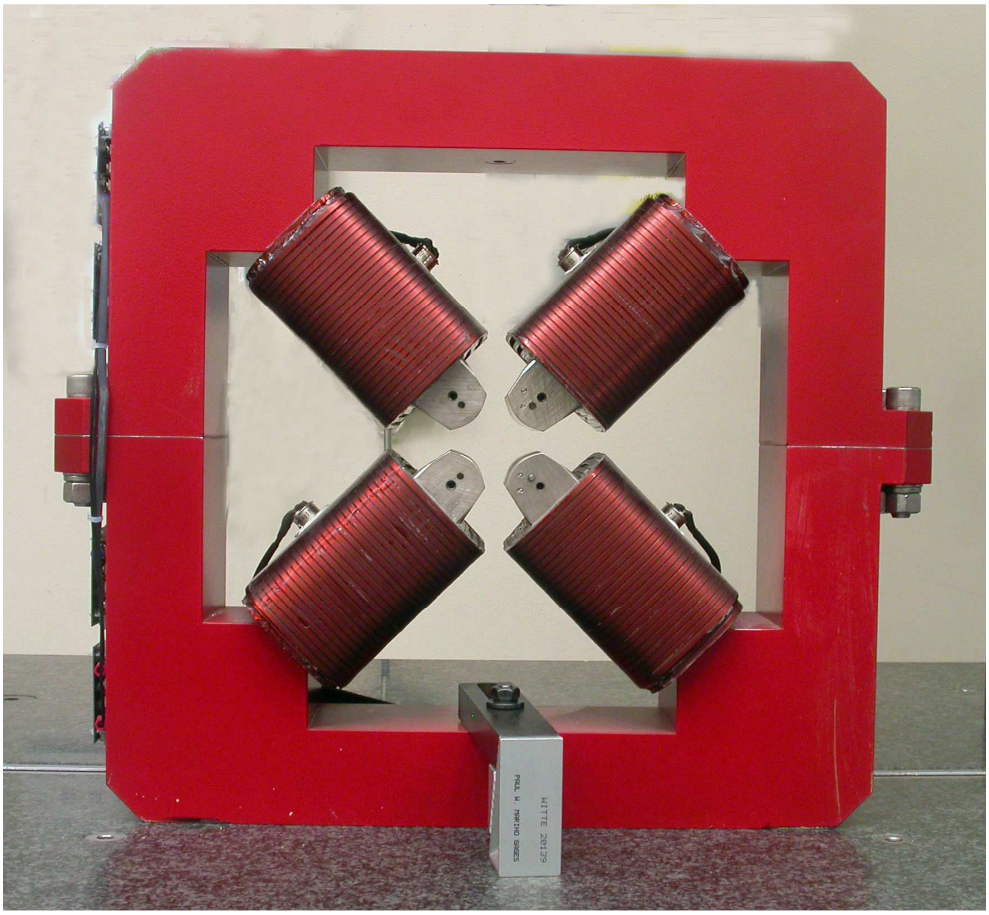
LCLS II Magnet Fiducialization Report
Injector Quadrupole 1.26Q3.5



Inspector : K. Caban

Engineer : J. Amann

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

Barcode No.: 4009

Mfg. S/N : 010

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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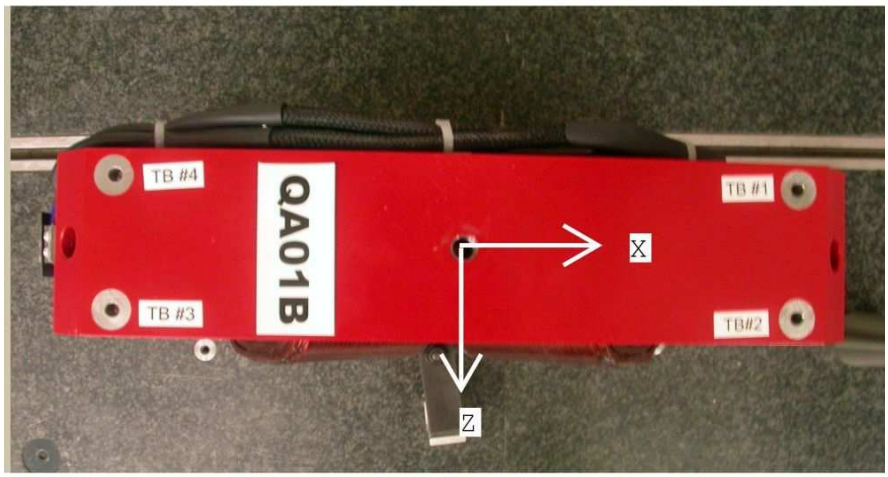
Tooling Ball Locations



Tooling Ball	X Coord.	Y Coord.	Z Coord.
TB 1	6.50603	8.86879	-1.25307
TB 2	6.50668	8.86912	1.24766
TB 3	-6.49278	8.88000	1.24825
TB 4	-6.49377	8.87952	-1.25326
TB A	6.50537	8.18143	-1.25256
TB B	6.50591	8.18205	1.24769
TB C	-6.49364	8.19316	1.24738
TB D	-6.49371	8.19204	-1.25251

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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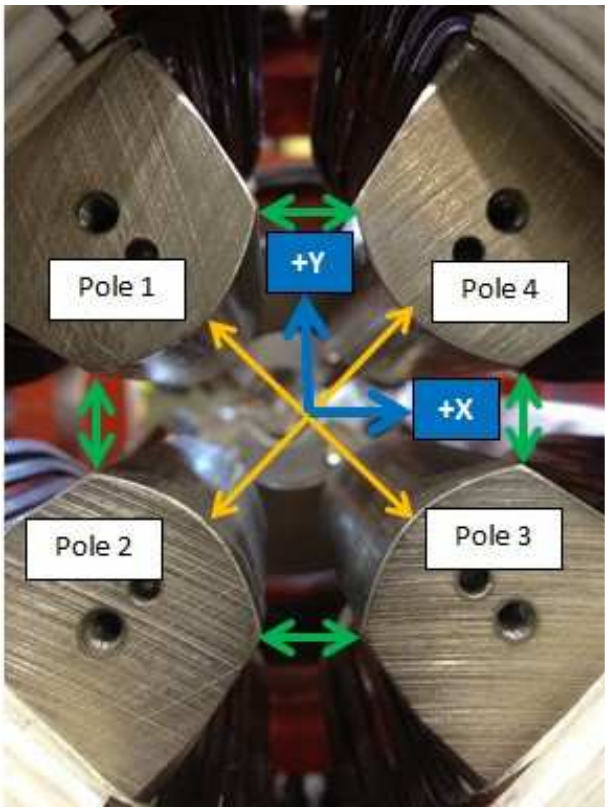
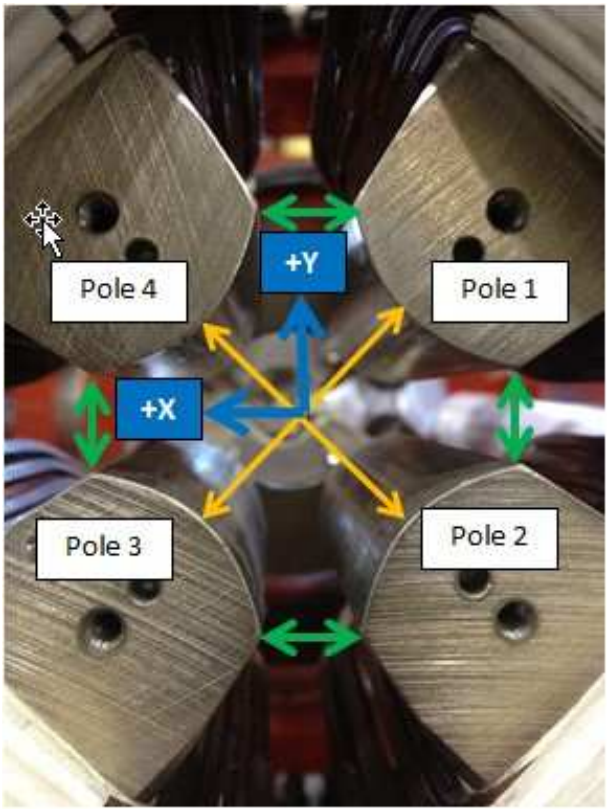
Pole Tip Gap Measurements

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	1.2603	1.25928
Pole Tip Distance 2-4	1.260	1.26274	1.26143
Gap 1-2	.422	0.42055	0.41927
Gap 2-3	.422	0.42628	0.42385
Gap 3-4	.422	0.42388	0.423
Gap 4-1	.422	0.42473	0.42467

Dimensions in Inch

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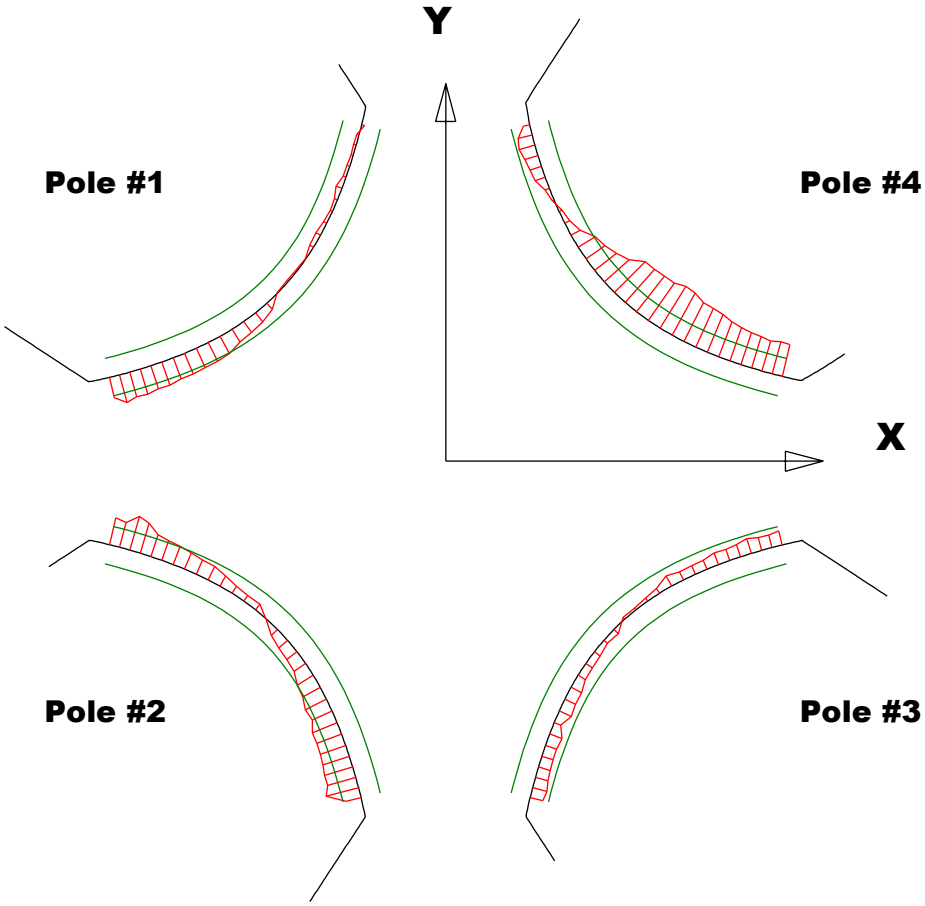
Composite Best-fit of Pole Tips, Downstream



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.	-0.00032	-0.00178	-0.00079	-0.00262
Max. Dev.	0.00152	0.00185	0.00083	0.00087

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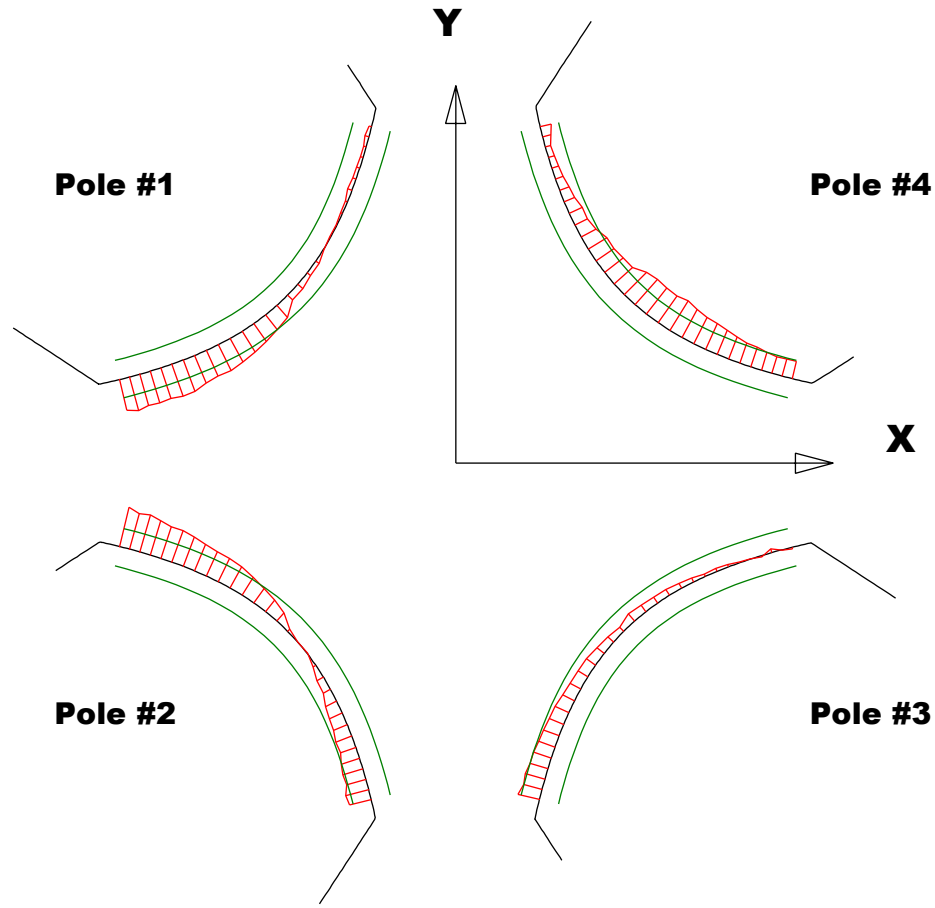
Composite Best-fit of Pole Tips, Upstream



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.	-0.00024	-0.00125	-0.00008	-0.00184
Max. Dev.	0.00184	0.00215	0.00118	-0.00028

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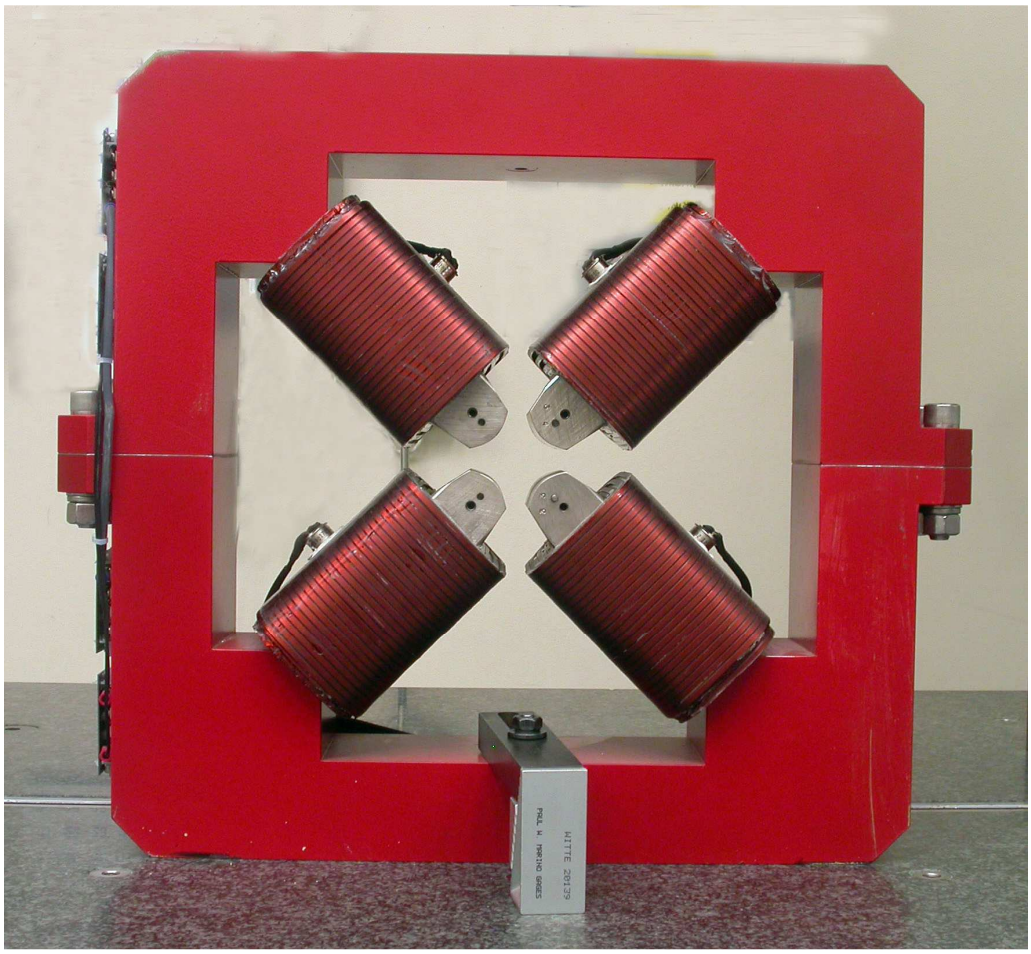
Angle of the Composite Pole Tip Best-Fit In Relation to Tooling Ball Plane



Angle in Decimal Degrees ° = 0.04691

Angle in Milliradians = 0.81874

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