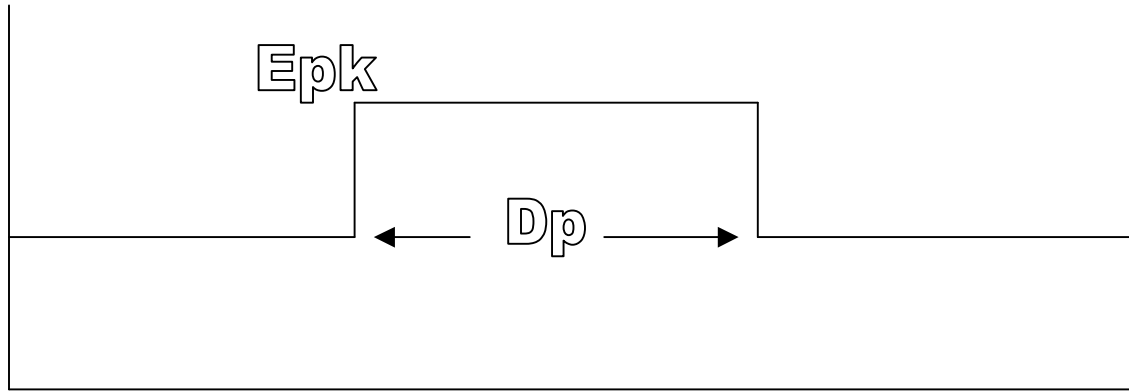
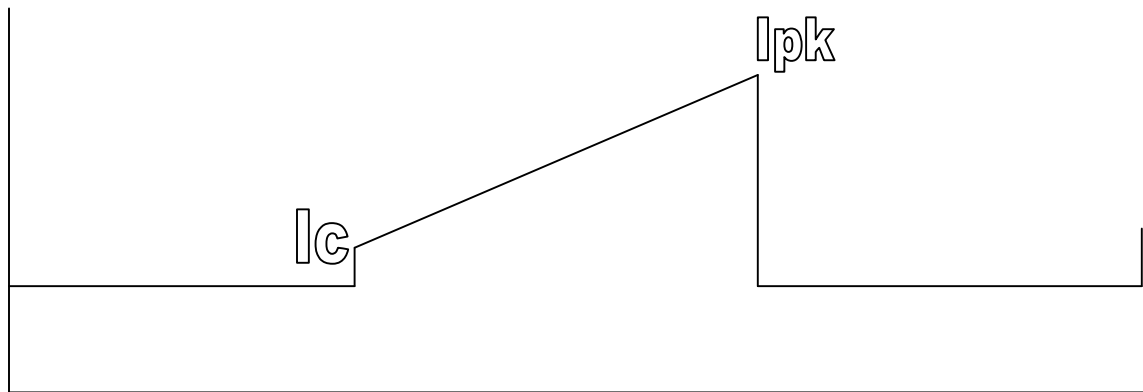

Design Soft Ferrite Cores for Maximum Inductance Under DC Current Bias Conditions

**By : George Orenchak
TSC Ferrite International Company**

TSC Ferrite International Company



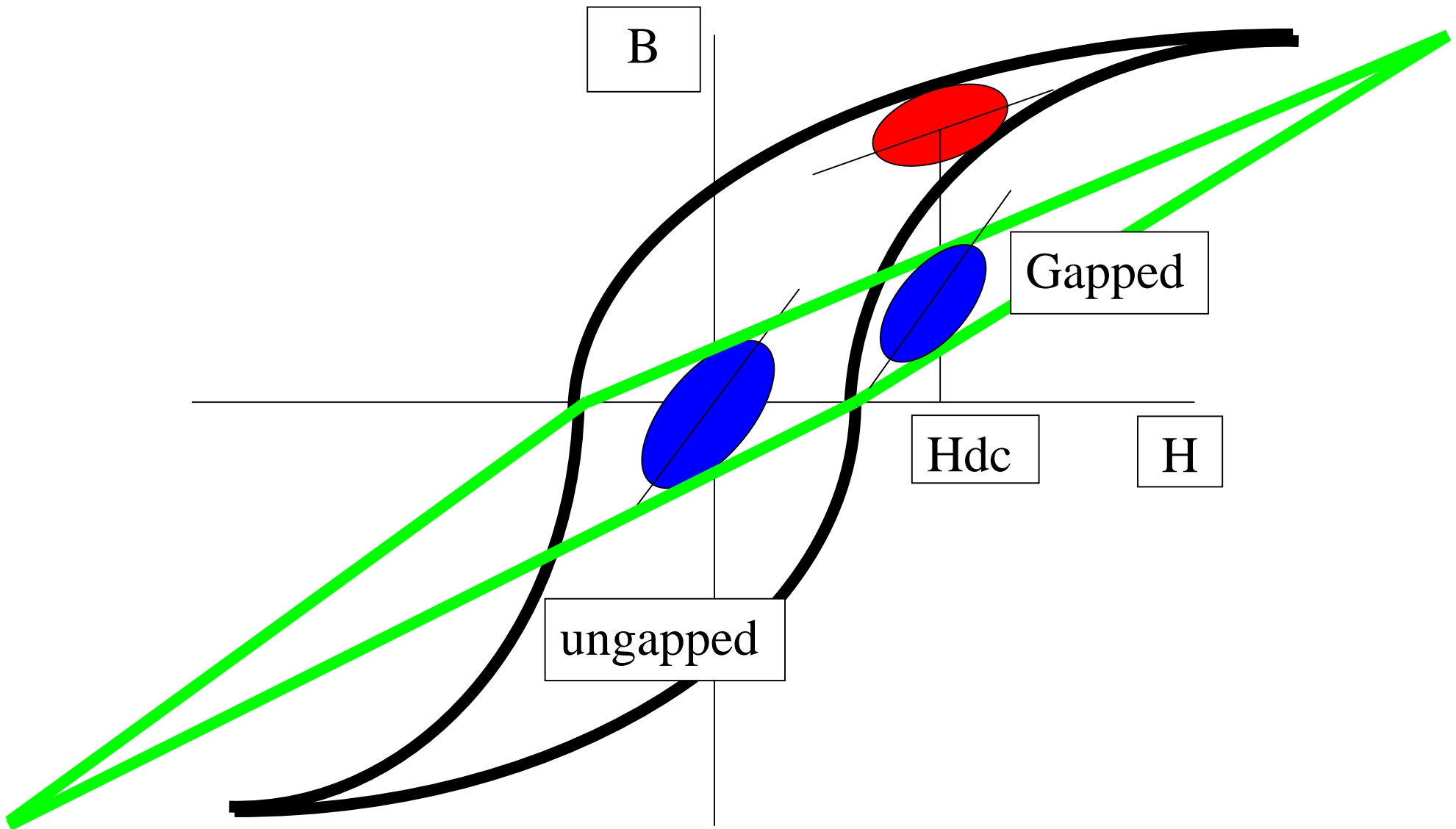
Voltage Waveform



Current Waveform

$$I_{pk} = ((E_{pk})(D_p) / \text{Inductance}) + I_c$$

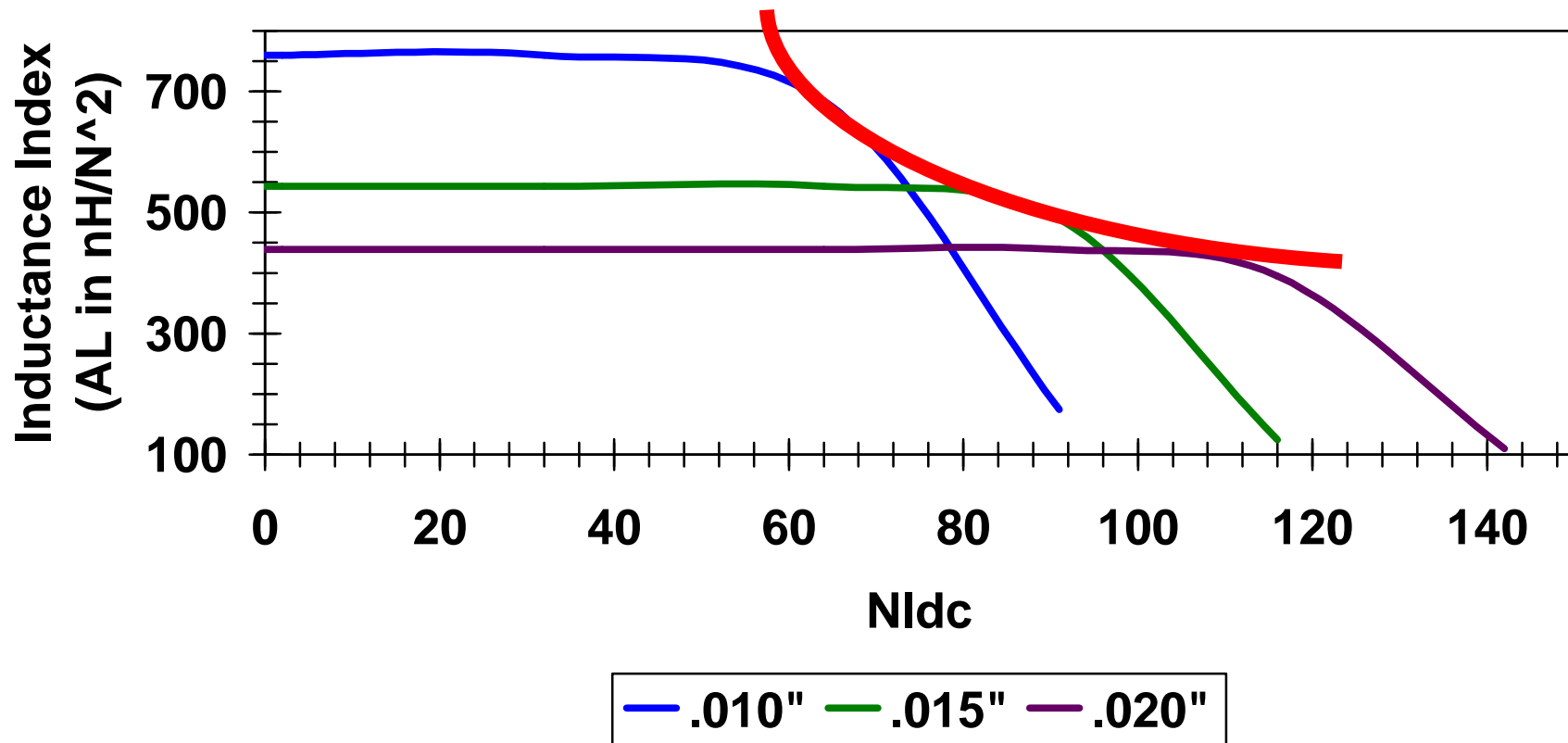
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Design Soft Ferrite Cores for Maximum Inductance Under DC Current Bias Conditions

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Inductance Index (AL) vs NIdc TSF-7099-41-16-12- E21 size



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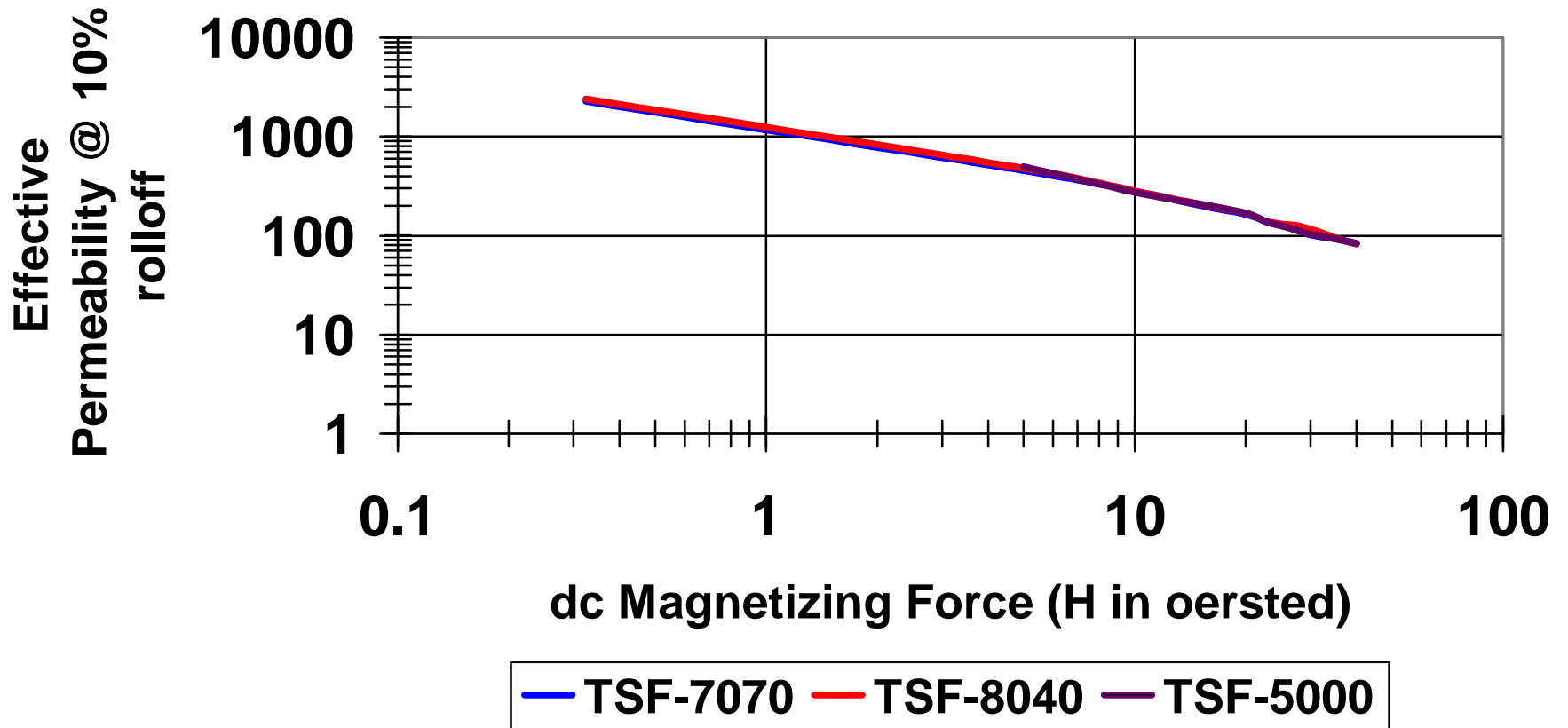
Effective Permeability $\mu_e = L / L_{air}$

$$\mu_e = (AL)(N^2) / (4\pi A_e 10^{-9} / L_e)$$

Magnetizing Force (H) = $.4\pi NI_{dc} / L_e$

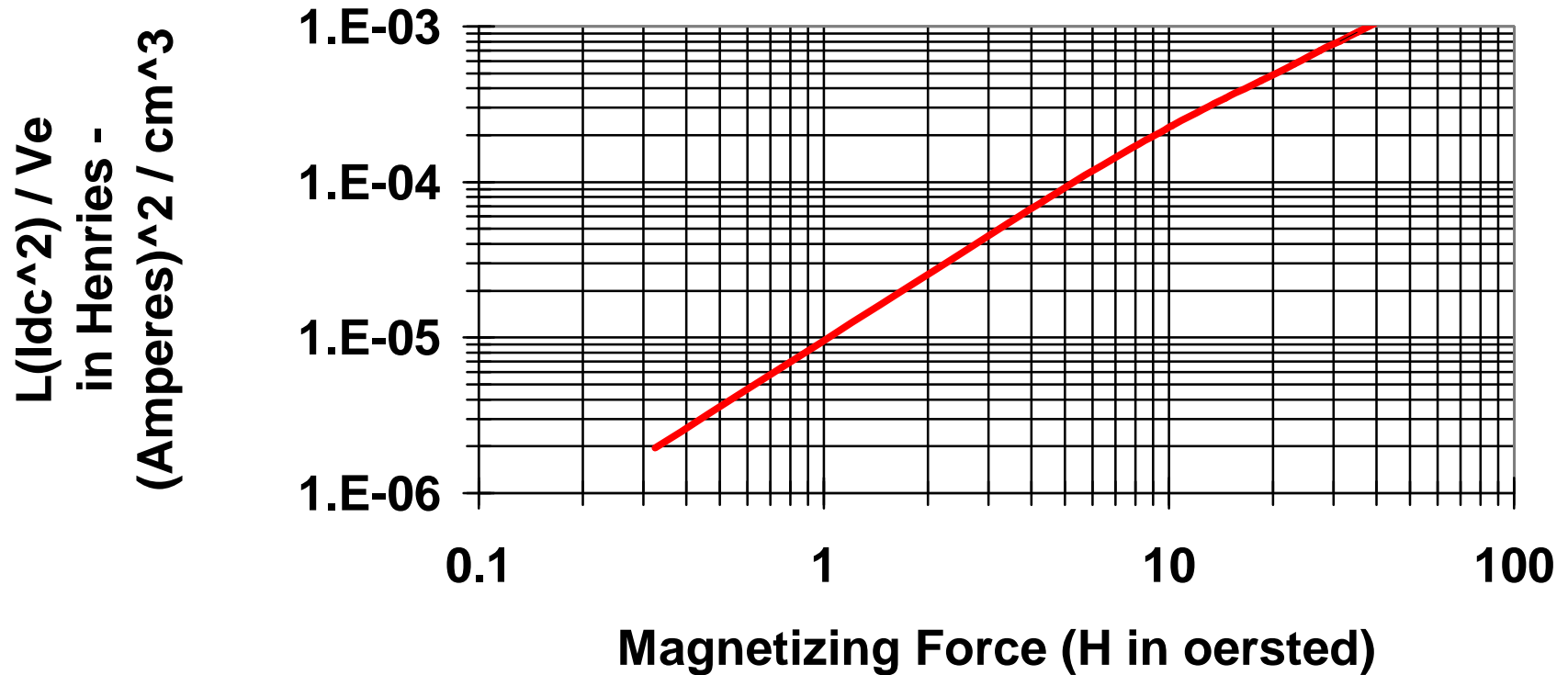
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Effective Permeability at 10% rolloff vs dc Magnetizing Force (H in oersted)



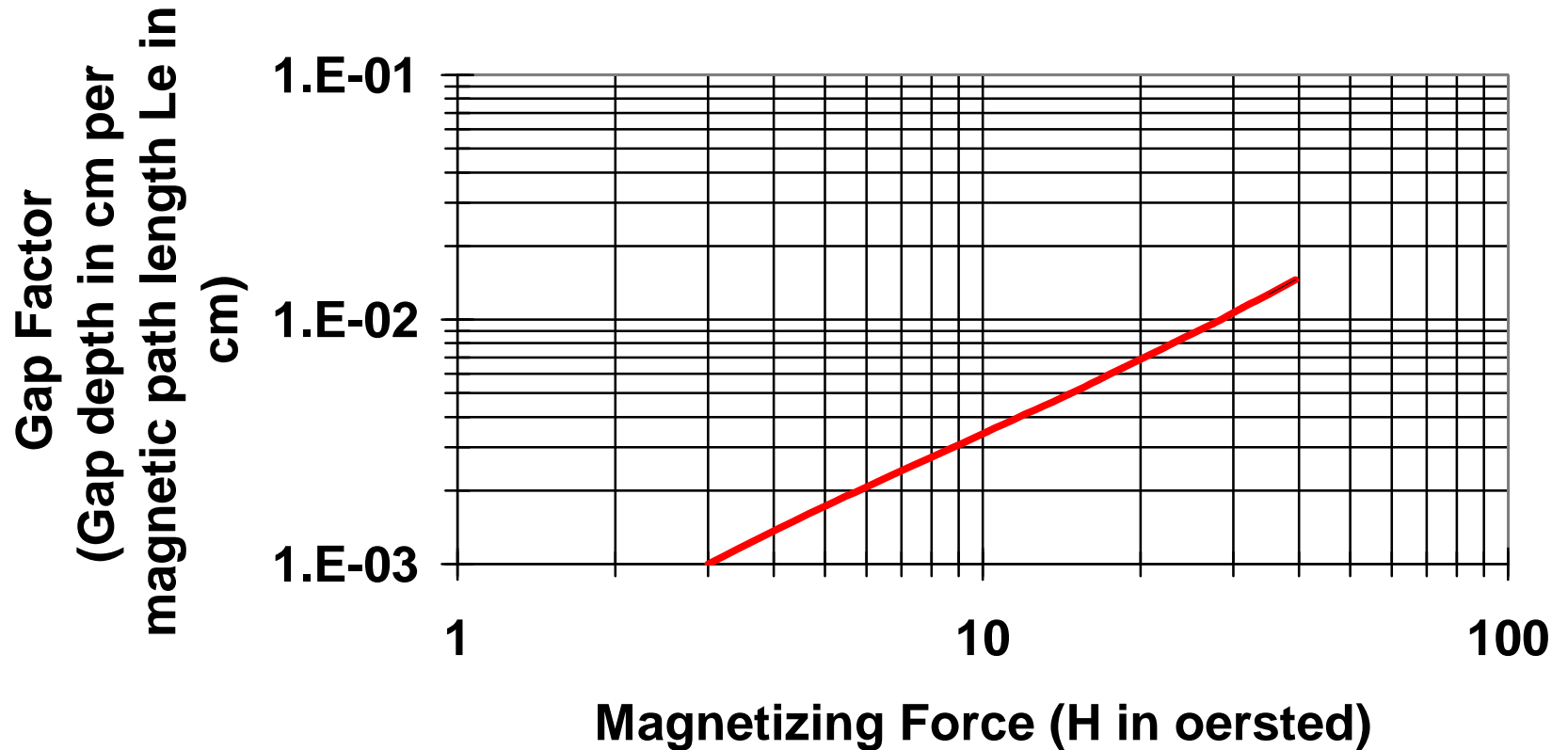
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Hanna Curve TSF-7070



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Gap Factor (Gap depth per magnetic path length)



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$$N = H L_e / (.4\pi I_{dc})$$

N = number of turns

H = magnetizing force in oersteds

L_e = magnetic path length in cm

I_{dc} = dc current in amps

$$\text{Gap depth} = GF L_e / 2.54$$

GF = Gap Factor from curve

L_e = magnetic path length in cm

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Part #	Le	Ae	Ve	Wa	L	Idc
TSF-7070-25-10-13	4.899	0.787	3.856	0.850	0.001	1.0
TSF-7070-25-16-06	7.408	0.399	2.954	1.652	0.001	1.0
TSF-7070-25-10-06	4.899	0.394	1.928	0.850	0.001	1.0

Part #	LIdc/Ve	H	N	NIdc	AL	Lair	Perm	Gap
TSF-7070-25-10-13	2.59E-4	12	47	47	457	2.02	226	0.0077
TSF-7070-25-16-06	3.39E-4	15	88	88	128	0.68	189	0.0146
TSF-7070-25-10-06	5.19E-4	21	82	82	149	1.01	148	0.0135

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