Magnetic Shielding for Angular Sensor Systems

Draft 1.1

INTERNAL DOCUMENT- ANGULAR SENSOR SHIELDING

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In collaboration with our Partner PML India

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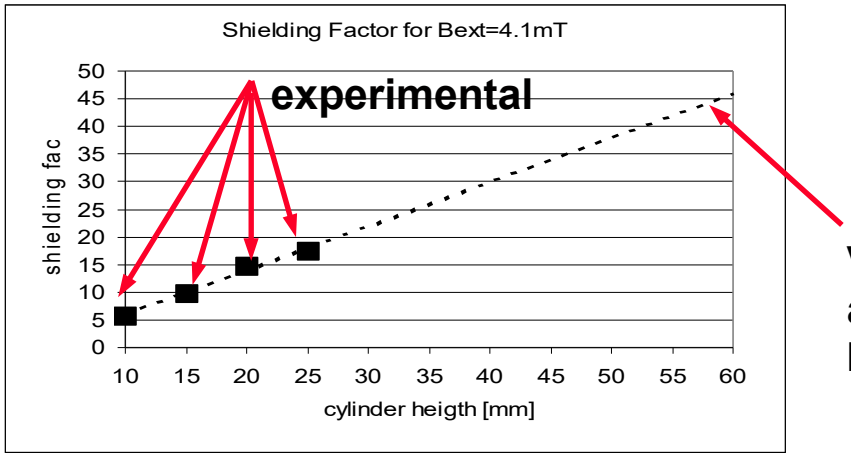
Soft Magnetic Material

Characteristics of Soft Magnetic Materials

Material		Silicon Steel	Permalloy		Ferrite Mn-Zn	Amorphous	
			50 Ni	80 Ni		Co-based	Fe-based
Saturation Flux Density,	Bs (G)	20,000	15,500	7,400	5,000	5,800	15,600
Coercive Force,	Hc (Oe)	0.5	0.15	0.03	0.1	0.005	0.03
Initial Permeability,	μi	1500	6,000	40,000	3,000	60,000	5,000
Max. Permeability,	μm	20,000	60,000	200,000	6,000	1,000,000	50,000
Resistance,	ρ ($\mu\Omega$/cm)	50	30	60	10^6	120	130
Curie Temperature,	Tc (℃)	750	500	500	140	255	415
Crystallization Temperature,	Tx (℃)	-	-	-	-	530	550
Squareness ratio,	Br/Bs (%)	-	-	-	30	90	-

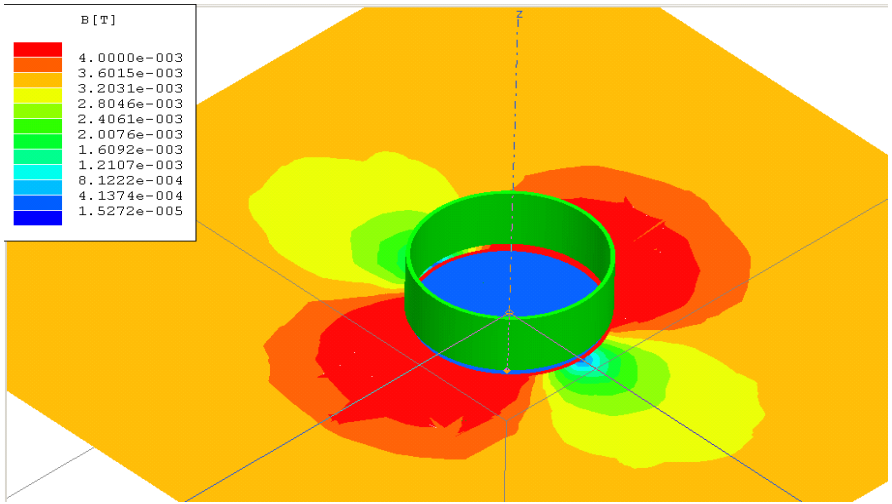
Soft Magnetic Material

Tested Shields
Material: SiFe
μr : 2000
Bsat: 2.0 T
Br: 1.267 T
Hc:0.243 A/cm
Diam. D: 23mm
Thickness d: 0.5mm
Height h: 5, 10, 15, 20, 25mm



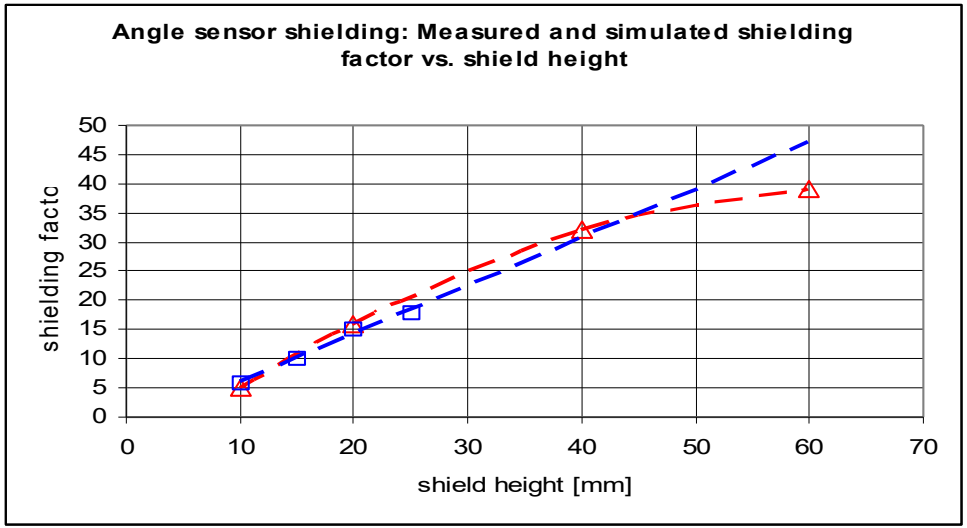
Value for ideally long cylinder reached at h ≈ 2.5*D assuming linear extrapolation behavior.

Soft Magnetic Material



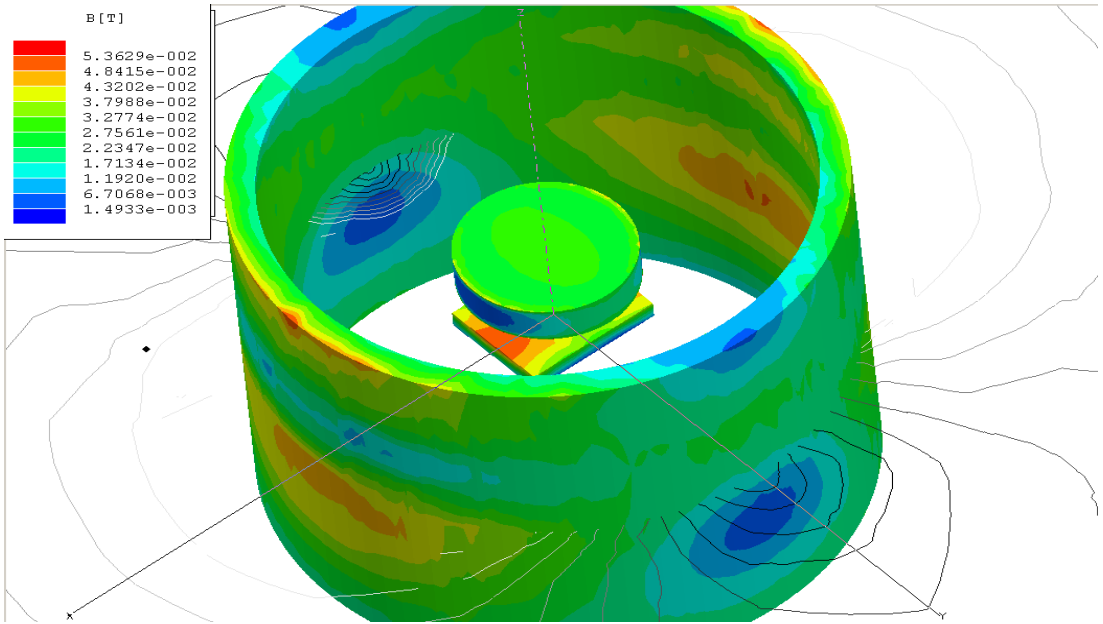
Simulation Model: D=23mm, Th=0.5mm, H=20mm

Simulation vs. Measurement



Verification of data by comparison of measurements and simulations

Custom specific simulation



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