

## LCLS II 2Q10 Fiducialization Report



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-344-113-21  
Barcode # : 4191  
Mfg. S/N : #15

## **Coordinate System Setup**

### **Spatial Alignment**

The Spatial Alignment of the magnet is created through a composite best-fit of the pole tips. Each pole tip scanned 0.150 inch inboard from the upstream magnet face and the downstream magnet face. A composite best-fit of the upstream poles and the downstream poles is made with the nominal pole tip shape and location. An axis is created through the two best-fit centerpoints. This axis is the spatial alignment of the magnet and defines the Z axis.

### **Planar Alignment**

The Planar Alignment of the magnet is the created by averaging the rotations of the composite best-fits of the upstream pole tips and downstream pole tips. This direction defines the Y and X directions of the magnet.

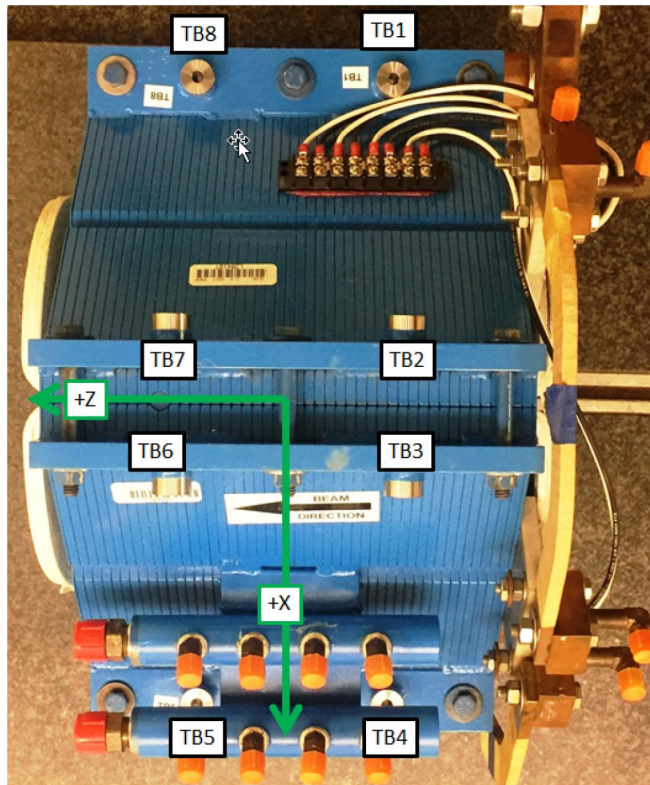
### **Coordinate Origins**

The origins of the magnet coordinate system are as follows. The XY origin lies on the axis of spatial alignment. The Z origin is the intersection of the mid-plane between the upstream and downstream magnet faces and the Z axis.

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## Tooling Ball Locations



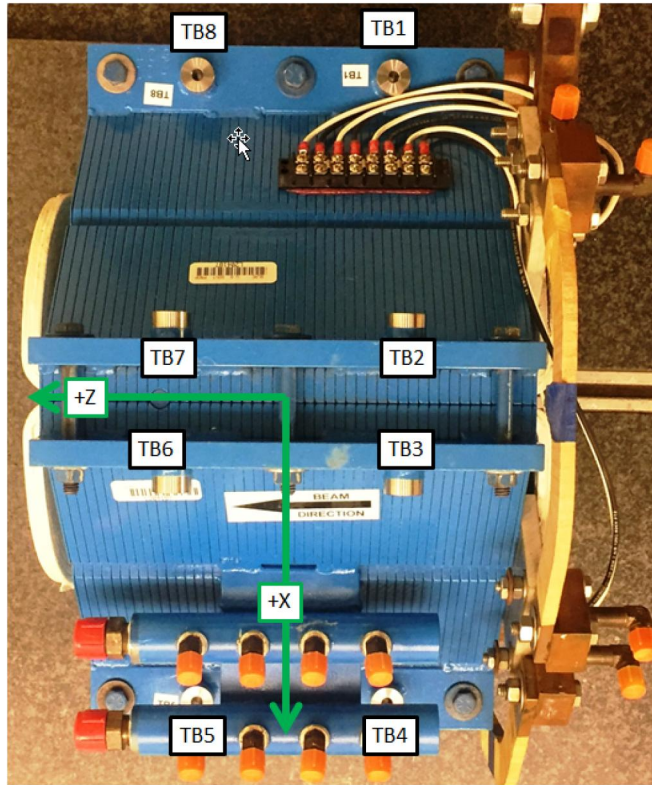
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-7.0647	2.6952	-2.1532
TB 2	-2.6839	7.0779	-2.1603
TB 3	2.6824	7.0561	-2.1710
TB 4	7.0476	2.6824	-2.1801
TB 5	7.0695	2.6769	2.1611
TB 6	2.6902	7.0568	2.1812
TB 7	-2.6680	7.0746	2.1788
TB 8	-7.0548	2.6914	2.1907

Tooling Ball Locations are 1 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

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## Tooling Ball Locations



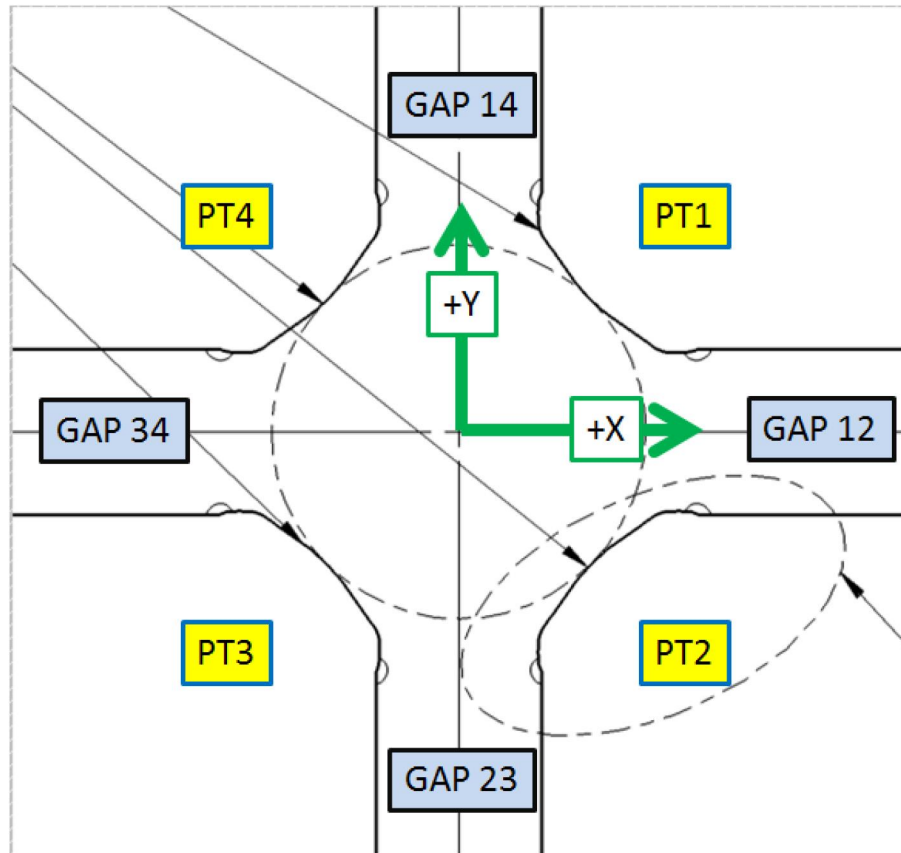
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-7.0692	2.0077	-2.1535
TB 2	-1.9954	7.0766	-2.1627
TB 3	1.9954	7.0598	-2.1700
TB 4	7.0448	1.9947	-2.1812
TB 5	7.0658	1.9898	2.1621
TB 6	2.0039	7.0549	2.2111
TB 7	-1.9803	7.0810	2.1466
TB 8	-7.0496	2.0041	2.1890

Tooling Ball Locations are 5/16 inch above Tooling Ball Adapter Plane  
Dimensions in Inch

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## Pole Tip Gap Measurements



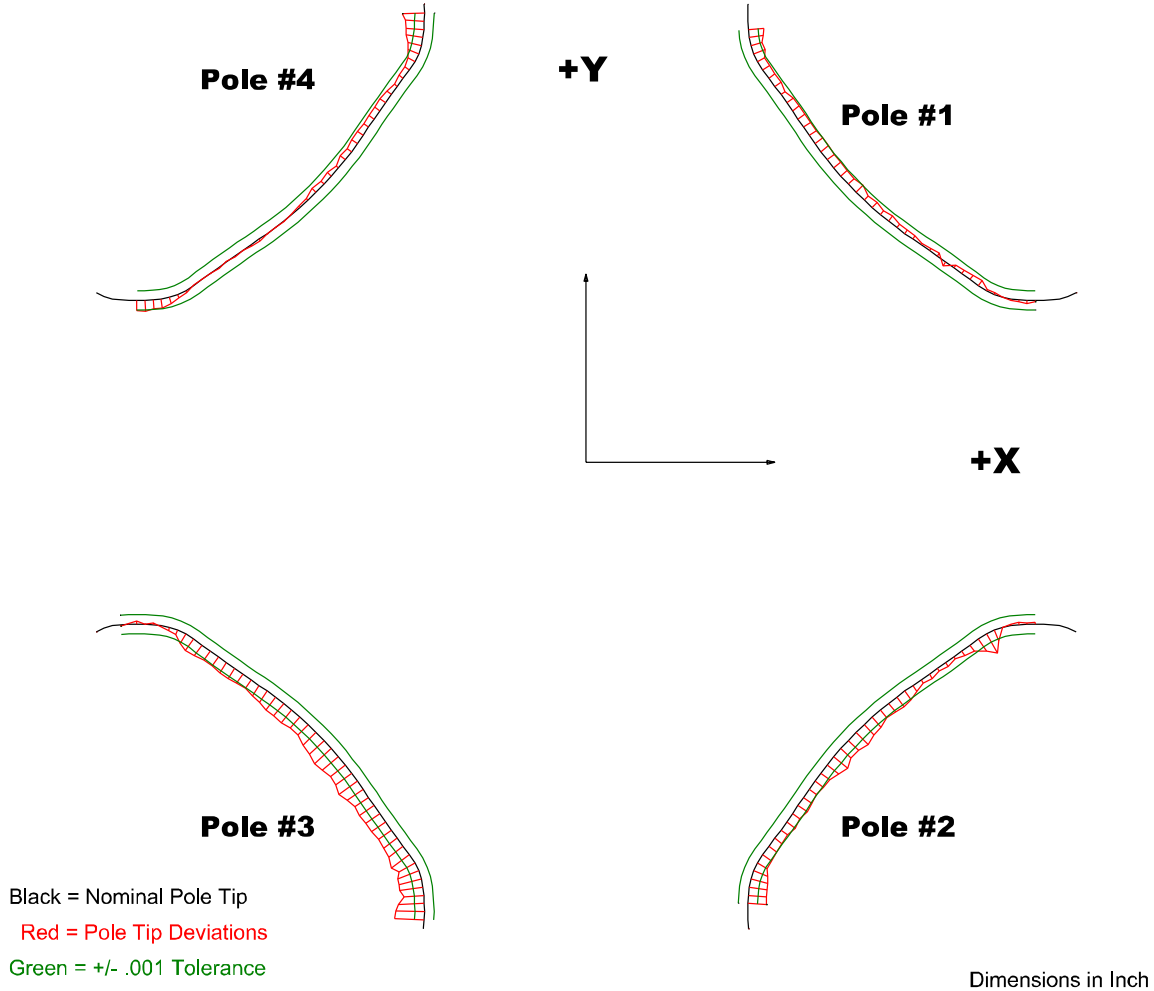
	Nominal Distance	Downstream Pole End	Upstream Pole End
PT Distance 1-3	2.026	2.02887	2.02943
PT Distance 2-4	2.026	2.02835	2.0283
Gap 1-2	0.8602	0.85873	0.85765
Gap 2-3	0.8602	0.86347	0.8628
Gap 3-4	0.8602	0.85688	0.85758
Gap 1-4	0.8602	0.86264	0.86151

Dimensions in Inch

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## Composite Best-fit of Pole Tips, Downstream



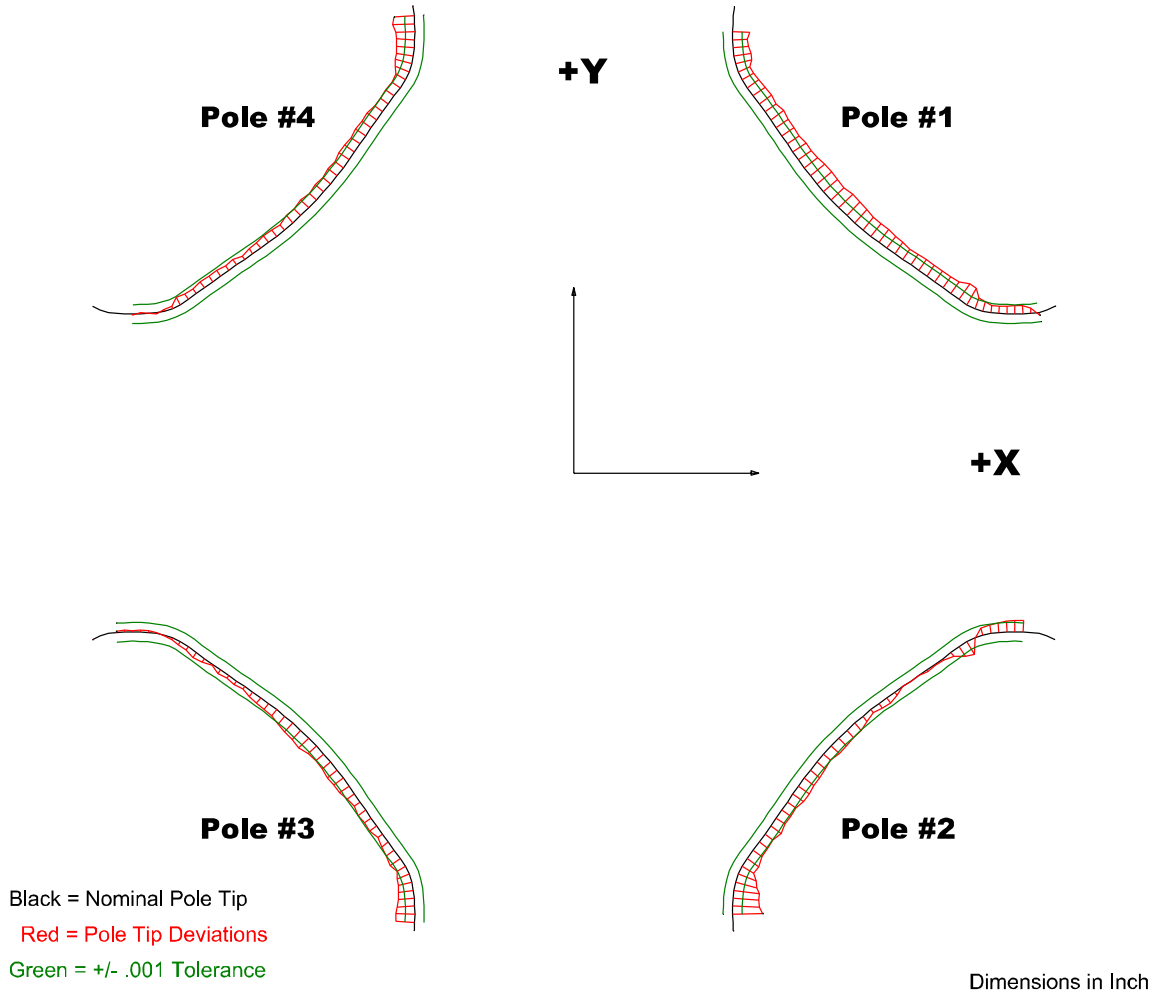
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00159	-0.00234	-0.00308	-0.00233
Max. Dev.	0.00049	0.00023	0.00029	0.00113

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## Composite Best-fit of Pole Tips, Upstream



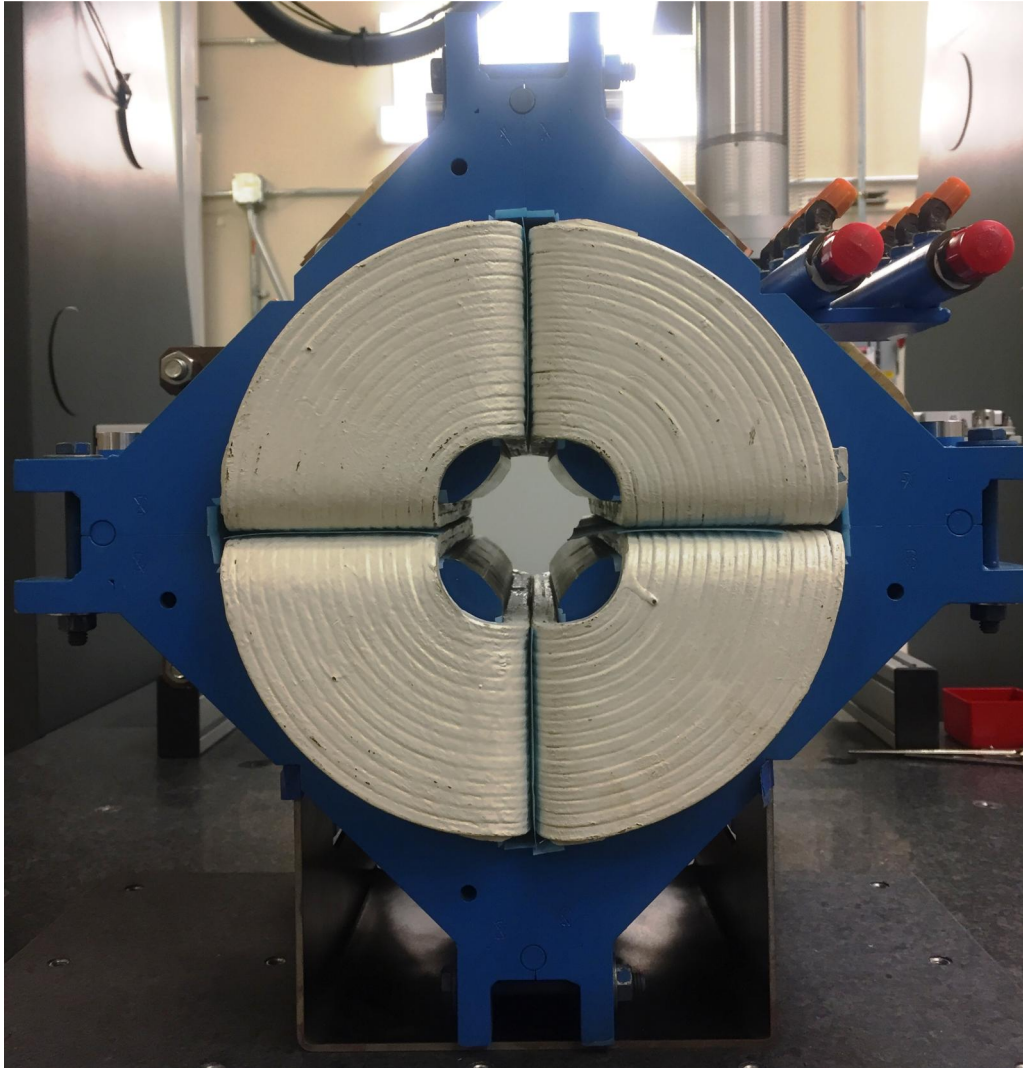
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00207	-0.00319	-0.00201	-0.0023
Max. Dev.	0.0003	0.00128	0.00023	0.00014

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## Angle of the Composite Pole Tip Best-Fit



in Decimal Degrees ° : 0.10478  
Angle in Milliradians : 1.82878

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