

## Arnold Technical Bulletin

# SMSS POWDER E-CORE

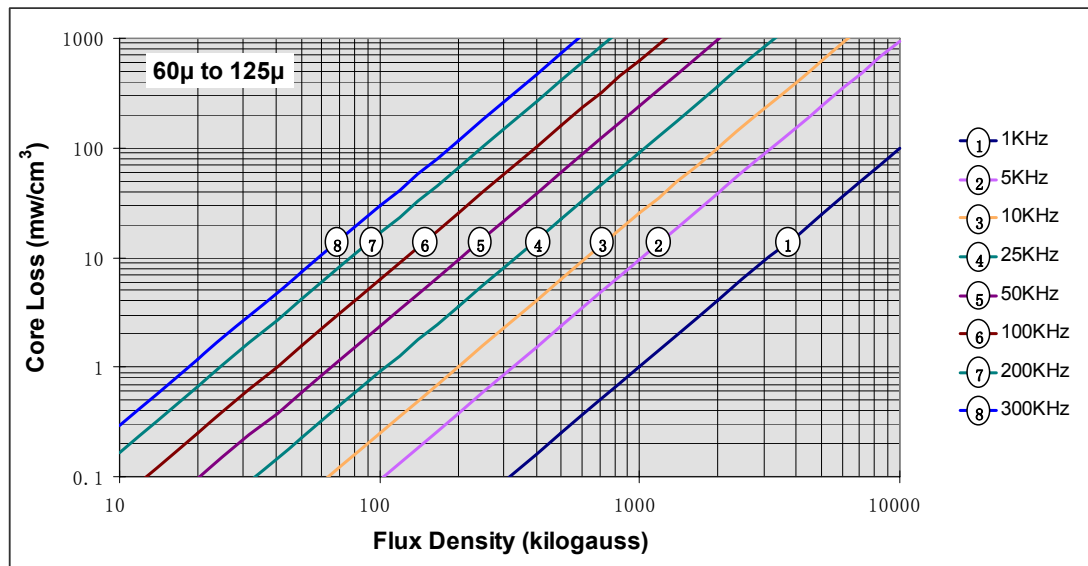
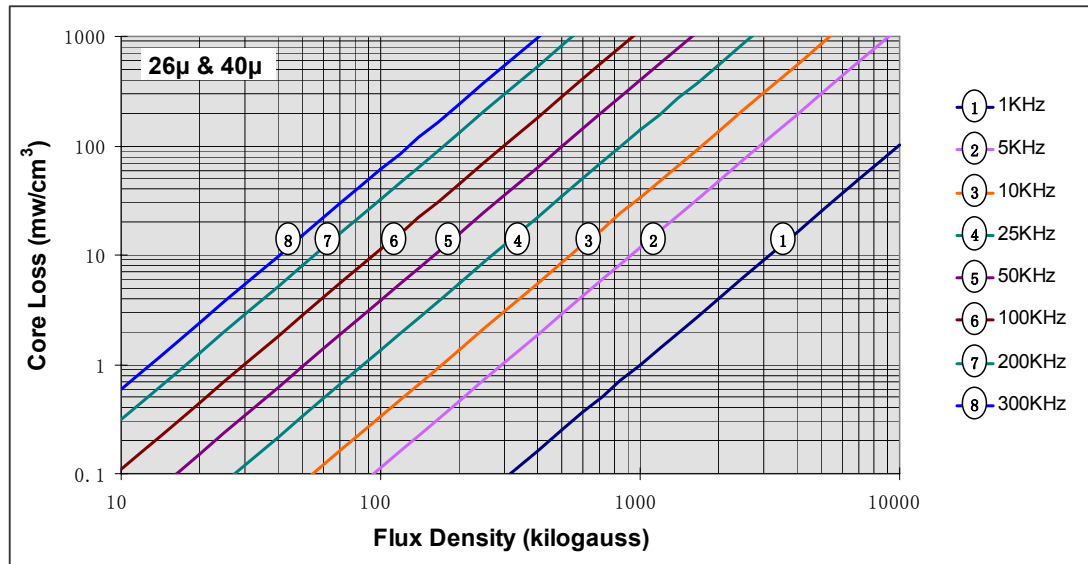
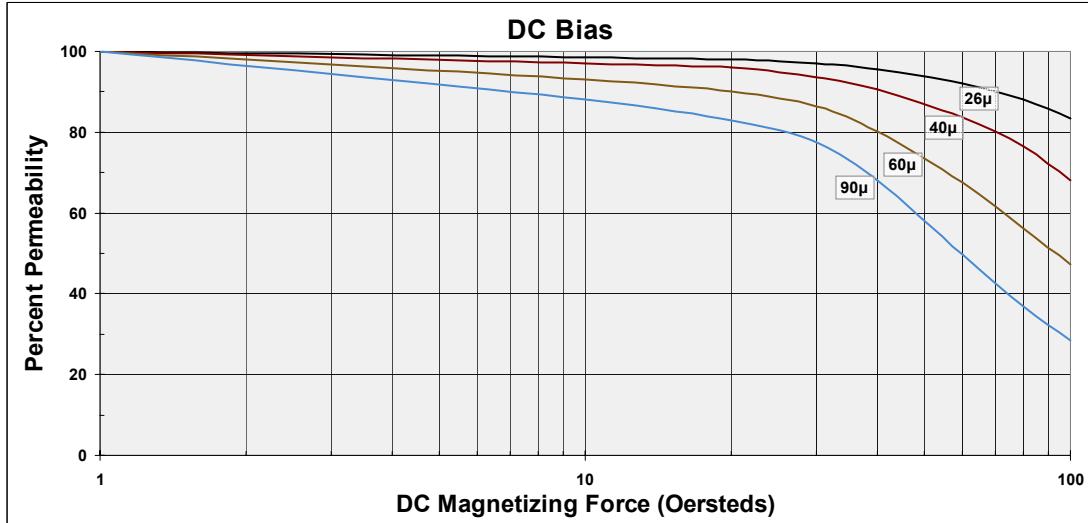
### INTRODUCTION

Arnold's SMSS powder E-cores are made of an alloy powder which has low losses at elevated temperature and has relatively stable inductance over temperature. Arnold cores feature a distributed air gap which minimizes fringing flux and makes them highly suited for applications such as switching regulator inductors, flyback transformers, and power factor correction (PFC) inductors.

The 10,000 gauss saturation level provides a higher energy storage capability than can be obtained with gapped ferrite E-cores, thus resulting in a smaller core size. SMSS E-cores do not have a significant decrease in saturation flux density at high temperature – a characteristic that lowers ferrite's DC bias handling ability. The flux capacity difference is even more dramatic at high temperatures, since the flux capacity of ferrites decrease with temperature while SMSS E-cores stay relatively constant. SMSS E-cores have significantly lower losses and substantially better thermal properties when compared to powdered iron E-cores.

Arnold SMSS E-cores are competitively priced against gapped ferrite E-cores and their distributed air gap eliminates EMI loss problems associated with ferrites. A selection of standard size E cores is available along with the ability to produce custom dimensions and other geometries. Arnold offers a range of permeabilities (14 $\mu$  ~ 125 $\mu$ ) as well as with a variety of other soft magnetic materials such as MPP, HF and FeSi.

# Typical Incremental Permeability vs. D.C. Bias and Core Loss Curves

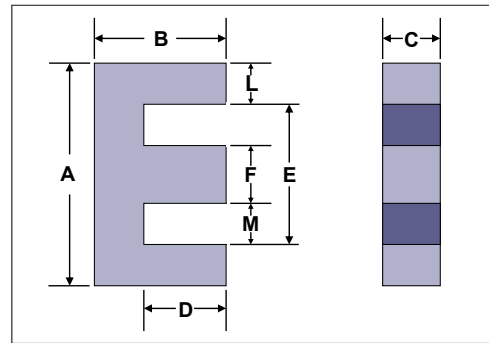


## FEATURES:

- Large energy storage capacity.
- No magnetic flux leakage.
- Good temperature stability.
- Low core loss at high frequencies.
- Excellent DC-Biased inductance features.

## APPLICATIONS:

- High inductance choke coils.
- Flyback transformers.
- Multiple circuit choke coils.
- Large current choke coils.
- Output chokes for SMPS.
- PFC reactors.



## E CORE DATA

PRRT NO.	UNIT	A	B	C	D(min)	E(min)	F	L(nom)	M(min)
EMS-1306	in (mm)	0.500±.010 (12.70)	0.252±.004 (6.40)	0.140±.006 (3.56)	0.178 (4.42)	0.35 (8.89)	0.140±.005 (3.56)	0.07 (1.78)	0.104 (2.64)
EMS-1908	in (mm)	0.760±.012 (19.30)	0.319±.007 (8.10)	0.188±.006 (4.78)	0.218 (5.54)	0.548 (13.90)	0.188±.005 (4.78)	0.094 (2.39)	0.183 (4.65)
EMS-2510	in (mm)	1.000±.015 (25.40)	0.375±.007 (9.50)	0.250±.004 (6.50)	0.245 (6.20)	0.740 (18.80)	0.250±.005 (6.20)	0.125 (3.20)	0.246 (6.30)
EMS-3015	in (mm)	1.185±.018 (30.10)	0.591±.009 (15.01)	0.278±.006 (7.06)	0.376 (9.70)	0.768 (19.50)	0.274±.008 (6.96)	0.201 (5.11)	0.254 (6.46)
EMS-3514	in (mm)	1.360±.020 (34.50)	0.557±.009 (14.10)	0.368±.007 (9.40)	0.378 (9.60)	0.995 (25.30)	0.367±.008 (9.30)	0.175 (4.40)	0.310 (7.90)
EMS-4117	in (mm)	1.609±.024 (40.90)	0.650±.011 (16.50)	0.493±.007 (12.50)	0.409 (10.40)	1.115 (28.30)	0.493±.008 (12.50)	0.238 (6.00)	0.310 (7.90)
EMS-4321	in (mm)	1.687±.025 (42.80)	0.830±.013 (21.10)	0.424±.010 (10.80)	0.587 (15.00)	1.195 (30.40)	0.468±.010 (11.90)	0.234 (5.95)	0.365 (9.27)
EMS-4322	in (mm)	1.687±.025 (42.80)	0.830±.013 (21.10)	0.608±.010 (15.40)	0.587 (15.00)	1.195 (30.40)	0.468±.010 (11.90)	0.234 (5.95)	0.365 (9.27)
EMS-4323	in (mm)	1.687±.025 (42.80)	0.830±.013 (21.10)	0.788±.010 (20.00)	0.587 (15.00)	1.195 (30.40)	0.468±.010 (11.90)	0.234 (5.95)	0.365 (9.27)

PART NO.	A <sub>L</sub> mH/1000TURNS±8%				Path Length	Cross Section	Volume
	26μ	40μ	60μ	90μ	le (cm)	Ae (cm <sup>2</sup> )	Ve (cm <sup>3</sup> )
EMS-1306-xxx	-	-	-	-	2.96	0.13	0.385
EMS-1908-xxx	26	35	48	69	4.01	0.228	0.914
EMS-2510-xxx	39	52	70	100	4.85	0.385	1.87
EXM-3015-xxx	33	46	71	92	6.56	0.601	3.94
EMS-3514-xxx	56	75	102	146	6.94	0.840	5.83
EMS-4117-xxx	88	119	163	234	7.75	1.520	11.8
EXM-4321-xxx	56	76	105	217	9.84	1.280	12.6
EXM-4322-xxx	80	108	150	217	9.84	1.830	18.0
EMS-4323-xxx	104	140	194	281	9.84	2.370	23.3

xxx: Add material code to part number, e.g., for 60μ the complete part number is EMS-2510-060.

PART NO.	Volume cm <sup>3</sup>	Weight grams	Weight lbs
EMS-1306	0.2207	1.54	0.0034
EMS-1908	0.5032	3.45	0.0076
EMS-2510	1.0526	6.90	0.0152
EMS-3015	2.3055	14.5	0.0319
EMS-3514	3.0927	18.5	0.0408
EMS-4117	6.3085	36.6	0.0805
EMS-4321	6.6590	36.1	0.0796
EMS-4322	9.4953	51.5	0.1135
EMS-4323	12.3316	66.9	0.1474