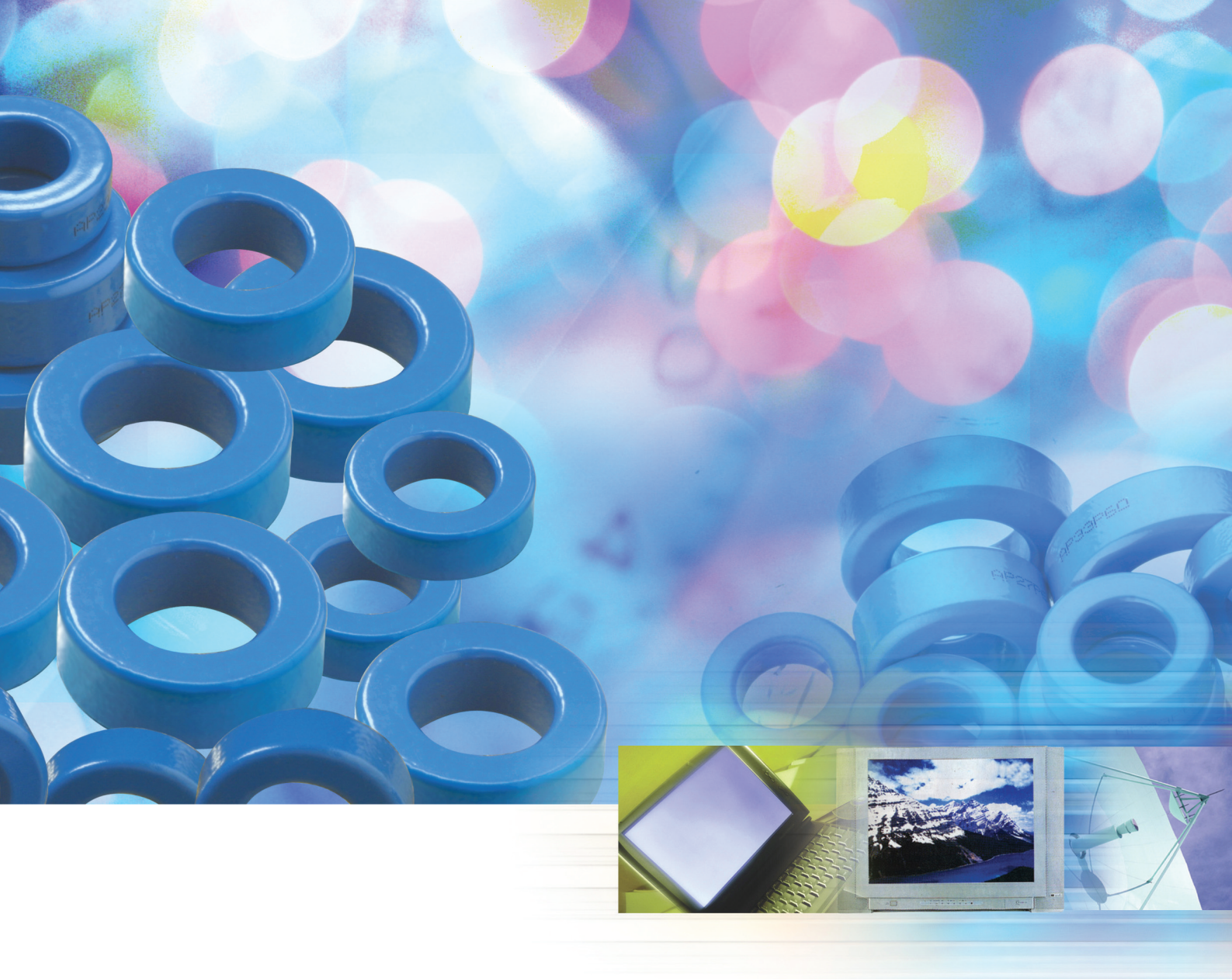
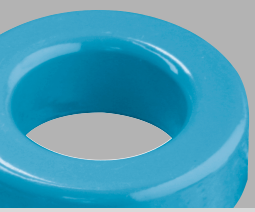


Advanced Powder Core

for High Current PFC/Out Put Choke Application

AMOSENSE Co., Ltd.

CONTENTS



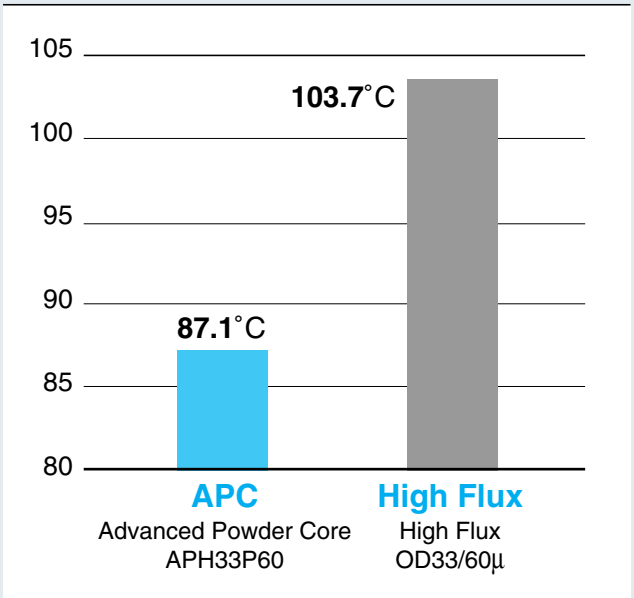
Advanced Powder Core

for High Current PFC/Out Put Choke Application

INTRODUCTION

Example of Field Test

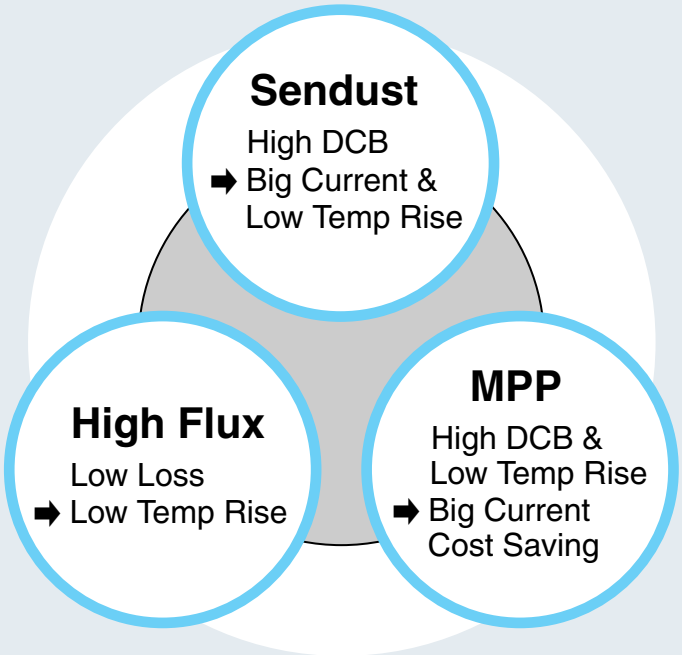
Power	Application	Model	Comparison	Condition
350Watt	PFC	APH33P60	High Flux OD33/60μ	No Fan 100V input



Temperature of APH33P60 is lower 15.6˚C!!

Advanced Powder Cores come into world with its utmost superior qualities. Amosense proudly introduce Advanced Powder Cores to our valuable customers.

Benefit of Advanced Powder Core



Material Property Comparison

Property	APC APH™	High Flux	MPP	Sendust KoolMμ	Iron	Ferrite
Bs(Gauss) Saturation Flux Density	**15,000**	15,000	**7,500**	10,000	10,000 ~12,000	3,000 ~4,500
Core Loss Pc(mW/cm³) @100kHz, 0.1T	**600**	**1,300 ~1,800**	500 ~1,500	850 ~1,200	1,300 ~1,800	Dep. Gap
% Ldc @100Oe(60μ)	**70%**	70%	**50%**	45%	40%	Dep. Gap
Composition	Fe-Si-B	Fe-Ni	Fe-Ni-Mo	Fe-Al-Si	Fe	Mn-Zn-Fe

Note 1 The properties are typical value measured.

PROPERTIES OF APH™

According to the market demand of severe competition, we put the state of art technology for the developing “Cost Effective” and “Attractive Performance” at the same time.

Power supply can be slim and smart with help of APH™ series it also enables cost effective.

Historical properties of APH™ series are ready to serve our customers.

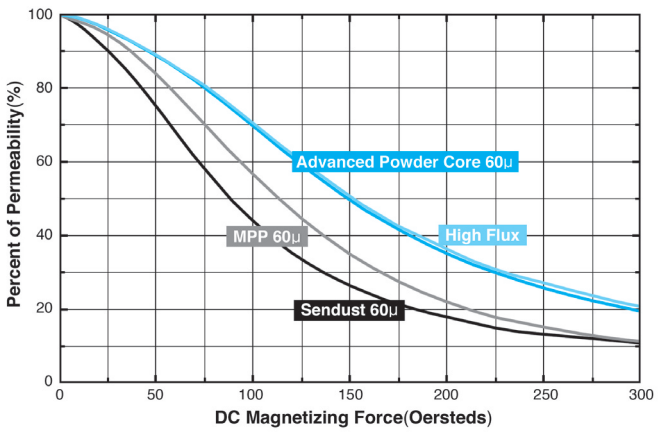
Innovative Benefit

- Remarkable Size Reduction
- Higher Efficient Solution
- More Cost Effective with Same Performance

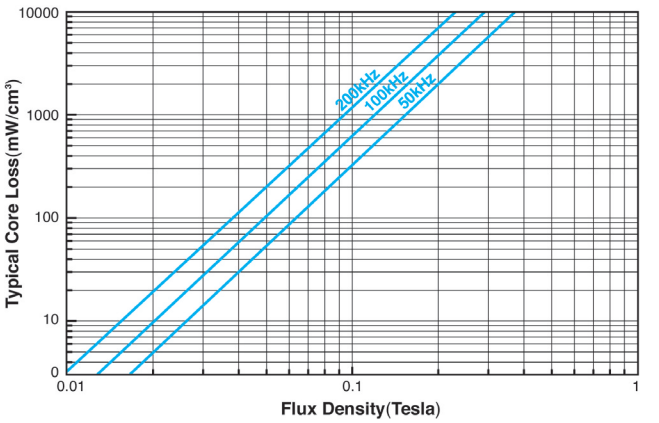
Application

- PFC Chokes for PC Power Supplies
- PFC Chokes for Server/Workstation Power Supplies
- PFC Chokes for Industrial PC
- PFC Chokes for LCD/PDP TV Power Supplies
- Output Chokes for General Industrial Power Supplies

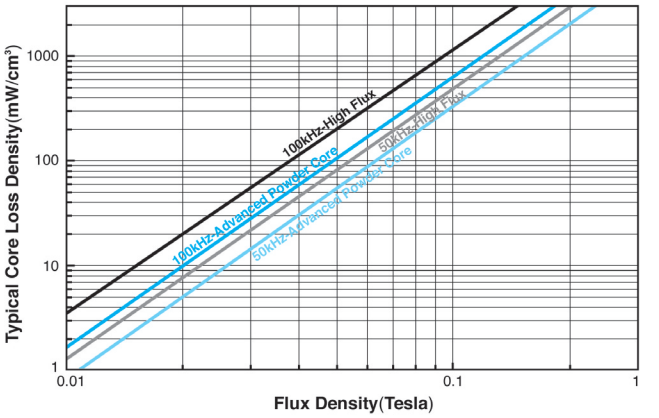
■ Comparison with HF, MPP and Sendust Material on DCB



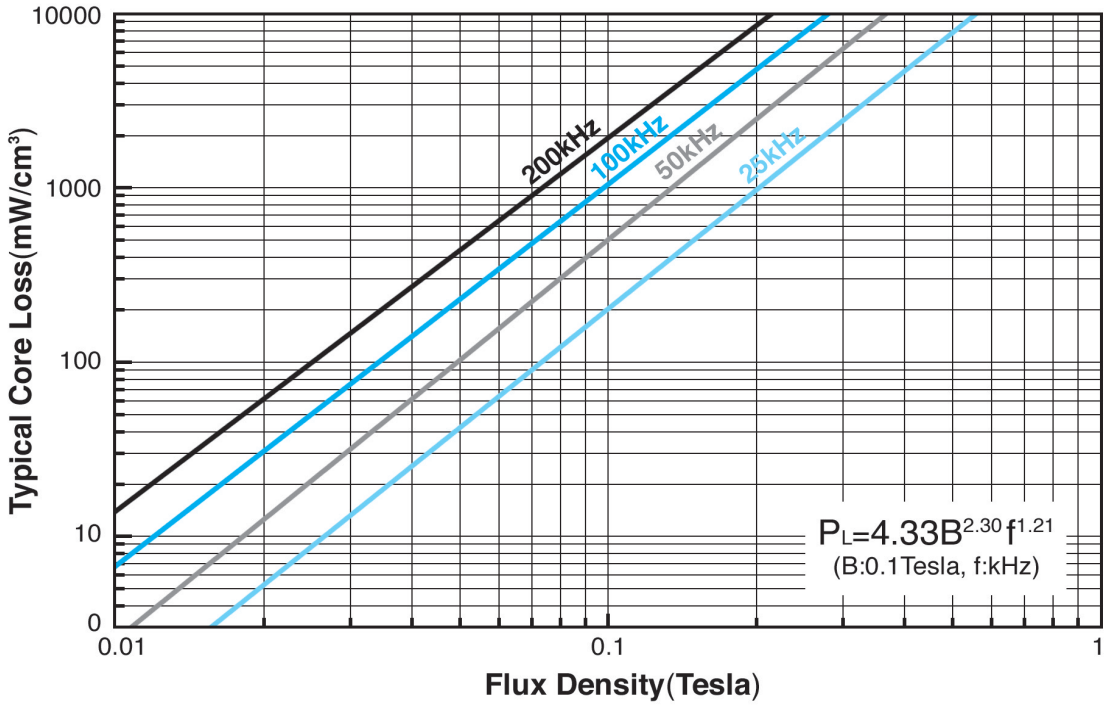
■ Core Loss Density of APH™



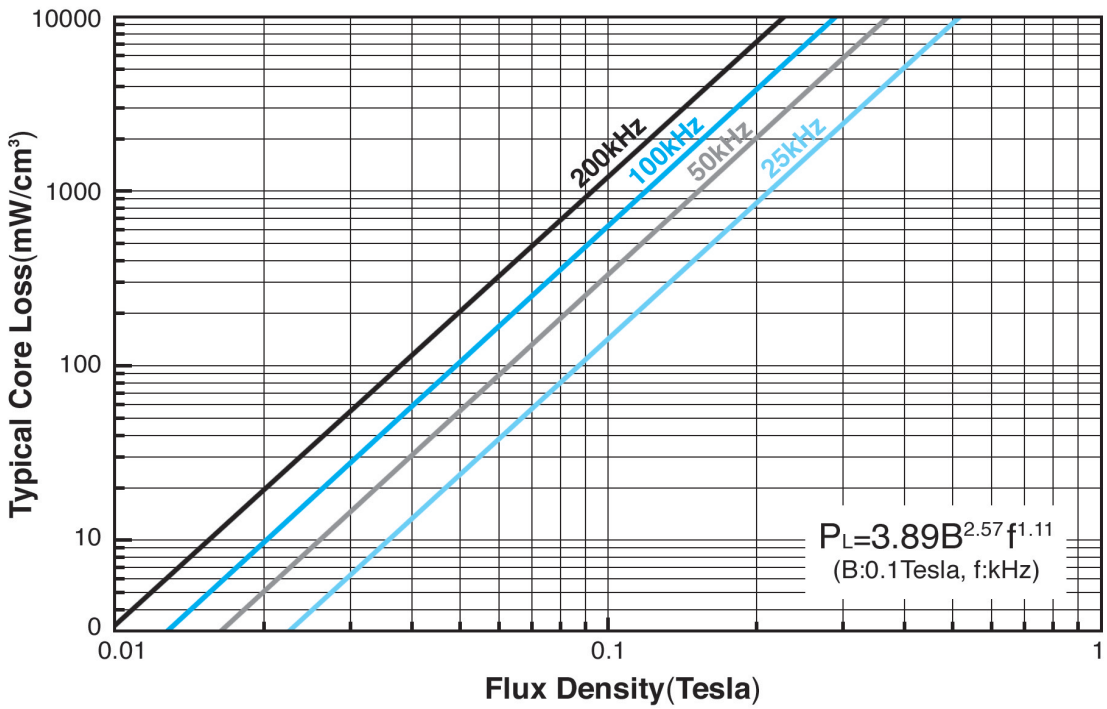
■ Typical Core Loss Density Comparyson with High Flux



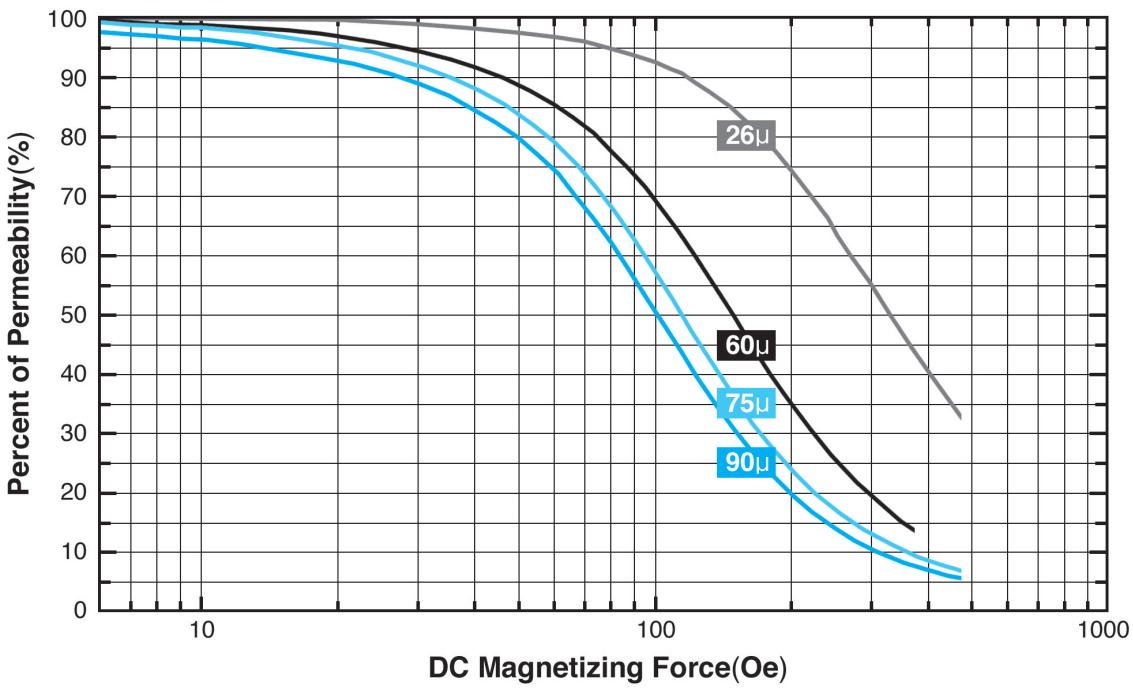
Core Loss Density Curves, 26μ



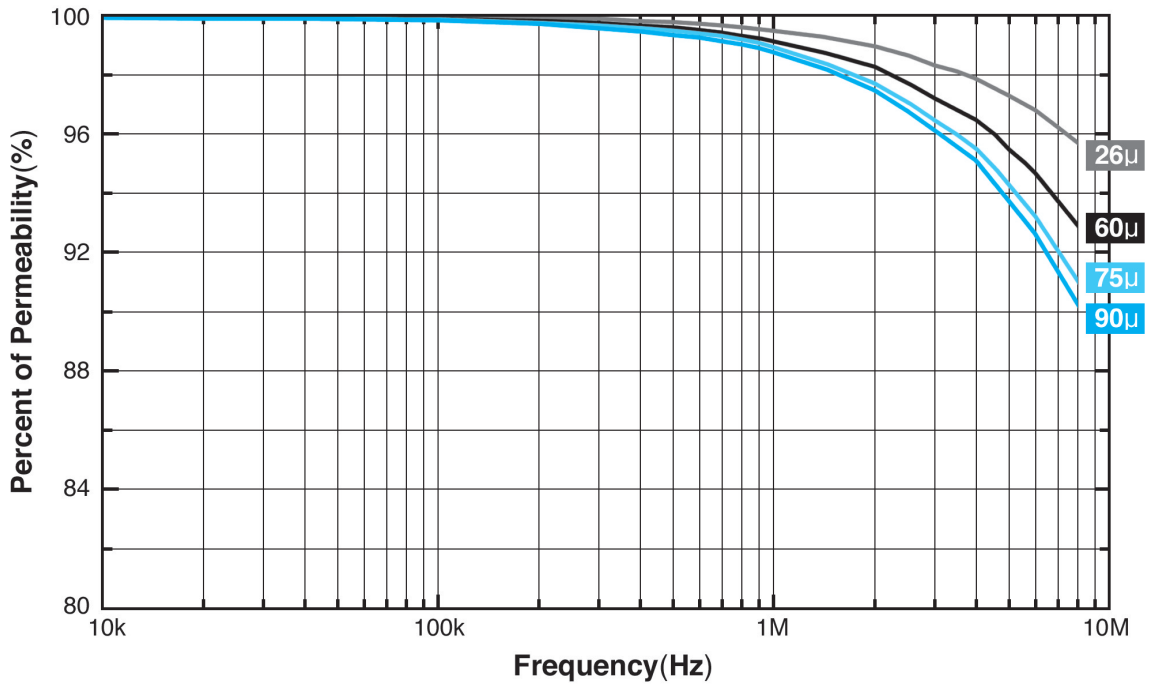
Core Loss Density Curves, 60~90μ



Permeability versus DC Bias Curves



Permeability versus Frequency Curves



Permeability versus DC Bias Curve Fit Formula

Effective Permeability (μ_{eff})

For a magnetic circuit constructed with an air gap, or gaps, the permeability of a hypothetical homogeneous material that would provide the same reluctance, or net permeability.

$$\mu_{eff} = \sqrt{\frac{\mu_i^2 + a\mu_i^3 H + b\mu_i^4 H^2}{1 + c\mu_i H + d\mu_i^2 H^2}}$$

	a	b	c	d
26μ	-7.24×10^{-5}	-2.31×10^{-9}	-5.21×10^{-5}	-1.50×10^{-8}
60μ	-3.30×10^{-5}	-2.22×10^{-10}	-1.20×10^{-5}	-1.22×10^{-8}
75μ	-3.46×10^{-5}	-4.28×10^{-11}	-1.70×10^{-5}	-2.40×10^{-8}
90μ	-3.18×10^{-5}	-7.58×10^{-11}	-1.35×10^{-5}	-1.50×10^{-8}

Replacement Concept

High Flux 60μ	⇄	APHxxP60
MPP 60μ	⇄	APHxxP60

Note 1 Number of winding is same.

Note 2 Size of core is same for HF and MPP replacement.

Note 3 Temperature rise of APC is smaller than High Flux, MPP.

PRODUCT OVERVIEW

Feature

- Reduce Overall Component Cost than Other Solution
- Low Ripple Current
- High Efficiency
- Smaller in Size (Save PCB Size)
- Smallest Temperature Rise among Powdered Core

Material Information

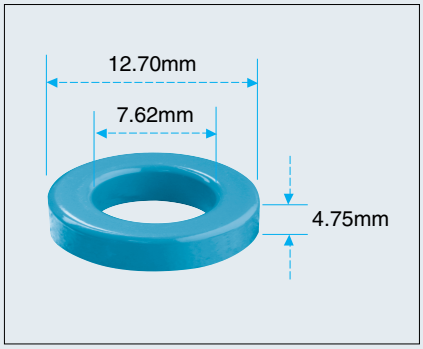
Properties	APH™	MPP	High Flux	Sendust	Ferrite
Saturation Flux Density Bs(G)	15,000	7,500	15,000	10,000	3,000
DC Bias Property @100Oe	70%	50%	70%	45%	Gap dep
Core Loss @100kHz, 0.1T	600	500	1,300	850	Gap dep

Specification of APH™ Series [APHXXP60 Core Information]

APH™	Size (Bare) (OD×ID×HT)	Size (Coated) (OD×ID×HT)	A_L (nH/N²)	Ac (cm²)	Le (cm)	SA (cm²)	Wa (cm²)	WaAc (cm⁴)	Vol (cm³)
APH13PXX	12.7× 7.6× 4.8	13.5× 7.0× 5.5	27	0.11	3.12	5.6	0.38	0.04	0.36
APH17PXX	16.5×10.2× 6.4	17.4× 9.5× 7.1	35	0.19	4.11	9.2	0.71	0.14	0.79
APH18PXX	17.3× 9.7× 6.4	18.0× 9.0× 7.1	43	0.23	4.14	9.9	0.64	0.13	0.96
APH20PXX	20.3×12.7× 6.4	21.1×12.1× 7.1	32	0.23	5.09	12.1	1.14	0.26	1.15
APH23PXX	22.9×14.0× 7.6	23.6×13.4× 8.4	43	0.33	5.67	15.7	1.41	0.47	1.88
APH24PXX	23.6×14.4× 8.9	24.3×13.8× 9.7	51	0.39	5.88	17.9	1.49	0.58	2.28
APH27PXX	26.9×14.7×11.2	27.7×14.1×12.0	75	0.65	6.35	24.7	1.56	1.02	4.15
APH33PXX	33.0×19.9×10.7	33.8×19.3×11.6	61	0.67	8.15	31.5	2.93	1.97	5.48
APH36PXX	35.8×22.4×10.5	36.7×21.5×11.3	56	0.68	8.98	34.5	3.64	2.47	6.09
APH40PXX	39.9×23.1×14.5	40.7×23.3×15.4	81	1.07	9.84	48.4	4.27	4.58	10.55
APH46PXX	46.7×24.1×18.0	47.6×23.3×18.9	135	1.99	10.74	69.3	4.27	8.50	21.37
APH47PXX	46.7×28.7×15.2	47.6×27.9×16.1	86	1.34	11.63	61.7	6.11	8.19	15.58
APH50PXX	50.8×31.8×13.5	51.7×30.9×14.4	73	1.25	12.73	64.2	7.50	9.38	15.93
APH57PXX	57.2×26.4×15.2	58.0×25.6×16.1	138	2.29	12.51	91.0	5.14	11.77	28.60

AMOSENSE APH™

APH13PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	12.70	7.62	4.75
Coating Core(epoxy)	13.46	6.99	5.51

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.114 cm^2	3.12 cm	0.383 cm^2	0.356 cm^3

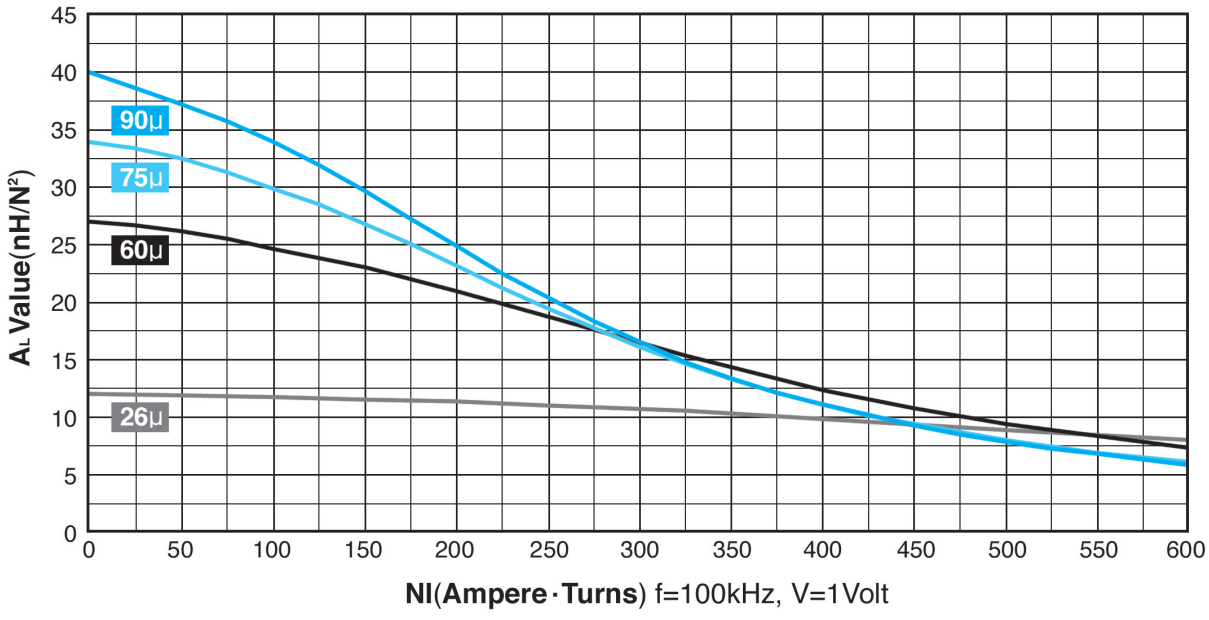
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH13P26	12	26
APH13P60	27	60
APH13P75	34	75
APH13P90	40	90

Winding Information

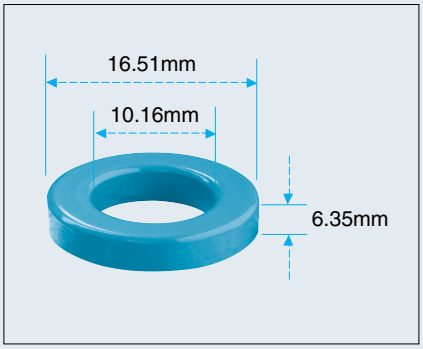
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
15	0.1530	10	0.00271	24	0.0566	31	0.0518
16	0.1370	11	0.00376	25	0.0505	35	0.0723
17	0.1220	13	0.00520	26	0.0452	40	0.1010
18	0.1090	15	0.00722	27	0.0409	45	0.1400
19	0.0980	17	0.01000	28	0.0366	50	0.1970
20	0.0879	19	0.01390	29	0.0330	56	0.2690
21	0.0785	22	0.01930	30	0.0294	63	0.3810
22	0.0701	25	0.02700	31	0.0267	69	0.5270
23	0.0632	28	0.03710	32	0.0241	77	0.7160

A_L vs NI Curve



AMOSENSE APH™

APH17PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	16.51	10.16	6.35
Coating Core(epoxy)	17.40	9.53	7.11

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.192cm^2	4.11cm	0.713cm^2	0.7891cm^3

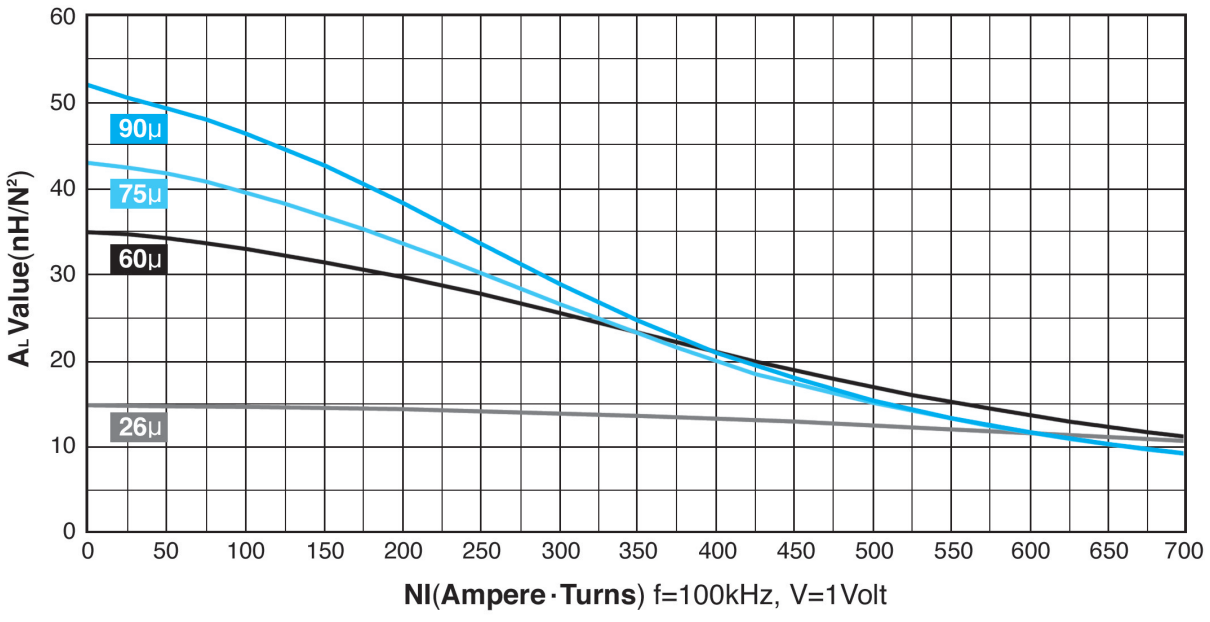
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH17P26	15	26
APH17P60	35	60
APH17P75	43	75
APH17P90	52	90

Winding Information

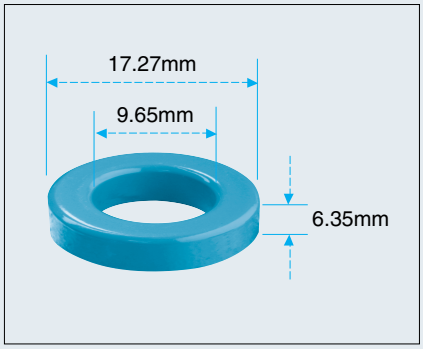
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	10	0.00165	21	0.0785	31	0.0323
13	0.1900	11	0.00230	22	0.0701	35	0.0453
14	0.1710	13	0.00318	23	0.0632	39	0.0626
15	0.1530	15	0.00443	24	0.0566	44	0.0876
16	0.1370	17	0.00617	25	0.0505	49	0.1230
17	0.1220	19	0.00856	26	0.0452	55	0.1720
18	0.1090	21	0.01190	27	0.0409	62	0.2390
19	0.0980	24	0.01660	28	0.0366	69	0.3360
20	0.0879	27	0.02310	29	0.0330	77	0.4600

A_L vs NI Curve



AMOSENSE APH™

APH18PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	17.27	9.65	6.35
Coating Core(epoxy)	18.03	9.02	7.11

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.232 cm^2	4.14 cm	0.638 cm^2	0.9605 cm^3

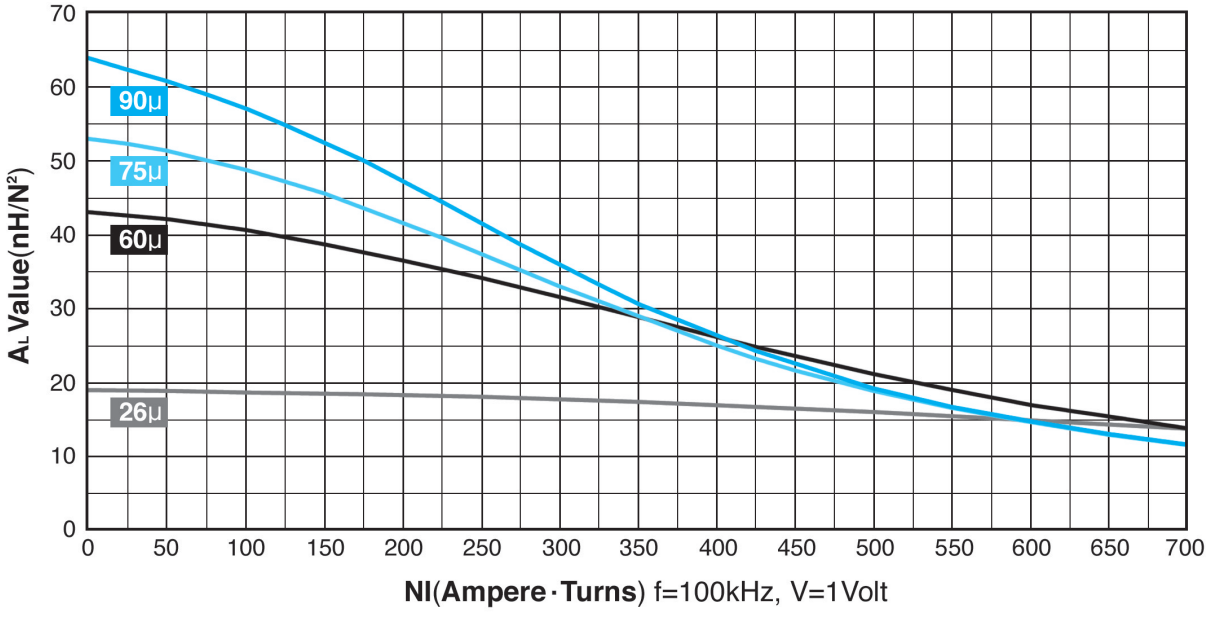
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH18P26	19	26
APH18P60	43	60
APH18P75	53	75
APH18P90	64	90

Winding Information

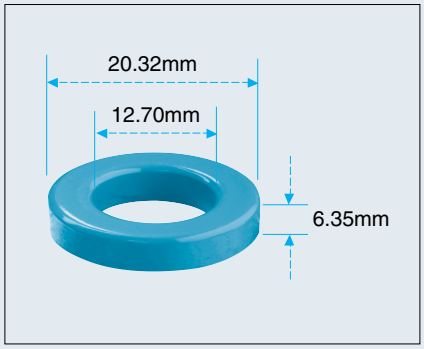
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	9	0.00161	21	0.0785	29	0.0319
13	0.1900	10	0.00225	22	0.0701	33	0.0449
14	0.1710	12	0.00311	23	0.0632	37	0.0621
15	0.1530	14	0.00434	24	0.0566	41	0.0869
16	0.1370	16	0.00606	25	0.0505	47	0.1220
17	0.1220	18	0.00843	26	0.0452	52	0.1710
18	0.1090	20	0.01180	27	0.0409	58	0.2370
19	0.0980	23	0.01640	28	0.0366	65	0.3340
20	0.0879	26	0.02280	29	0.0330	73	0.4580

A_L vs NI Curve



AMOSENSE APH™

APH20PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	20.32	12.70	6.35
Coating Core(epoxy)	21.1	12.07	7.11

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.226 cm^2	5.09 cm	1.14 cm^2	1.151 cm^3

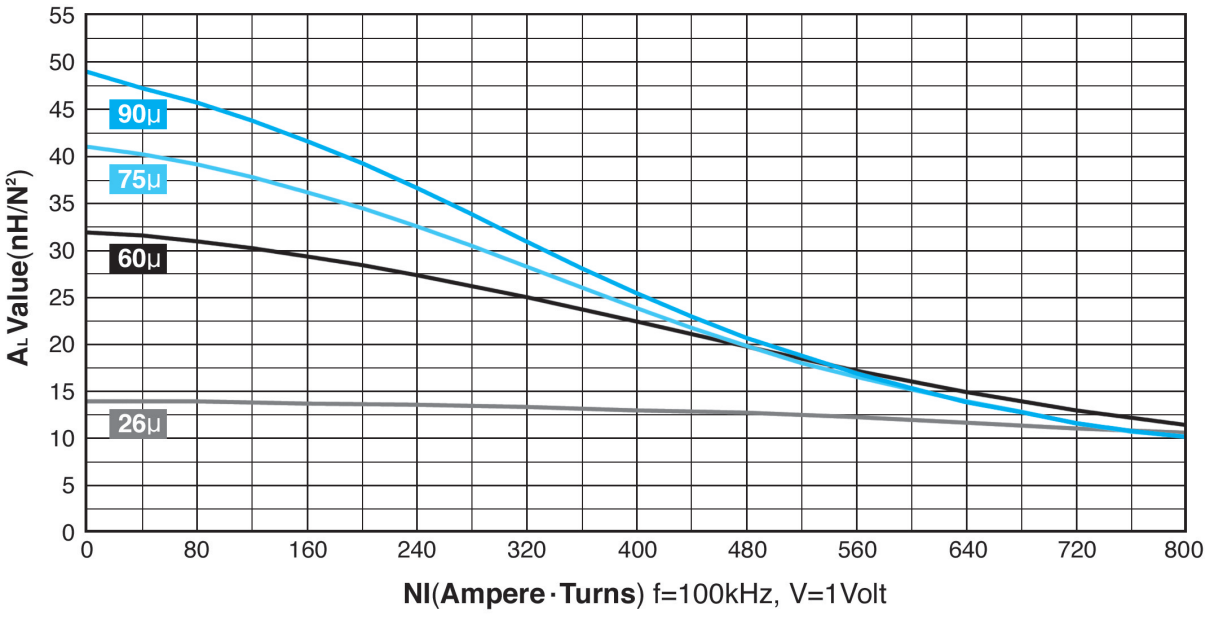
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH20P26	14	26
APH20P60	32	60
APH20P75	41	75
APH20P90	49	90

Winding Information

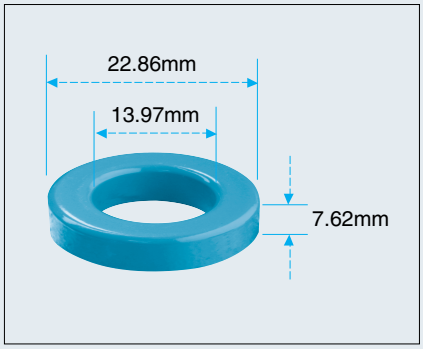
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	13	0.00221	21	0.0785	40	0.0430
13	0.1900	15	0.00307	22	0.0701	45	0.0604
14	0.1710	17	0.00424	23	0.0632	50	0.0834
15	0.1530	19	0.00590	24	0.0566	56	0.1170
16	0.1370	22	0.00822	25	0.0505	63	0.1640
17	0.1220	25	0.01140	26	0.0452	71	0.2300
18	0.1090	28	0.01590	27	0.0409	79	0.3180
19	0.0980	32	0.02220	28	0.0366	89	0.4480
20	0.0879	35	0.03080	29	0.0330	98	0.6140

A_L vs NI Curve



AMOSENSE APH™

APH23PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	22.86	13.97	7.62
Coating Core(epoxy)	23.62	13.39	8.38

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.331cm²	5.67cm	1.41cm²	1.8771cm³

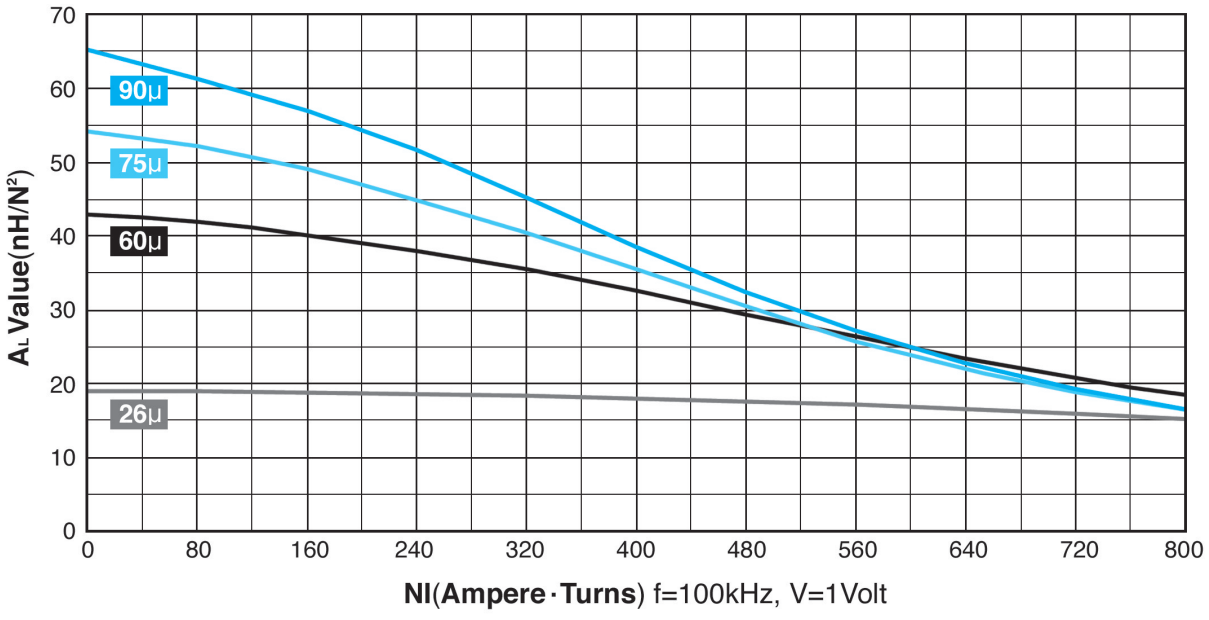
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH23P26	19	26
APH23P60	43	60
APH23P75	54	75
APH23P90	65	90

Winding Information

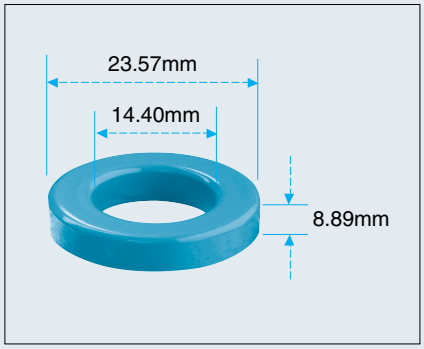
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	15	0.00276	21	0.0785	45	0.0548
13	0.1900	17	0.00384	22	0.0701	50	0.0771
14	0.1710	19	0.00532	23	0.0632	56	0.1070
15	0.1530	22	0.00742	24	0.0566	63	0.1500
16	0.1370	25	0.01040	25	0.0505	71	0.2100
17	0.1220	28	0.01440	26	0.0452	79	0.2950
18	0.1090	31	0.02020	27	0.0409	88	0.4090
19	0.0980	35	0.02810	28	0.0366	99	0.5770
20	0.0879	40	0.03920	29	0.0330	109	0.7910

A_L vs NI Curve



AMOSENSE APH™

APH24PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	23.57	14.40	8.89
Coating Core(epoxy)	24.30	13.77	9.70

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.388 cm^2	5.88 cm	1.49 cm^2	2.2814 cm^3

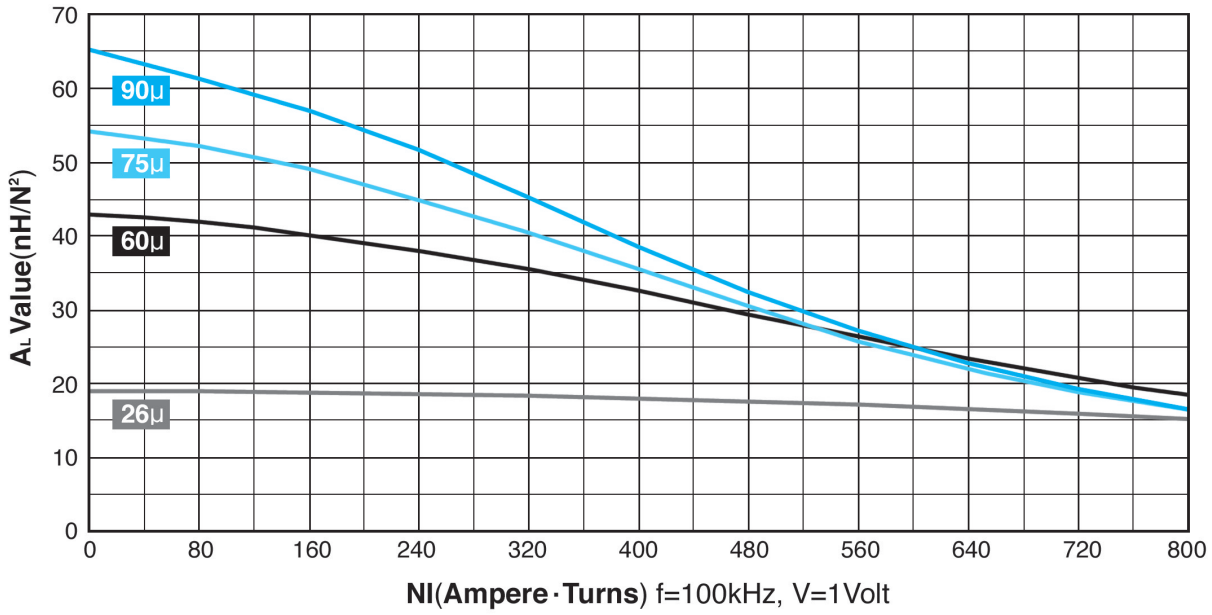
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH24P26	22	26
APH24P60	51	60
APH24P75	63	75
APH24P90	76	90

Winding Information

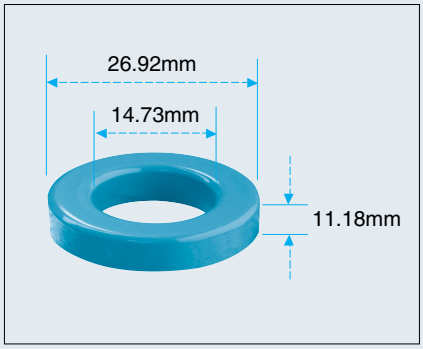
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	15	0.00307	21	0.0785	46	0.0620
13	0.1900	17	0.00429	22	0.0701	52	0.0874
14	0.1710	20	0.00595	23	0.0632	58	0.1210
15	0.1530	22	0.00832	24	0.0566	65	0.1700
16	0.1370	25	0.01160	25	0.0505	73	0.2380
17	0.1220	29	0.01620	26	0.0452	81	0.3360
18	0.1090	32	0.02270	27	0.0409	91	0.4650
19	0.0980	36	0.03180	28	0.0366	101	0.6570
20	0.0879	41	0.04430	29	0.0330	112	0.9010

A_L vs NI Curve



AMOSENSE APH™

APH27PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	26.92	14.73	11.18
Coating Core(epoxy)	27.70	14.10	11.99

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.654 cm^2	6.35 cm	1.56 cm^2	4.150 cm^3

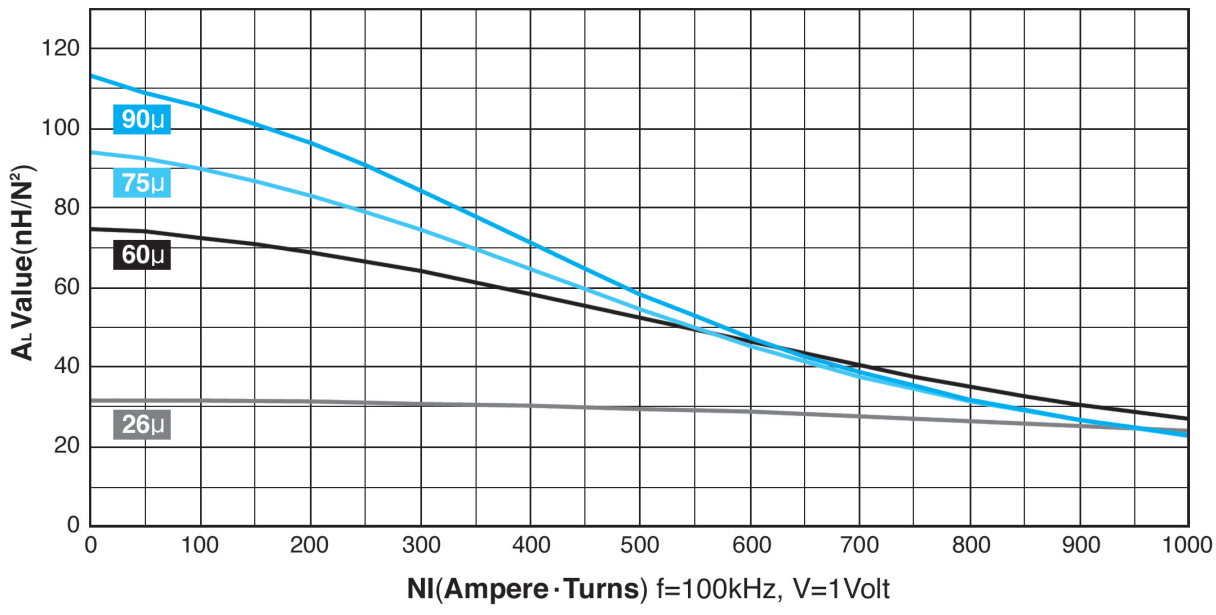
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH27P26	32	26
APH27P60	75	60
APH27P75	94	75
APH27P90	113	90

Winding Information

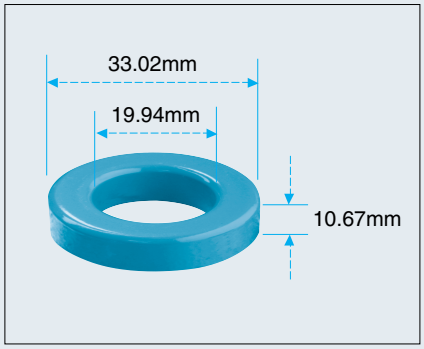
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	16	0.00367	21	0.0785	47	0.0759
13	0.1900	18	0.00514	22	0.0701	53	0.1070
14	0.1710	20	0.00715	23	0.0632	59	0.1490
15	0.1530	23	0.01000	24	0.0566	66	0.2090
16	0.1370	26	0.01410	25	0.0505	74	0.2940
17	0.1220	29	0.01970	26	0.0452	83	0.4140
18	0.1090	33	0.02760	27	0.0409	93	0.5750
19	0.0980	37	0.03870	28	0.0366	104	0.8120
20	0.0879	42	0.05410	29	0.0330	115	1.1100

A_L vs NI Curve



AMOSENSE APH™

APH33PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	33.02	19.94	10.67
Coating Core(epoxy)	33.83	19.30	11.61

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.672 cm^2	8.15 cm	2.93 cm^2	5.4768 cm^3

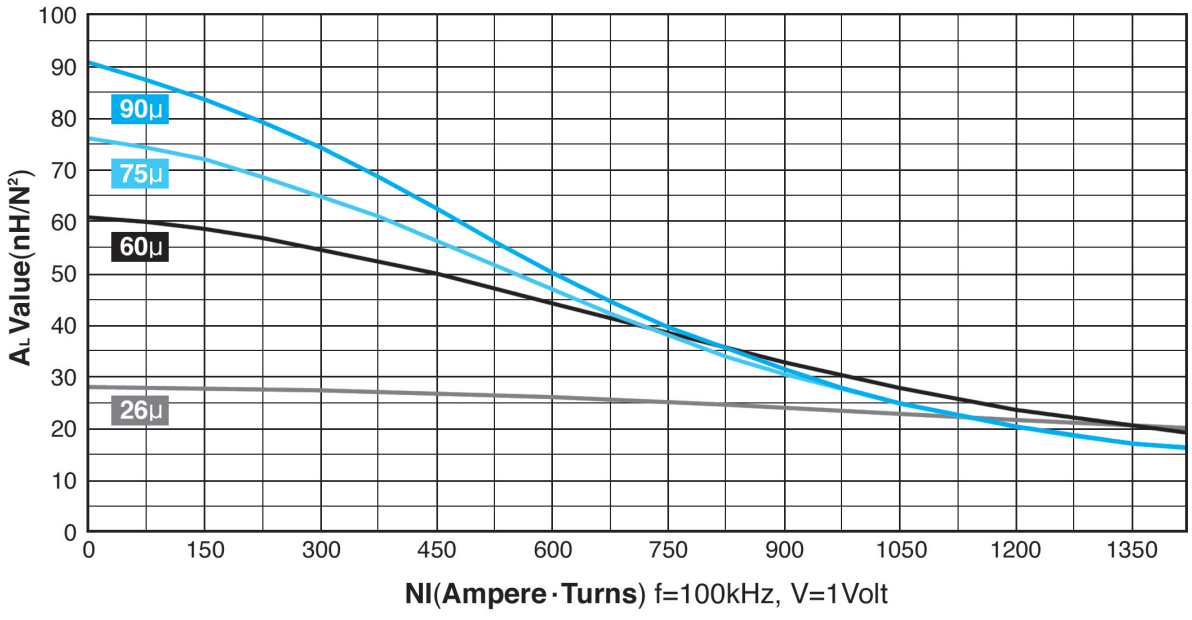
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH33P26	28	26
APH33P60	61	60
APH33P75	76	75
APH33P90	91	90

Winding Information

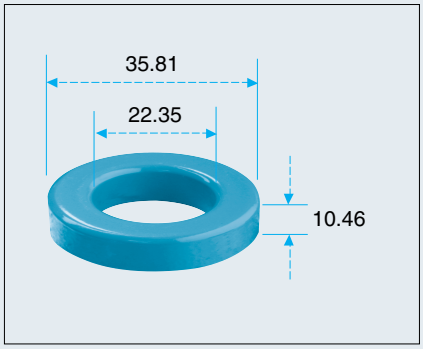
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	23	0.00517	21	0.0785	66	0.1050
13	0.1900	26	0.00722	22	0.0701	74	0.1480
14	0.1710	29	0.01000	23	0.0632	82	0.2060
15	0.1530	32	0.01400	24	0.0566	92	0.2890
16	0.1370	37	0.01970	25	0.0505	103	0.4060
17	0.1220	41	0.02740	26	0.0452	115	0.5720
18	0.1090	46	0.03840	27	0.0409	128	0.7940
19	0.0980	52	0.05380	28	0.0366	143	1.1200
20	0.0879	58	0.07500	29	0.0330	159	1.5400

A_L vs NI Curve



AMOSENSE APH™

APH36PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	35.81	22.35	10.46
Coating Core(epoxy)	36.70	21.50	11.28

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
0.678 cm^2	8.98 cm	3.64 cm^2	6.0884 cm^3

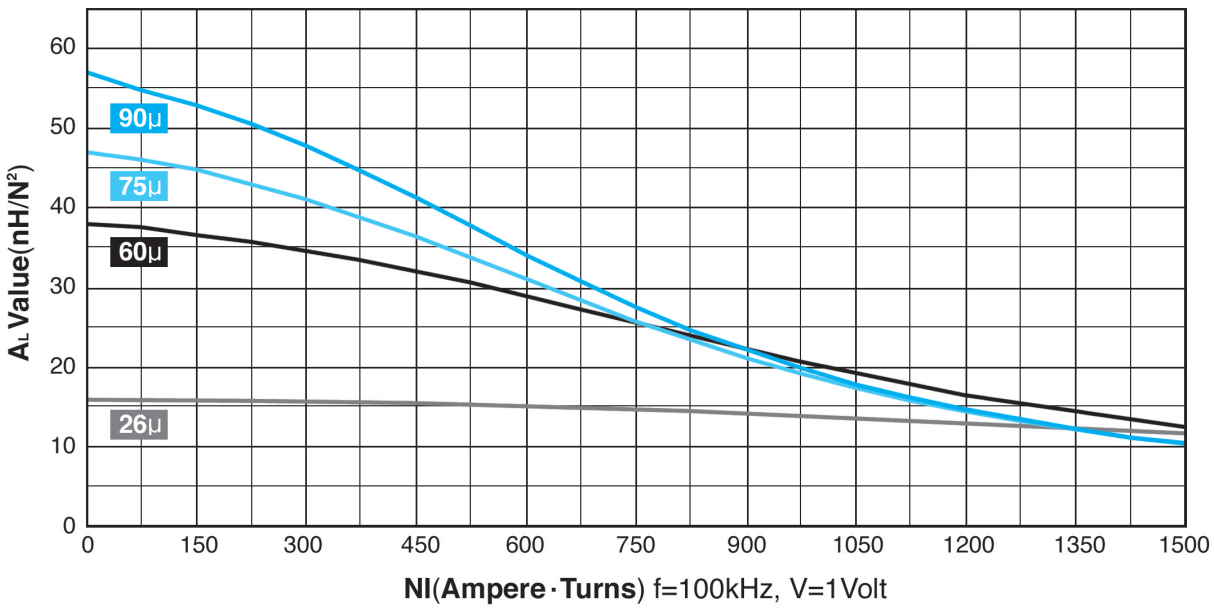
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH36P26	24	26
APH36P60	56	60
APH36P75	70	75
APH36P90	84	90

Winding Information

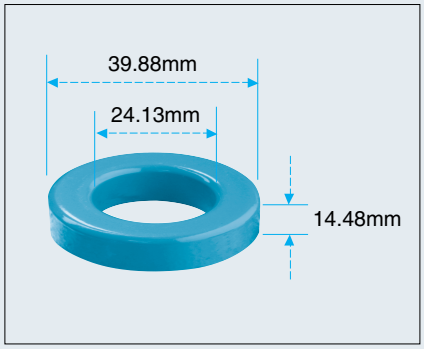
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
12	0.2130	25	0.00579	21	0.0785	74	0.1170
13	0.1900	29	0.00809	22	0.0701	82	0.1660
14	0.1710	32	0.01120	23	0.0632	92	0.2290
15	0.1530	37	0.01570	24	0.0566	103	0.3220
16	0.1370	41	0.02200	25	0.0505	115	0.4520
17	0.1220	46	0.03060	26	0.0452	129	0.6370
18	0.1090	52	0.04290	27	0.0409	143	0.8850
19	0.0980	58	0.06000	28	0.0366	160	1.2500
20	0.0879	65	0.08370	29	0.0330	177	1.7100

A_L vs NI Curve



AMOSENSE APH™

APH40PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	39.88	24.13	14.48
Coating Core(epoxy)	40.70	23.30	15.37

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
1.072 cm^2	9.84 cm	4.27 cm^2	10.5485 cm^3

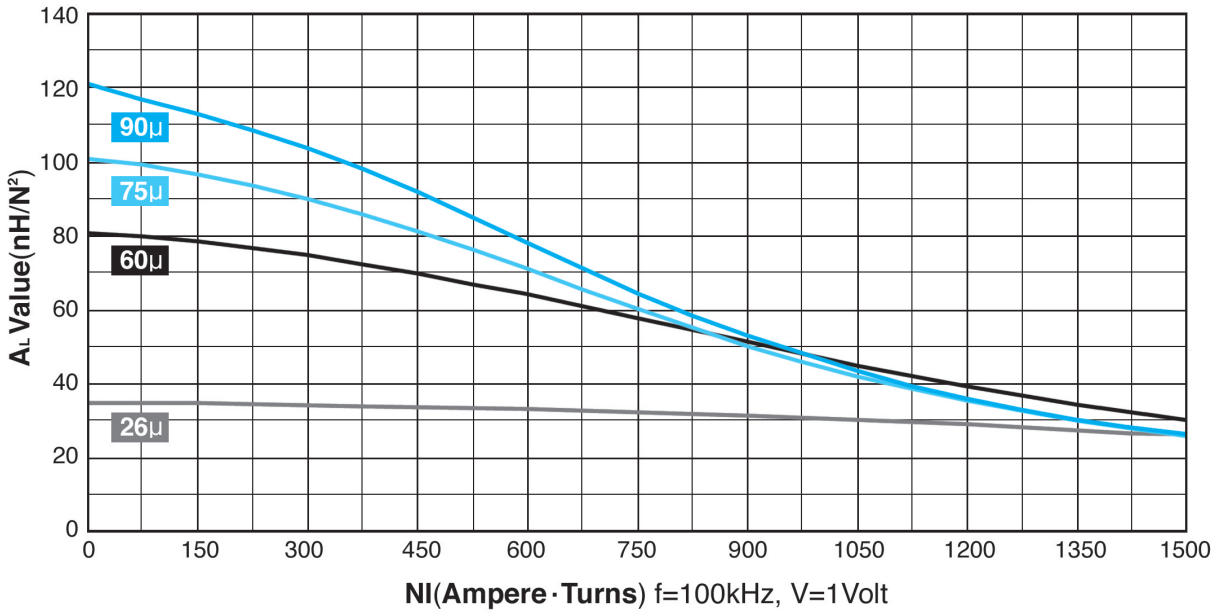
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH40P26	35	26
APH40P60	81	60
APH40P75	101	75
APH40P90	121	90

Winding Information

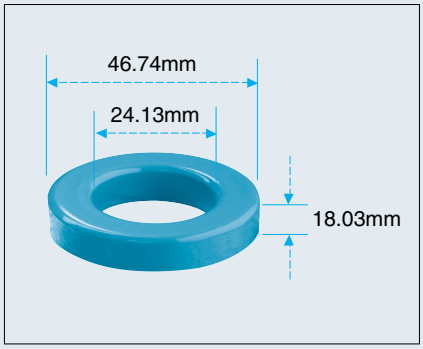
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
10	0.2670	22	0.00389	19	0.0785	64	0.0804
11	0.2380	25	0.00545	20	0.0701	71	0.1120
12	0.2130	28	0.00762	21	0.0632	80	0.1580
13	0.1900	31	0.01070	22	0.0566	90	0.2230
14	0.1710	35	0.01480	23	0.0505	100	0.3090
15	0.1530	40	0.02080	24	0.0452	112	0.4350
16	0.1370	45	0.02920	25	0.0409	125	0.6110
17	0.1220	50	0.04080	26	0.0366	140	0.8620
18	0.1090	57	0.05740	27	0.0330	155	1.2000

A_L vs NI Curve



AMOSENSE APH™

APH46PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	46.74	24.13	18.03
Coating Core(epoxy)	47.60	23.30	18.92

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
1.990 cm^2	10.74 cm	4.27 cm^2	21.373 cm^3

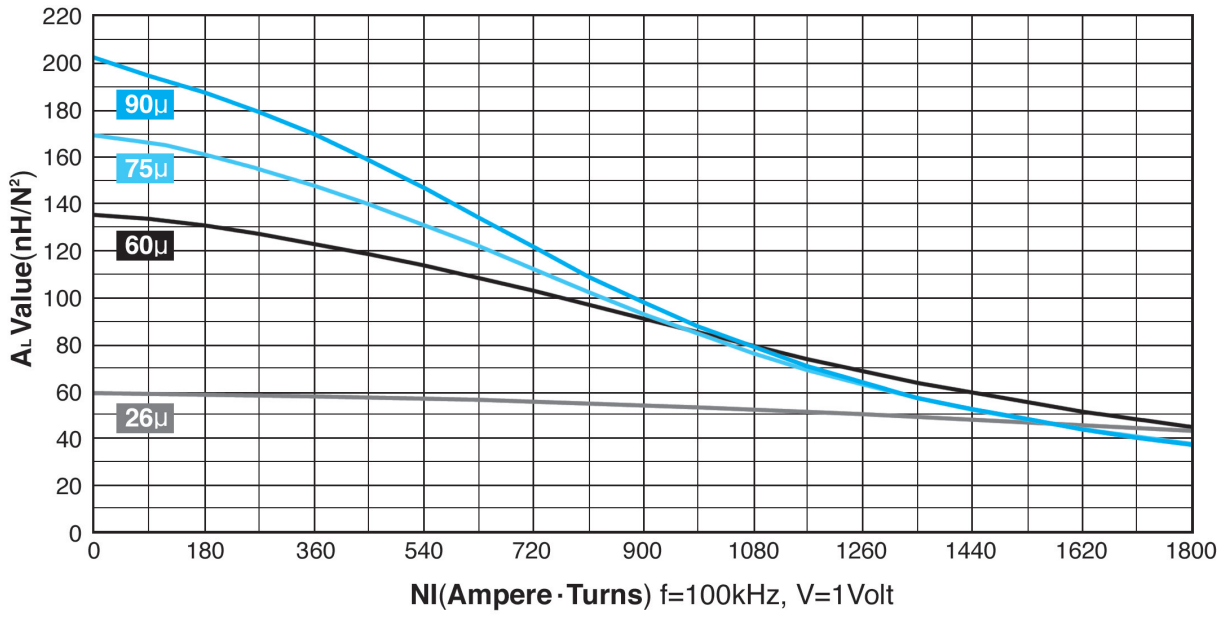
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH46P26	59	26
APH46P60	135	60
APH46P75	169	75
APH46P90	202	90

Winding Information

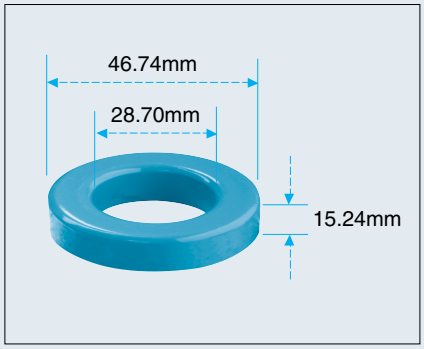
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
10	0.2670	22	0.0488	19	0.0785	64	0.1040
11	0.2380	25	0.0688	20	0.0701	71	0.1460
12	0.2130	28	0.0966	21	0.0632	80	0.2050
13	0.1900	31	0.0136	22	0.0566	90	0.2900
14	0.1710	35	0.0189	23	0.0505	100	0.4030
15	0.1530	40	0.0267	24	0.0452	112	0.5670
16	0.1370	45	0.0375	25	0.0409	125	0.7980
17	0.1220	50	0.0526	26	0.0366	140	1.1300
18	0.1090	57	0.0740	27	0.0330	155	1.5700

A_L vs NI Curve



AMOSENSE APH™

APH47PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	46.74	28.70	15.24
Coating Core(epoxy)	47.60	27.90	16.13

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
1.340 cm^2	11.63 cm	6.11 cm^2	15.584 cm^3

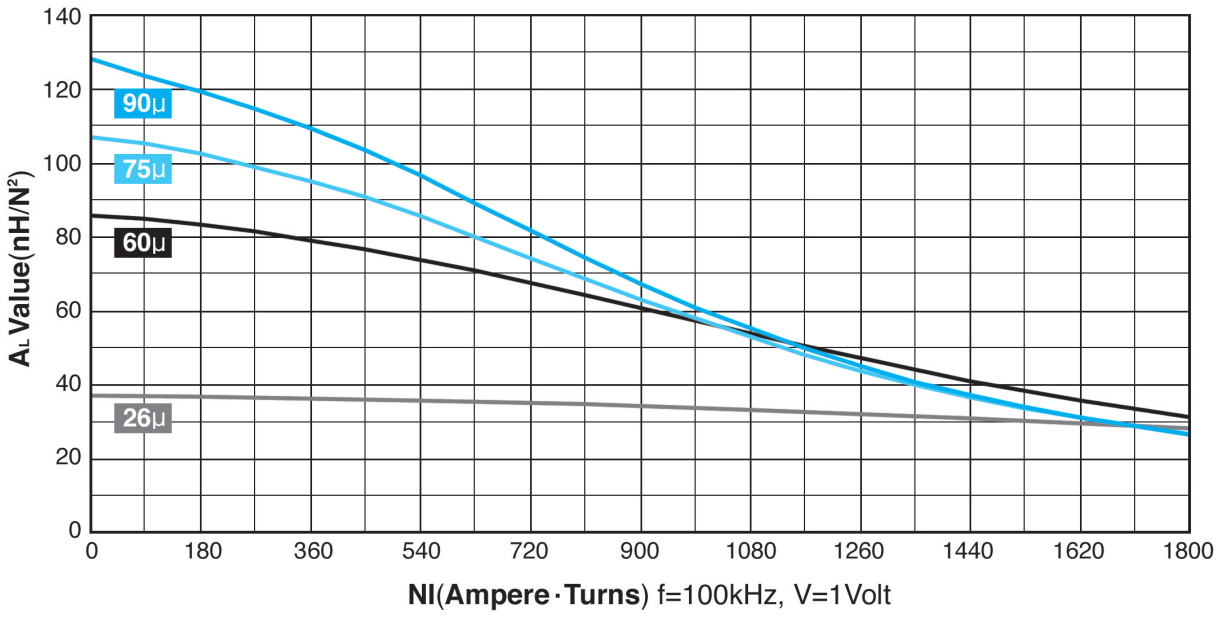
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH47P26	37	26
APH47P60	86	60
APH47P75	107	75
APH47P90	128	90

Winding Information

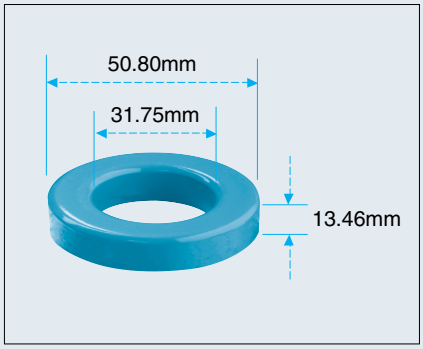
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
10	0.2670	26	0.00505	19	0.0980	77	0.1040
11	0.2380	30	0.00708	20	0.0879	86	0.1460
12	0.2130	34	0.00990	21	0.0785	96	0.2050
13	0.1900	38	0.01390	22	0.0701	108	0.2900
14	0.1710	43	0.01930	23	0.0632	120	0.4020
15	0.1530	48	0.02700	24	0.0566	134	0.5650
16	0.1370	54	0.03800	25	0.0505	150	0.7950
17	0.1220	61	0.05300	26	0.0452	168	1.1200
18	0.1090	68	0.07450	27	0.0409	186	1.5600

A_L vs NI Curve



AMOSENSE APH™

APH50PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	50.80	31.75	13.46
Coating Core(epoxy)	51.70	30.90	14.35

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
1.251 cm^2	12.73 cm	7.50 cm^2	15.929 cm^3

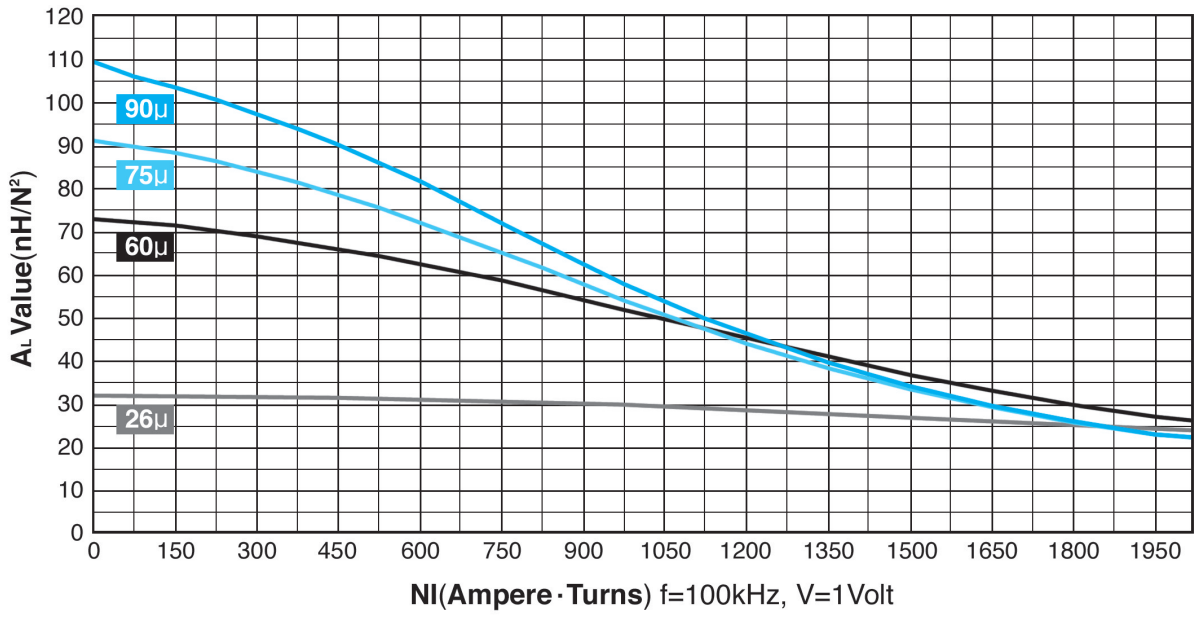
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH50P26	32	26
APH50P60	73	60
APH50P75	91	75
APH50P90	109	90

Winding Information

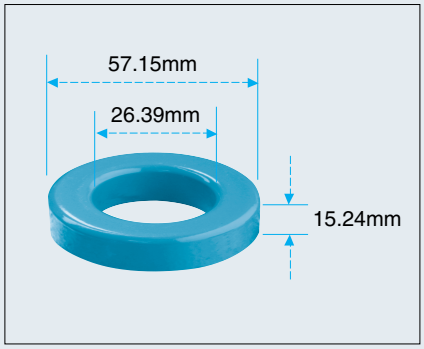
AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
10	0.2670	30	0.00539	19	0.0980	85	0.1100
11	0.2380	33	0.00754	20	0.0879	95	0.1540
12	0.2130	38	0.01050	21	0.0785	107	0.2160
13	0.1900	43	0.01470	22	0.0701	120	0.3060
14	0.1710	48	0.02050	23	0.0632	133	0.4240
15	0.1530	54	0.02870	24	0.0566	149	0.5960
16	0.1370	60	0.04020	25	0.0505	167	0.8380
17	0.1220	68	0.05620	26	0.0452	186	1.1800
18	0.1090	76	0.07880	27	0.0409	207	1.6400

A_L vs NI Curve



AMOSENSE APH™

APH57PXX



Core Dimension

Cross Secion	OD(max)	ID(min)	HT(max)
Bare Core(mm)	57.15	26.39	15.24
Coating Core(epoxy)	58.00	25.60	16.10

Magnetic Dimensions

Cross Secion (A)	Path Length (L)	Window Area (Wa)	Volume (V)
2.29 cm^2	12.5 cm	5.14 cm^2	28.6 cm^3

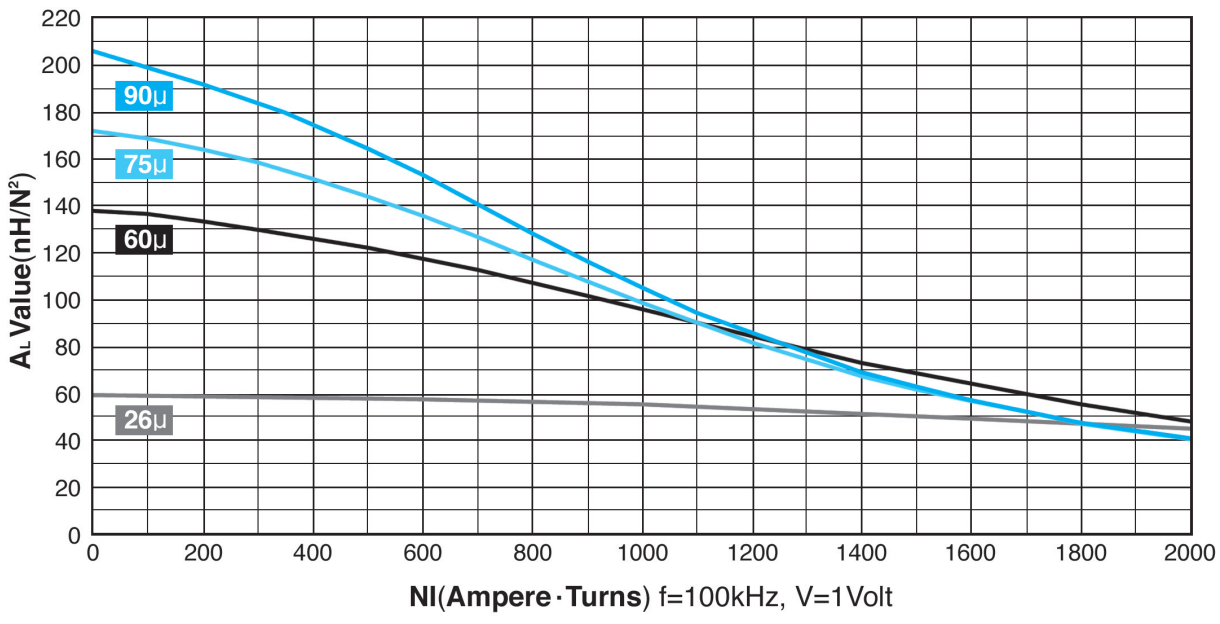
Available Cores

Part No.	AL (nH/N2)	Perm. (μ)
APH57P26	60	26
APH57P60	138	60
APH57P75	172	75
APH57P90	206	90

Winding Information

AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω	AWG Wire No.	Dia(cm)	Single Lager Turns	Rdc, Ω
10	0.2670	26	0.00551	19	0.0980	78	0.1330
11	0.2380	30	0.00801	20	0.0879	88	0.1890
12	0.2130	34	0.01150	21	0.0785	99	0.2690
13	0.1900	39	0.01650	22	0.0701	111	0.3810
14	0.1710	43	0.02300	23	0.0632	124	0.5340
15	0.1530	49	0.03300	24	0.0566	138	0.7520
16	0.1370	55	0.04690	25	0.0505	156	1.0700
17	0.1220	62	0.06640	26	0.0452	174	1.5100
18	0.1090	70	0.09480	27	0.0409	193	2.1000

A_L vs NI Curve



APPENDIX

Unit and Conversions

cgs units	mks units
$B = H + 4\pi M$ B in gauss H in oersteds M in emu/cm^3 μ_0(vacuum) = 1	**$B = \mu_0 H + M$** B in webers/$meter^2$(tesla) H in amperes/meter M in webers/$meter^2$ μ_0(vacuum) = $4\pi \times 10^{-7}$(weber/ampere meter)

cgs to mks	mks to cgs
B : 1gauss = 10^{-4} weber/$meter^2$ H : 1oersted = 79.58 amperes/meter M : 1emu/cm^3 = 12.57×10^{-4} weber/$meter^2$ ϕ : 1maxwell = 10^{-8} weber	1weber/$meter^2$ = 10^4 gauss 1ampere/meter = 12.57×10^{-3} Oe 1weber/$meter^2$ = 796 emu/cm^3 1weber = 10^8 maxwells

Permeability(μ)

In magnetics, permeability is the ability of a material to conduct flux.
The magnetitude of the permeability at a given induction is a measure of the ease with which a core material can be magnetized to that induction.
It is defined as the ratio of the flux density B to the magnetizing force H.

$$\mu = \frac{B}{H}$$

μ = permeability
B = flux density(gauss)
H = magnetizing force(oersteds)

Flux Density, B(Gauss ; Tesla)

The corresponding parameter for the induced magnetic field in an area perpendicular to the flux path. Flux density is determined by the field strength permeability of the medium in which it is measured.
1T = 10^4 Gauss

$$B_{max} = \frac{E_{rms} \times 10^8}{4.44 f A N}$$ **: Faraday's Law**

B_{max} = maximum flux density(gauss)
E_{rms} = voltage across coil(volts)
f = frequency(hertz)
A = effective cross section area(cm^2)
N = number of turns

Inductance of Wound core

The inductance of a wound core at a given number of turns is calculated using the following formula.

$$L = \frac{0.4\pi\mu N^2 A \times 10^{-2}}{\ell}$$

$$L_N = A_L N^2 10^{-3}$$

L = inductance(μH)
μ = permeability
N = number of turns
A = effective cross section area(cm^2)
ℓ = mean magnetic path length(cm)
L_N = Inductance at n turns(μH)
A_L = nominal Inductance(nH/N^2)

Magnetizing Force, H(Oe ; A/m)

The magnetic field strength which produces magnetic flux. The mmf per unit length. H can be considered to be a measure of the strength or effort that the magnetomotive force applies to magnetic circuit to establish a magnetic field. H may be expressed as H=NI/ℓ , where ℓ is the mean length of the magnetic circuit in meters.
1 Oersted = 79.58A/m

$$H = \frac{0.4\pi NI}{\ell}$$ **: Ampere's Law**

H = magnetizing force(oersteds)
N = number of turns
I = peak magnetizing current(amperes)
ℓ = mean magnetic path length(cm)

Core Loss

Powder cores have low hysteresis loss, minimizing signal distortion, and low residual loss. The total core loss at low flux densities is the sum of three frequency dependent losses of hysteresis loss, residual loss, and eddy current loss. The core loss is calculated from the following Legg's equation.

$$\frac{R_{ac}}{\mu L} = aB_{max}f + cf + ef^2$$

$R_{ac}/\mu L$: Total loss factor
$aB_{max}f$: Hysteresis loss
cf : Residual loss
ef^2: Eddy current loss

R_{ac} = core loss resistance(ohms)
a = hysteresis loss coefficient
c = residual loss coffefficient
e = eddy current loss cofficient
μ = permeability
L = inductance(μH)
B_{max} = maximum flux density(gauss)
f = frequency(hertz)

Wire Table

AWG Wire No.	Bare Area		Resistivity 10^{-6}cmΩ at 20°C	Heavy Synthetics					Current Capacity Amps (listed by columns of amps/cm²)			
				Area		Diameter		Weight gm/cm				
	cm² (×10⁻³)	Cir-Mil		cm² (×10⁻³)	Cir-Mil	cm	inch		200	400	600	800
10	53.61	10384	32.7	55.9	11046	0.267	0.1051	0.468	10.4	20.8	31.2	41.6
11	41.68	8226	41.37	44.5	8798	0.238	0.0938	0.0375	8.23	16.4	24.6	32.8
12	33.08	6529	52.09	35.64	7022	0.213	0.0838	0.2977	6.53	13.06	19.6	26.1
13	26.26	5184	65.64	28.36	5610	0.190	0.0749	0.2367	5.18	10.4	15.5	20.8
14	20.82	4109	82.8	22.95	4556	0.171	0.0675	0.1879	4.11	8.22	12.3	16.4
15	16.51	3260	104.3	18.37	3624	0.153	0.0602	0.1492	3.26	6.52	9.78	13.0
16	13.07	2581	131.8	14.73	2905	0.137	0.0539	0.1184	2.58	5.06	7.74	10.3
17	10.39	2052	165.8	11.68	2323	0.122	0.0482	0.0943	2.05	4.10	6.15	8.20
18	8.228	1624	209.5	9.326	1857	0.109	0.0431	0.07472	1.62	3.25	4.88	6.50
19	6.531	1289	263.9	7.539	1490	0.0980	0.0386	0.05940	1.29	2.58	3.87	5.16
20	5.188	1024	332.3	6.065	1197	0.0879	0.0346	0.04726	1.02	2.05	3.08	4.10
21	4.116	812.3	418.9	4.837	954.8	0.0785	0.0309	0.03757	0.812	1.63	2.44	3.25
22	3.243	640.1	531.4	3.857	761.7	0.0701	0.0276	0.02965	0.640	1.28	1.92	2.56
23	2.588	510.8	666.0	3.135	620.0	0.0632	0.0249	0.02372	0.511	1.02	1.53	2.04
24	2.047	404.0	842.1	2.514	497.3	0.0566	0.0223	0.01884	0.404	0.808	1.21	1.62
25	1.623	320.4	1062.0	2.002	396.0	0.0505	0.0199	0.01498	0.320	0.641	0.962	1.28
26	1.280	252.8	1345.0	1.603	316.8	0.0452	0.0178	0.01185	0.253	0.506	0.759	1.01
27	10.21	201.6	1687.6	1.313	259.2	0.0409	0.0161	0.00945	0.202	0.403	0.604	0.806
28	0.8046	158.8	2142.7	1.0515	207.3	0.0366	0.0144	0.00747	0.159	0.318	0.477	0.656
29	0.6470	127.7	2664.3	0.8548	169.0	0.0330	0.0130	0.00602	0.128	0.255	0.382	0.510
30	0.5067	100.0	3402.2	0.6785	134.5	0.0294	0.0116	0.00472	0.100	0.200	0.300	0.400
31	0.4013	79.21	4294.6	0.5595	110.2	0.0267	0.0105	0.00372	0.0792	0.158	0.237	0.316
32	0.3242	64.00	5314.9	0.4559	90.25	0.0241	0.0095	0.00305	0.0640	0.128	0.192	0.256
33	0.2554	50.41	6748.6	0.3662	72.25	0.0216	0.0085	0.00214	0.0504	0.101	0.152	0.202
34	0.2011	39.69	8572.8	0.2863	56.25	0.0191	0.0075	0.00189	0.0397	0.0794	0.119	0.159
35	0.1589	31.36	10849	0.2268	44.89	0.0170	0.0067	0.00150	0.0314	0.0627	0.0940	0.125
36	0.1266	25.00	13608	0.1813	36.00	0.0152	0.0060	0.00119	0.0250	0.0500	0.0750	0.100
37	0.1026	20.25	16801	0.1538	30.25	0.0140	0.0055	0.000977	0.0203	0.0405	0.0608	0.0810
38	0.08107	16.00	21266	0.1207	24.01	0.0124	0.0049	0.000773	0.0160	0.0320	0.0480	0.0640
39	0.06207	12.25	27775	0.0932	18.49	0.0109	0.0043	0.000593	0.0123	0.0245	0.0368	0.0490
40	0.04869	9.61	35400	0.0723	14.44	0.0096	0.0038	0.000464	0.00961	0.0192	0.0288	0.0384
41	0.03972	7.84	43405	0.0584	11.56	0.00863	0.0034	0.000379	0.00785	0.0157	0.0236	0.0314
42	0.03166	6.25	54429	0.04558	9.00	0.00762	0.0030	0.000299	0.00625	0.0125	0.0188	0.0250
43	0.02452	4.84	70308	0.03683	7.29	0.00685	0.0027	0.000233	0.00484	0.00968	0.0145	0.0194
44	0.0202	4.00	85072	0.03165	6.25	0.00635	0.0025	0.000195	0.00400	0.00800	0.0120	0.0160

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