

## LCLS II 2Q10 Fiducialization Report



Inspector : K. Caban  
Engineer : J. Amann  
Drawing No. : SA-344-113-21  
Barcode # : 4184  
Mfg. S/N : #12

## **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.

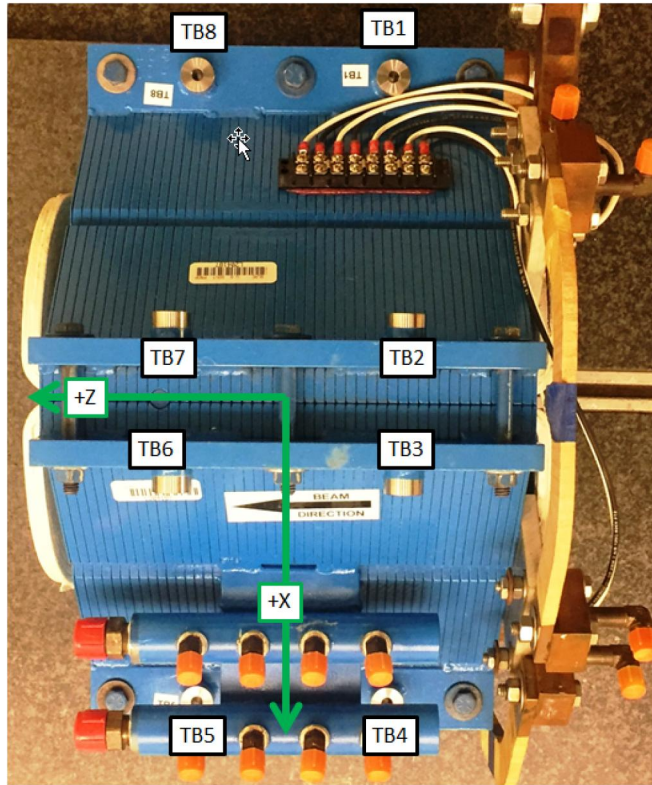
### **Coordinate Origins**

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



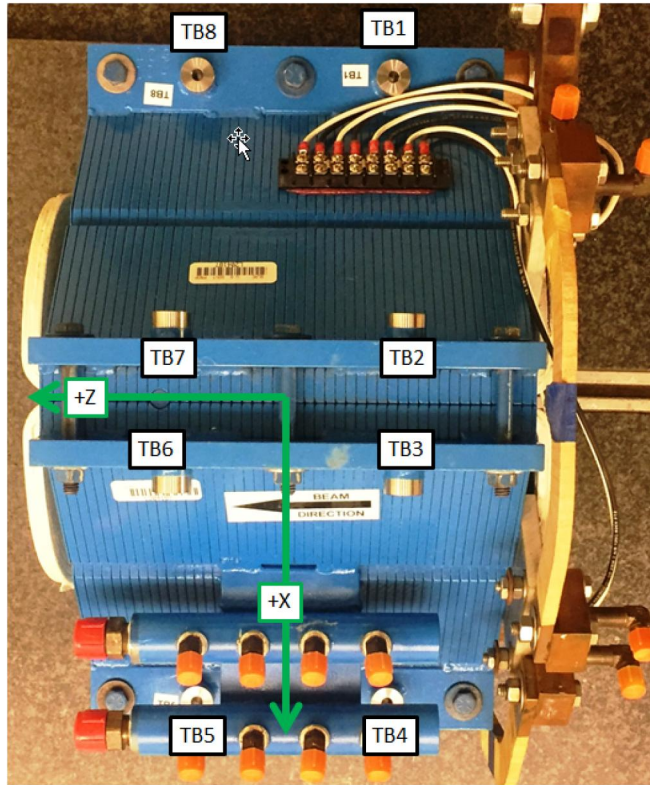
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-7.0676	2.6764	-2.1535
TB 2	-2.6747	7.0585	-2.1738
TB 3	2.6799	7.0711	-2.1761
TB 4	7.0687	2.6643	-2.1899
TB 5	7.0566	2.6749	2.1527
TB 6	2.6871	7.0681	2.1649
TB 7	-2.6754	7.0584	2.1683
TB 8	-7.0600	2.6779	2.1859

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

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## Tooling Ball Locations



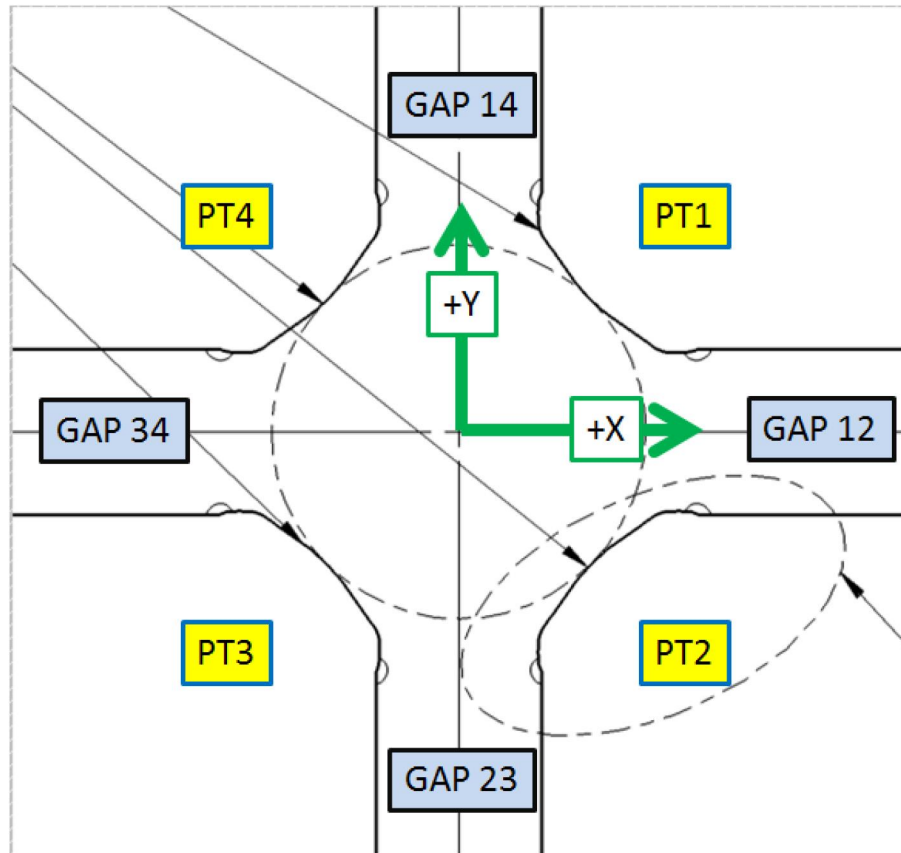
Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	-7.0644	1.9877	-2.1535
TB 2	-1.9868	7.0591	-2.1739
TB 3	1.9924	7.0691	-2.1745
TB 4	7.0674	1.9770	-2.1880
TB 5	7.0568	1.9883	2.1552
TB 6	2.0003	7.0669	2.1821
TB 7	-1.9869	7.0642	2.1488
TB 8	-7.0559	1.9904	2.1866

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

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## Pole Tip Gap Measurements



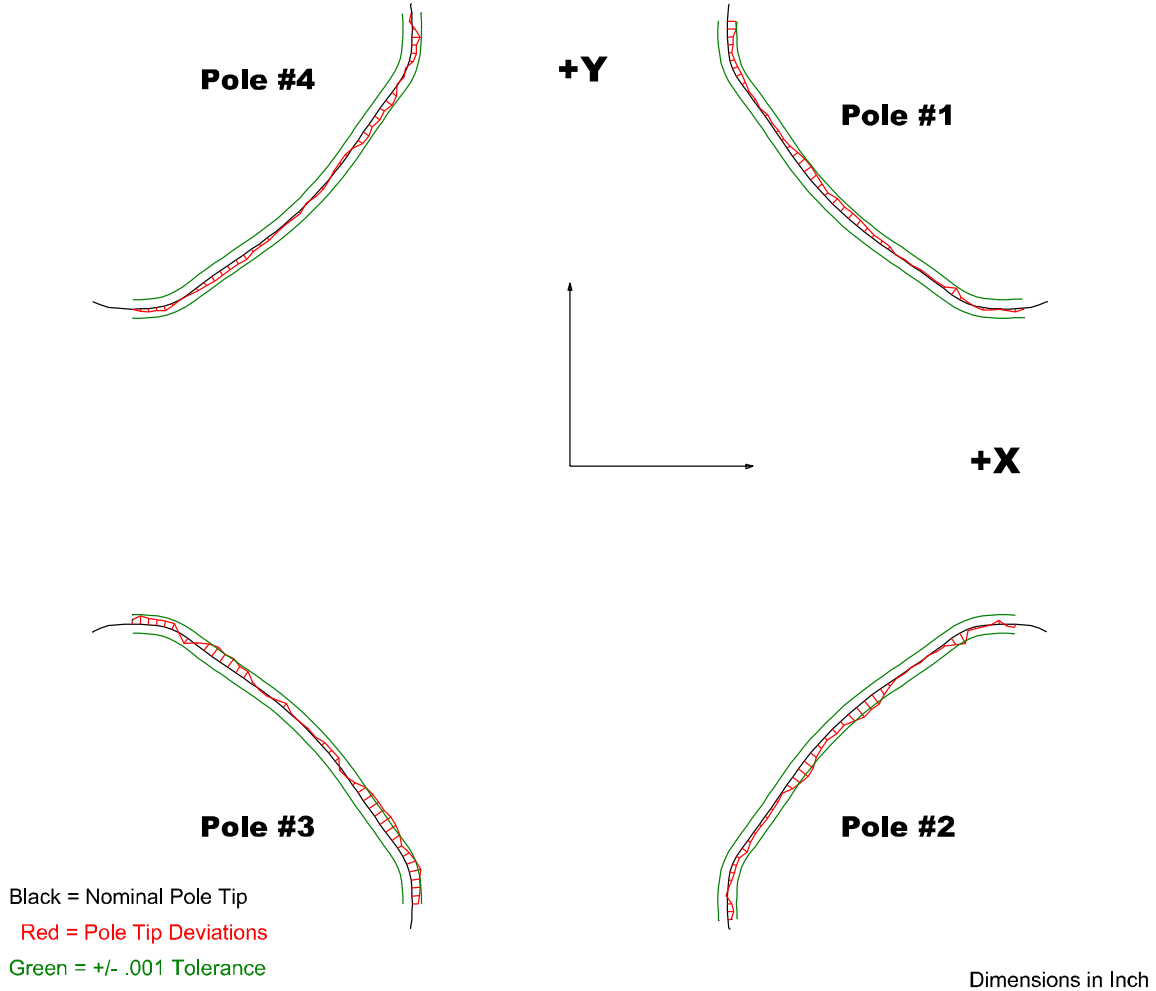
	Nominal Distance	Downstream Pole End	Upstream Pole End
PT Distance 1-3	2.026	2.02649	2.02636
PT Distance 2-4	2.026	2.0266	2.02703
Gap 1-2	0.8602	0.85751	0.85667
Gap 2-3	0.8602	0.85773	0.85272
Gap 3-4	0.8602	0.85736	0.85732
Gap 1-4	0.8602	0.85794	0.85988

Dimensions in Inch

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## Composite Best-fit of Pole Tips, Downstream



### Pole Tip Deviations

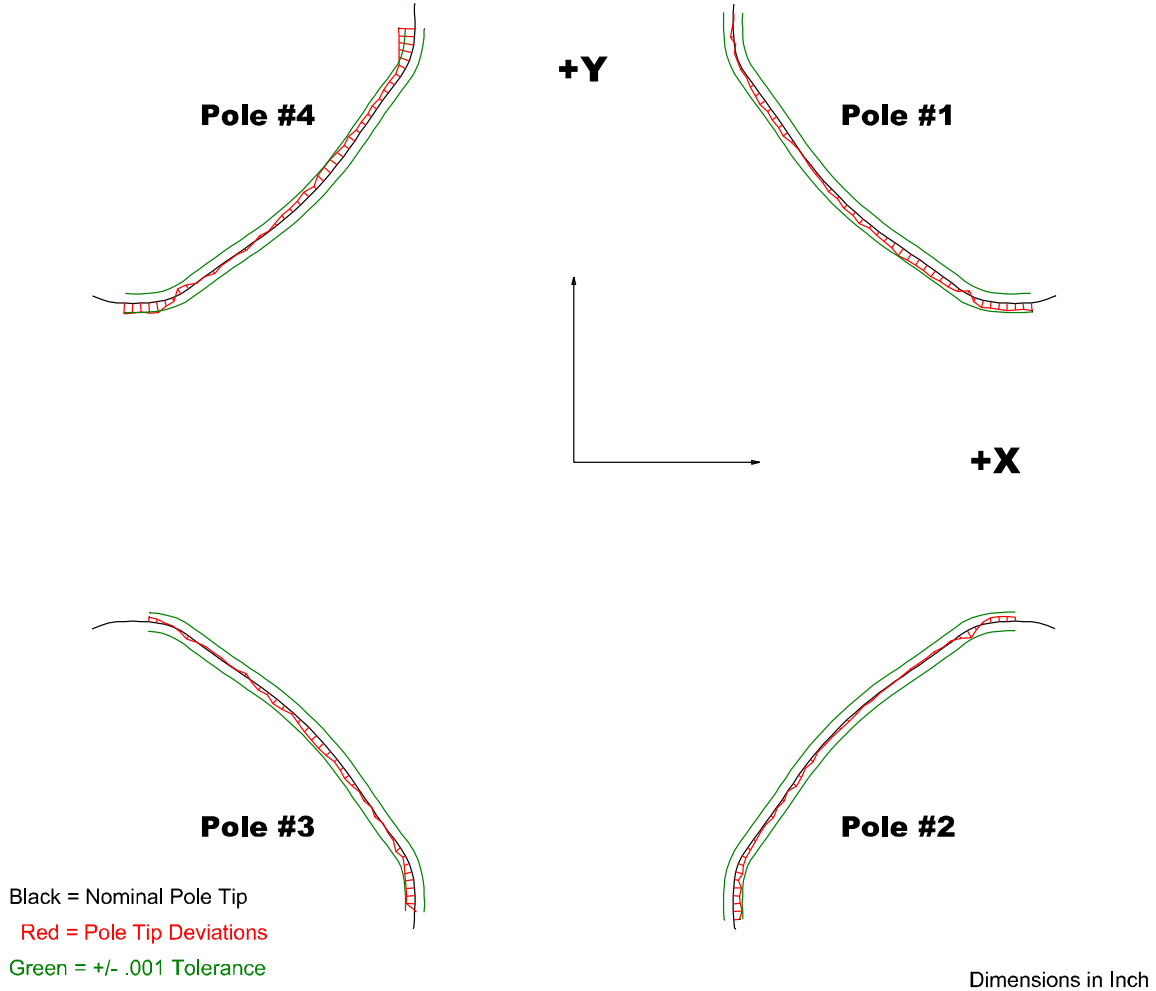
Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00096	-0.00132	-0.00067	-0.0003
Max. Dev.	0.00035	0.00038	0.00143	0.00089

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## Composite Best-fit of Pole Tips, Upstream



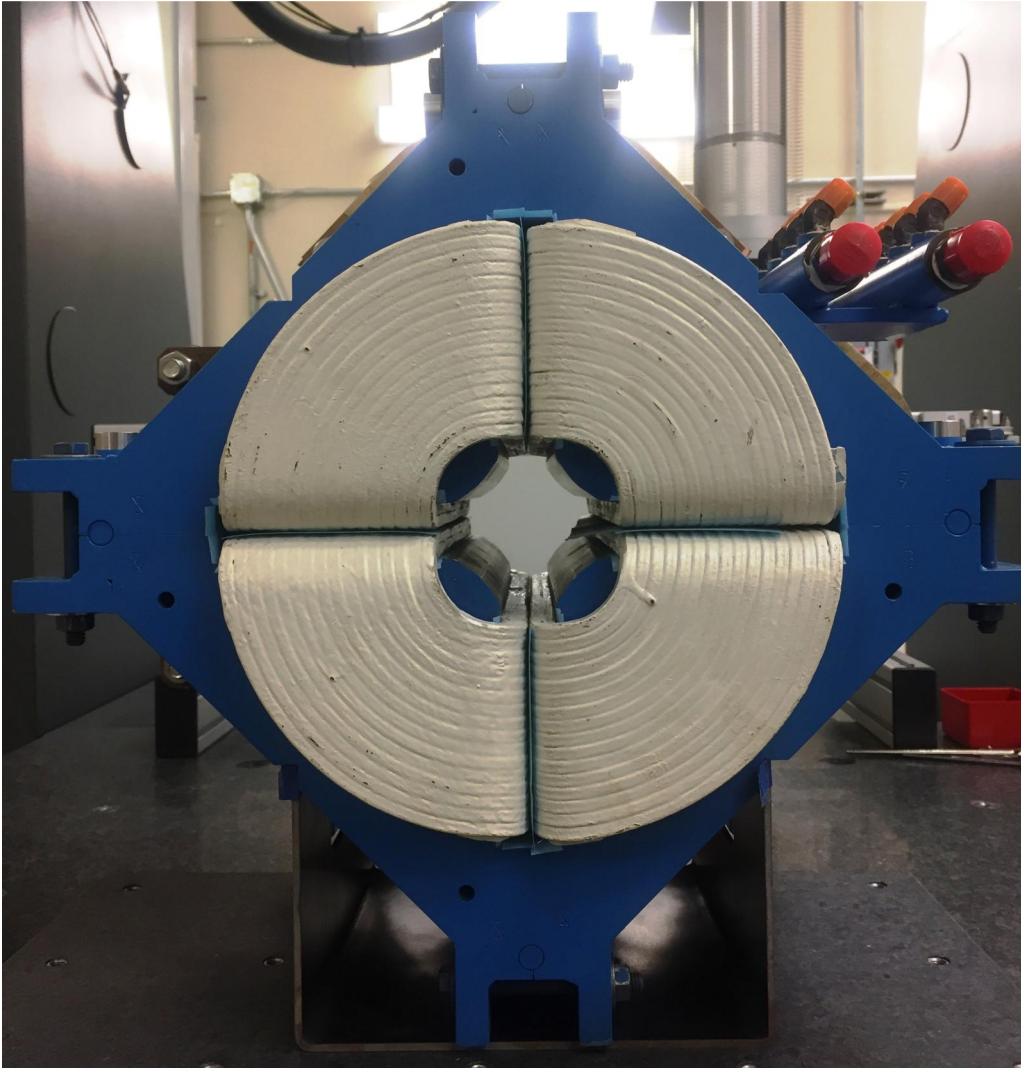
### Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.0004	-0.00096	-0.00095	-0.00172
Max. Dev.	0.00089	0.00056	0.00049	0.00114

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## Angle of the Composite Pole Tip Best-Fit



in Decimal Degrees ° : 0.06117  
Angle in Milliradians : 1.06760

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