream. The radial error is the amount from the calculated circle center. A positive radial error means the point lies beyond the circle's edge.

The calculated circle centers are shown below, in the above referenced system.

Circle Centers			
Position	**X**	**Y**	**Z**
Upstream	-0.42	-1.35	-499.11
Downstream	-0.20	-0.68	885.73

The pitch and yaw rotation angles for the planes are shown below. Pitch is the rotation about the X axis. Yaw is the rotation about the Y axis. Positive follows the right hand rule. Units are degrees.

rotation angles for upstream	
Pitch	89.9790°
Yaw	90.0093°
Rotation Angles for Downstream	
Rx from Y	90.0202°
Ry from Z	90.0089°