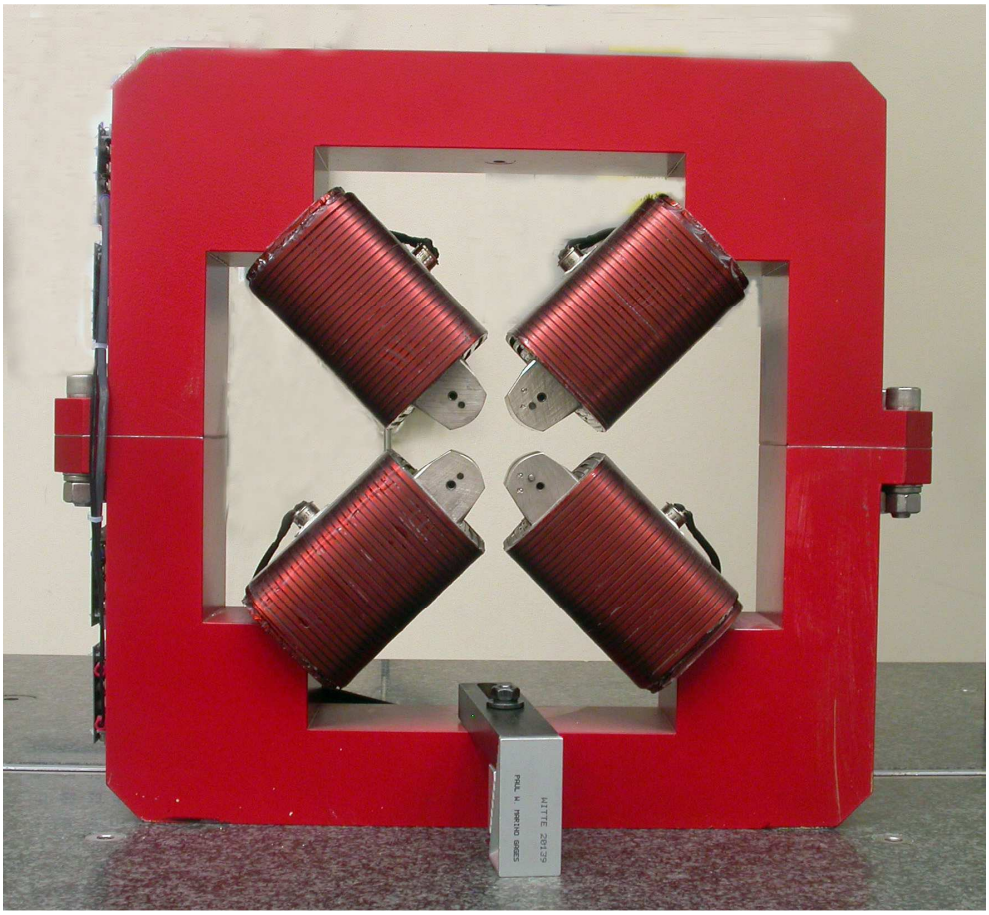
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

Drawing No. : SA-380-309-12 R1

Barcode No.: 4001

Mfg. S/N : 008

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 .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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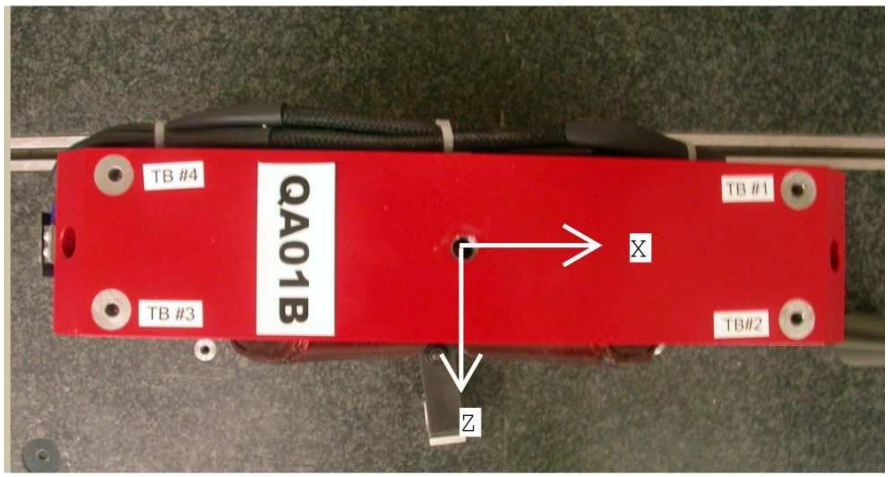
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.50112	8.87519	-1.24988
TB 2	6.50145	8.87669	1.25188
TB 3	-6.49860	8.87696	1.24814
TB 4	-6.49800	8.87631	-1.25205
TB A	6.50023	8.18841	-1.24947
TB B	6.50120	8.18818	1.25049
TB C	-6.49881	8.18981	1.24868
TB D	-6.49816	8.18902	-1.25102

Tooling Ball Locations (1-4) are 1 inch above unpainted surface pads
Tooling Ball Locations (A-D) are 5/16 inch above unpainted surface pads

Dimensions in Inch

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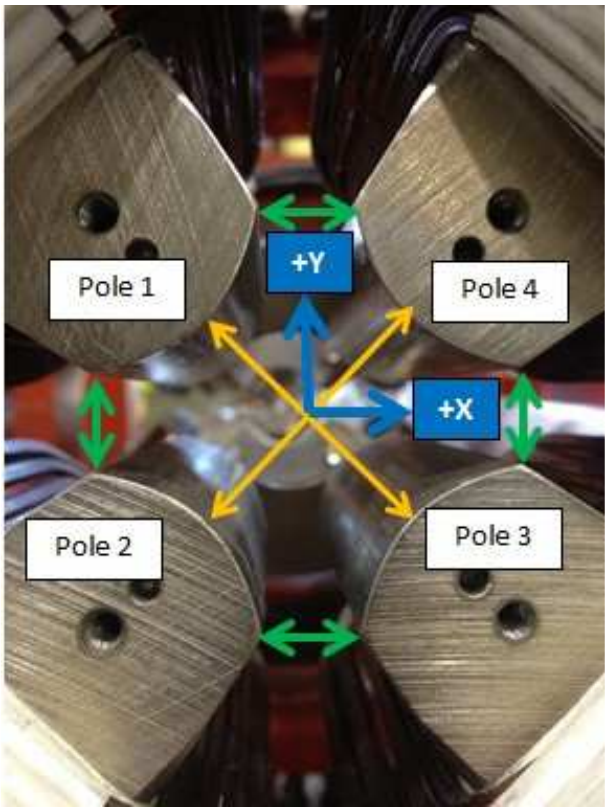
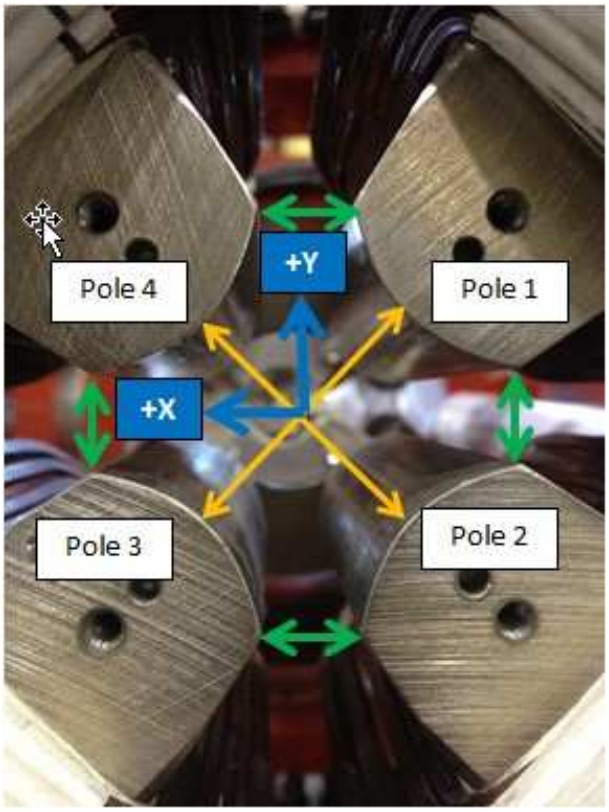
Pole Tip Gap Measurements

Pole Tips View from Downstream



Pole Tips View from Upstream



	Nominal Distance	Downstream Pole Ends	Upstream Pole Ends
Pole Tip Distance 1-3	1.260	1.2594	1.25986
Pole Tip Distance 2-4	1.260	1.26051	1.26106
Gap 1-2	.422	0.4221	0.42436
Gap 2-3	.422	0.42255	0.42065
Gap 3-4	.422	0.42219	0.42371
Gap 4-1	.422	0.42128	0.42199

Dimensions in Inch

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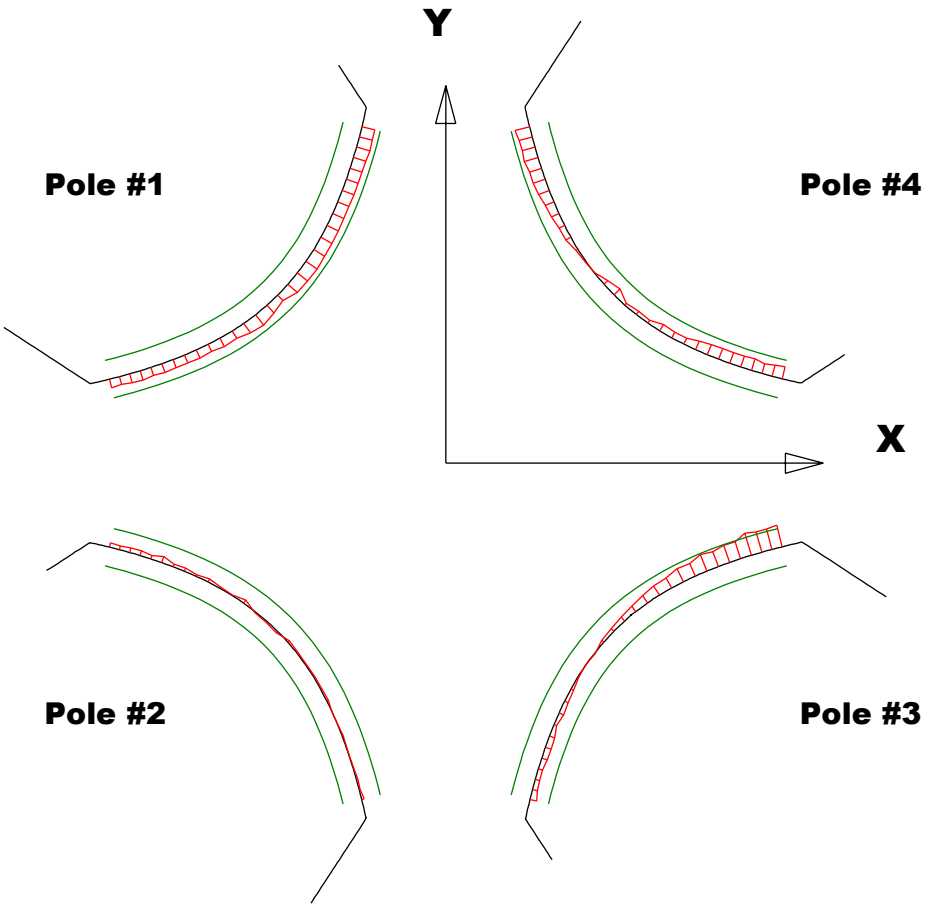
Composite Best-fit of Pole Tips, Downstream



Black = Nominal Pole Tip
Red = Pole Tip Deviations
Green = +/- .001 Tolerance

Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	0.0004	-0.00011	-0.00037	-0.00066
Max. Dev.	0.00074	0.00034	0.00122	0.00081

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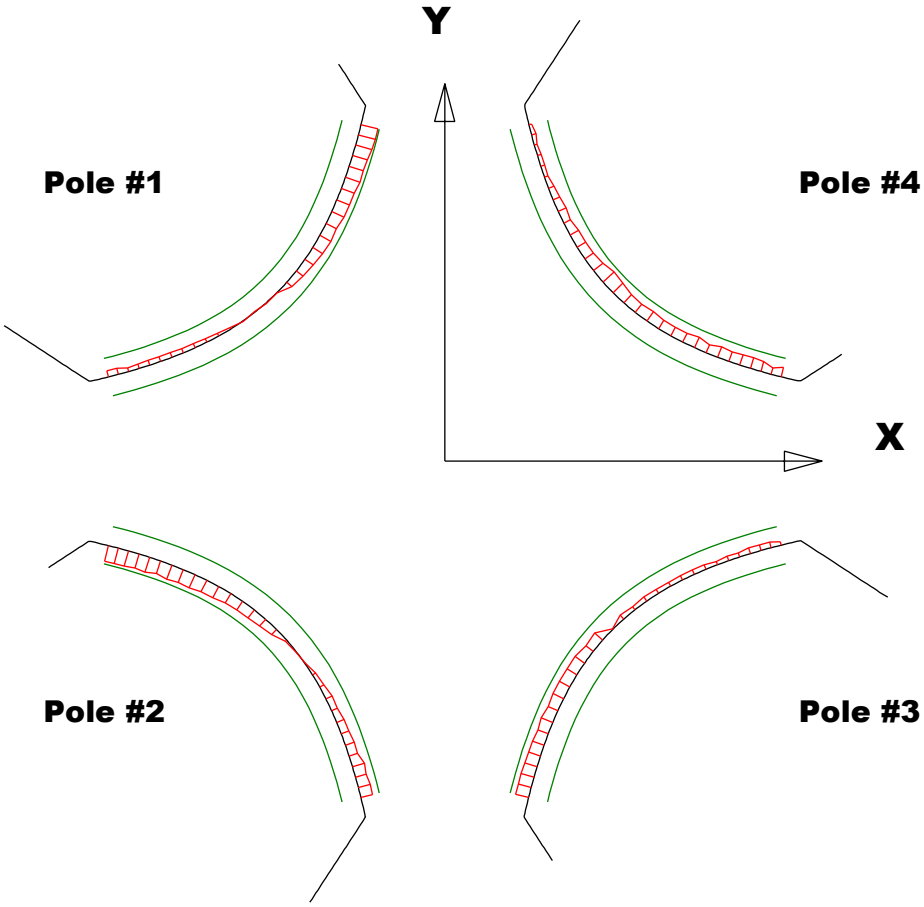
Composite Best-fit of Pole Tips, Upstream



Black = Nominal Pole Tip
Red = Pole Tip Deviations
Green = +/- .001 Tolerance

Dimensions in Inch

Pole Tip Deviations

Pole Tip	#1	#2	#3	#4
Min. Dev.	-0.00034	-0.00086	0.00004	-0.00079
Max. Dev.	0.00093	0.00067	0.00072	-0.00013

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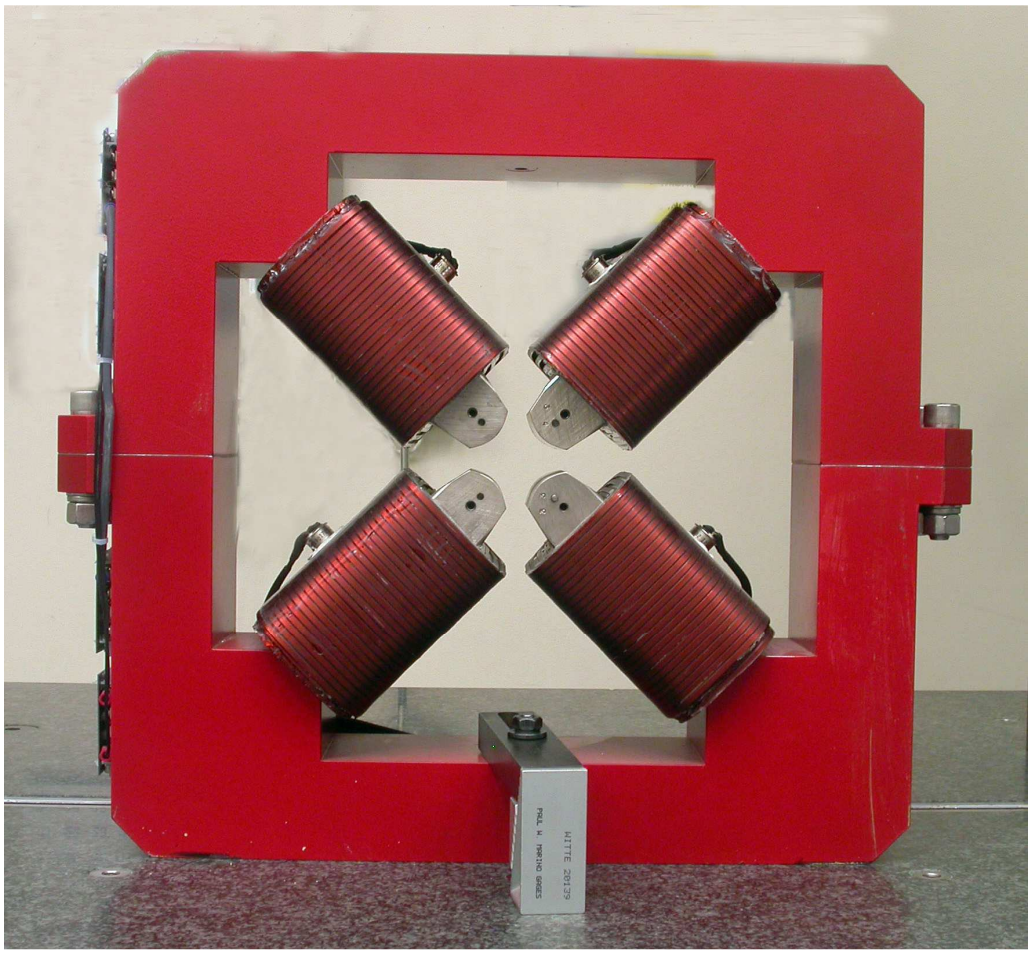
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = 0.00444

Angle in Milliradians = 0.07752

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