



APPLIED ENGINEERING  
SCIENCE, INC.

PO Box 696 Eastlake, CO 80614 (303)920-8180

# Field Analysis Erase Head

Joe Jurneke  
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# Discussion



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- The estimated deep gap field from the erase head is 5.1kG – about 2x the media coercivity as measured by VSM (Vibrating Sample Magnetometer)
- The efficiency is 99%, with no core saturation limitations
- The magnetic field from the PM (Permanent Magnet) is coupled into the core laminations in very close proximity – approx 0.001 inch
- Erasure is expected to be excellent due to field intensity and gap geometry affecting the erase zone
- Magnetostatic analysis predicts that given the worst Switching Field distribution, Thickest media coating, etc, the static field at the back of the magnetic coating is much higher than needed to properly erase media

# Basic Assumptions



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- Model is first order analysis of geometry provided by Mountain Engineering
- Analysis does not take into account proximity to saturated flux conditions in core, however analysis indicates sufficient margin exists to not be of concern
- All geometry is approximate
- All magnetic properties are taken on the lower limits of specification – hence the analysis should represent the poorest performance expected

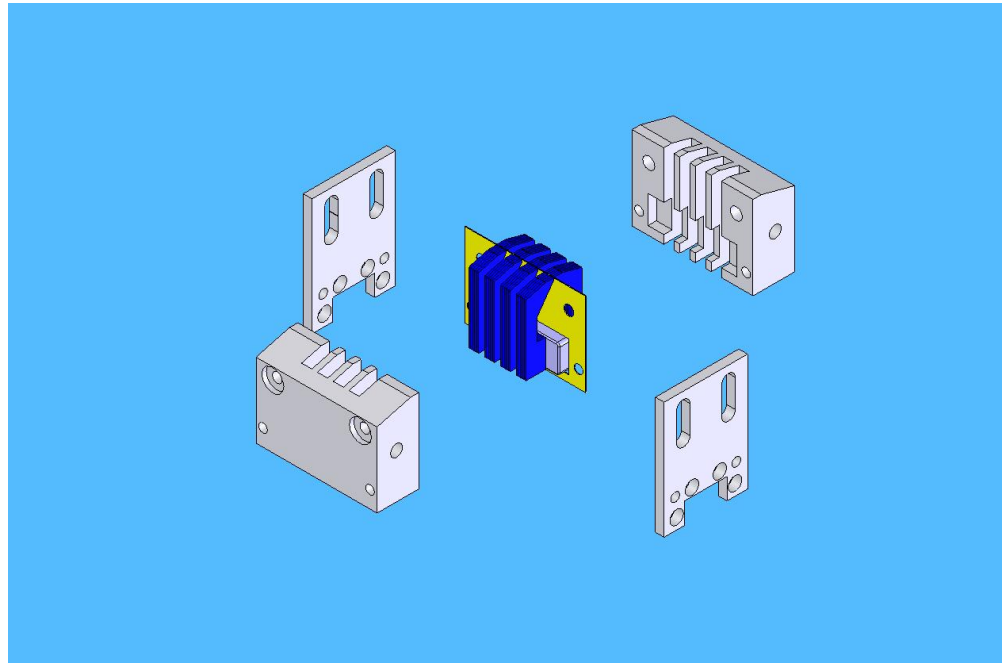


Image Courtesy  
Mountain  
Engineering

# Basic Model Parameters



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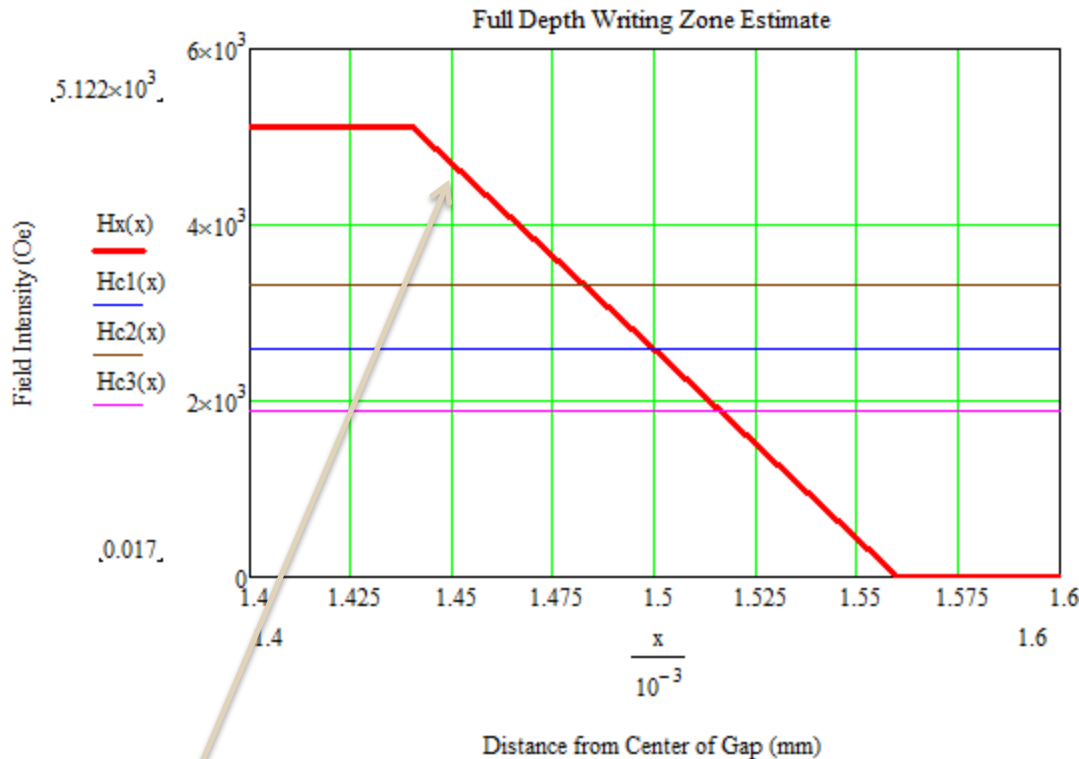
	Parameter	Variable	Unit	Value
Magnet	PM Length	L	mm	15
	PM Width	W	mm	5
	PM Thickness	D	mm	3
	PM to Core Dist	z	mm	0.025
	PMB Field	B	Tesla	1.32
Core	Core Permeability	ur		12000
	Gap	G	mm	0.13
	Gap Length	gl	mm	0.3
	Core Volume	Cvol	mm <sup>3</sup>	7.3
	Magnetic Core Length	l	mm	20
	Gap Volume	Gvol	mm <sup>3</sup>	0.009906
	Core Surface Area	Garea	mm <sup>2</sup>	28.8
	Efficiency	eff	%/100	0.998
	Number of Lams	N	N	7
	Lam Height	HL	mm	5
	Lam thickness	TL	mm	0.25
	PoleArea	Ap	mm <sup>2</sup>	8.75
	Pole Reluctance	Rp		151.6
	Gap Reluctance	Rg		197049
Field	K1			6.000
	K2			0.04325
	Br		T	0.5724
	Deep gap field		T	0.5129
	Ho		Oersted	5129.45

# Record Field Intensity - Back Side of Magnetic Coating



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Field Strength along trailing contour

$$H_{c1}(x) = H_c$$

$$H_{c2}(x) = H_c + H_c \cdot \frac{SFD}{2}$$

$$H_{c3}(x) = H_c - H_c \cdot \frac{SFD}{2}$$

Field estimates much higher than required to properly erase tape – at max SFD a field of less than 3500 Oe is required – estimated field is 5100+ Oe