INDEX

INTRODUCTION

Shield beads have been referred to in many different ways, from simple terms such as ferrite cores to more complicated phrases, such as anti-interference beads, EMI/RFI suppressors, wide band chokes (used generally for multi-hole beads with more than one turn of wire), ... etc.

Its major application is to isolate a conductor in an environment of stray magnetic fields, the others are in conjunction with a capacitive element to create a low pass filter at low frequencies and dissipative at the higher frequencies. Furthermore, they can be used alone on component leads either to prevent any parasitical oscillations or to attenuate unwanted signal pickup or transmissions which might travel along a component lead or interconnection wires or cables.

Some of the newest beads being manufactured today are large in size and impedance value. Facing with shutdown because of EMI, manufacturers of electronic devices ingeniously started putting flat ribbon cable through and/or wrapping turns of coaxial cable and bunched wire on large ferrite toroids. They also cut the tubular beads in half, piecing them over wires that were already in place. Because of the increased demand for cores that could be used to attenuate EMI signals, ferrite shield beads can be found marketed in various configurations manufactured specially for high frequency attenuation. The cores are comparatively inexpensive and easily installed and, most important, they attenuate the unwanted noise and EMI without degradation of the informative signal.

The FCC limitations on field strength are presented to the manufacturer in terms of microvolts per meter (μV/m). But different manufacturer has different idea about it. We hereby abopt a suitable choice for this at 1 ohm. The following equation relates attenuation to the impedance of a shield bead in ohm.

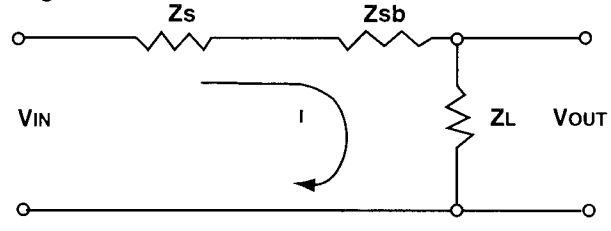
$$A = 20 \log \frac{Zsb + Z_L + Zs}{Z_L + Zs}$$

The selected value for both load and source impedance of 1 ohm reduces the above equation to:

$$A = 20 \log \frac{Zsb}{2}$$

When Zsb > > 1 and where
Z_L = load impedance (one ohm)
Zsb = shield bead impedance
Zs = source impedance (one ohm)

Figure 1



Many approaches are used to comply with design or specification limits. Basic circuit design, component layout, shielding of enclosures and through use of shielding materials must all be considered. For t he elimination of radiation or conduction through leads or cables, ferrite shield beads are being employed with great success. The only sure test of the effectiveness of a ferrite bead is still in experiment. This catalog lists a small representation of the large selection of parts available. We would be pleased to provide custom-designed ferrite beads to meet your specific requirements.

MAGNETIC PROPERTIES OF MATERIALS

Property	Unit	Symbol	A	B	A_3	B_{246}	B_{319}	D_2	E_1	O_1	K	X_{129}	Y_4	Y_7
Initial Permeability		μ_i	180	800	190	1200	1800	70	15	480	200	700	100	300
Maximum Permeability		μ_m	525	1270	3700	2750	3025	180	20	680	220	1220	610	850
Saturation Flux Density @H	Gauss	Bs	3800 @ 20	2400 @ 10	3350 @ 10	2900 @ 10	2280 @ 3	2800 @ 25	1700 @ 100	2100 @ 20	2400 @ 25	3350 @ 10	3650 @ 20	2800 @ 10
Coercive Force	Oersteds	Hc	2.1	0.3	0.486	0.2	0.255	4.4	29	0.8	1.9	0.7	1.7	0.8
Residual Flux Density	Gauss	Br	1800	850	2050	1450	1245	1200	1080	1100	630	2100	2200	1440
Curie Temperature	°C	Tc	300	140	180	175	150	300	300	150	175	220	300	175
Volume Resistivity	OHM-CM	ρ	10^7	10^7	10^7	10^7	10^7	10^7	10^7	10^7	10^7	10^7	10^7	10^7
Practical Frequency Range	MHz		0.4 to 15	0.1 to 0.7	0.4 to 15	0.01 to 0.5	0.01 to 0.4	0.5 to 15	10 to 150	0.01 to 1	0.1 to 2	0.1 to 1	0.5 to 15	0.1 to 1
Specific Gravity		d	4.7	4.8	4.8	4.7	4.9	4.7	4.8	4.9	4.8	4.7	4.7	4.7
Loss Factor @ MHz	$\frac{1}{\mu_i Q}$		1.7×10^{-4} @ 1	6.9×10^{-5} @ 0.5	1.2×10^{-4} @ 0.5	1.2×10^{-4} @ 0.5	1.1×10^{-5} @ 0.8	7.5×10^{-5} @ 5	5.0×10^{-4} @ 5	7.5×10^{-5} @ 1	5.3×10^{-5} @ 1	8.4×10^{-5} @ 4	4.0×10^{-5} @ 1	3.2×10^{-5} @ 1
Temp. Coefs of Initial Permeability	%/°C 20°C-70°C		0.1	0.07	0.35	0.10	0.28	0.30	0.10	0.024	0.20	0.06	0.10	0.20

Glossary of Terms

μ_i **Initial Permeability** - The limited value of permeability of a ferromagnetic body at the origin of the curve of first magnetization.

μ_a **Amplitude Permeability** - The permeability at a stated value of field strength (or of the induction) with the field strength varying periodically with time and no static magnetic field being present.

μ_m **Maximum Permeability** - The maximum value of amplitude permeability.

μ_Δ **Incremental Permeability** - The permeability measured with an alternate magnetic field and in the presence of a static (DC) magnetic field.

μ_e **Effective Permeability** - For a component built up by different materials, the magnetic stray flux being negligible, the resulting permeability, defined as the permeability of a hypothetical homogeneous material with the same shape , dimensions and total reluctance.

A_L **Inductance Factor** - The self-inductance that a coil of specified shape and dimensions placed on the core in a given position would have if it consisted of one turn.

$$A_L = \frac{L}{N^2}$$

Core Loss - The power absorbed by a body of ferromagnetic material and dissipated as heat when that body is subjected to a time-varying magnetic field.

T.C. **Temperature Coefficient** - The change in inductance of a magnetic component with temperature expressed in PPM/C or %C

TC **Curie Point** - The critrical temperature above which a ferromagnetic body is paramagnetic.

ρ **Resistivity** - The resistance measured by means of direct voltage of a body of ferromagnetic material with a constant cross sectional area, multiplied by that cross sectional area and divided by its length.

$\tan\delta$ **Tangent Of The Loss Angle** - The quotient of the magnitude of the imaginary part and the real part of the complex permeability expressed in series terms.

$$\tan\delta = \frac{\mu_s''}{\mu_s'} = \frac{1}{Q}$$

Q **Quality Factor** - The inverse of the tangent of the loss angle

$$Q = \frac{1}{\tan\delta}$$

$\frac{\tan\delta}{\mu_i}$ **Loss Factor** - The quotient of the tangent of the loss angle and the permeability.

$$\frac{\tan\delta}{\mu_i} = \frac{1}{\mu_i Q}$$

B_S **Saturation Induction** (Saturation Flux Density) - The maximum intrinsic induction possible in a material.
B_R **Residual Induction** - The induction remaining in a magnetic material when the magnetizing force is reduced to zero.

H_C **Coercive Force** - The magnetizing field strength required to reduce the induction in a magnetic material to zero.

Lp **Parallel Inductance** - The pure self-inductance of an inductor in parallel with a pure resistance of such value that the combination has the equivalent electrical characteristics of the subject core and coil.

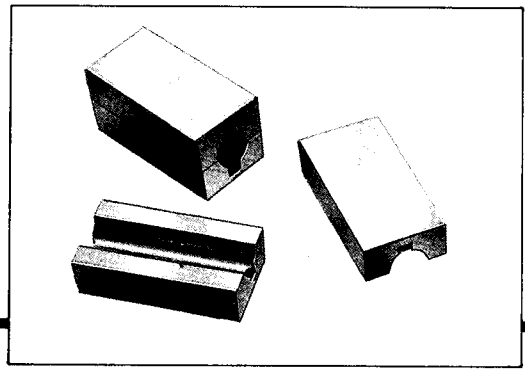
Rp **Parallel Resistance** - The pure resistance in parallel with a pure inductance of such value that the combination has the equivalent electrical characteristics of the subject core and coil.

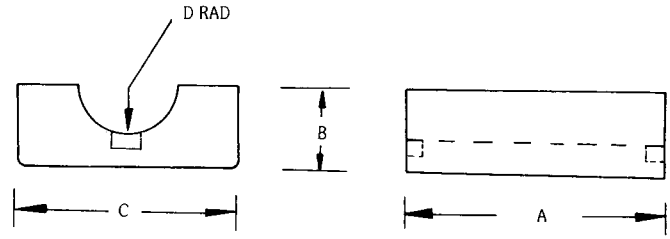
Xp **Parallel Reactance** - The parallel inductance or capacitance of a core or coil multiplied by the angular frequency.

$$Xp = \omega Lp = 2\pi f Lp$$

EMI CORES/FH TYPE

1. Shape





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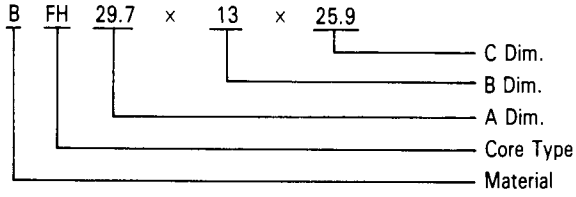


3. Material:

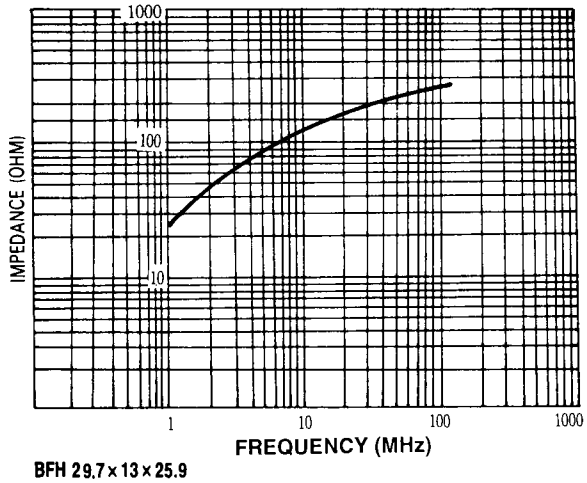
B

4. Dimensions

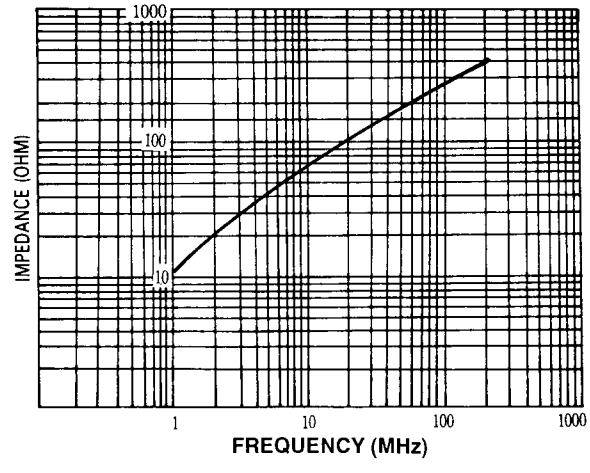
CORES	A Dim m/m	B Dim m/m	C Dim m/m	D Dim m/m	TYPICAL IMPEDANCE (OHM)		REMARK
					25 MHz	100 MHz	
BFH 28.5 x 7.5 x 15	28.5 ± 0.75	7.5 ± 0.3	15.0 ± 0.7	3.3 ± 0.15	190	280	LF 65
BFH 30x 9.4 x 18.7	30.0 ± 0.75	9.4 ± 0.3	18.7 ± 0.7	5.0 ± 0.15	130	272	LF100
BFH 29.7 x 13 x 25.9	29.7 ± 0.75	13.0 ± 0.3	25.9 ± 0.7	6.5 ± 0.15	150	270	LF130

5. Characteristics.

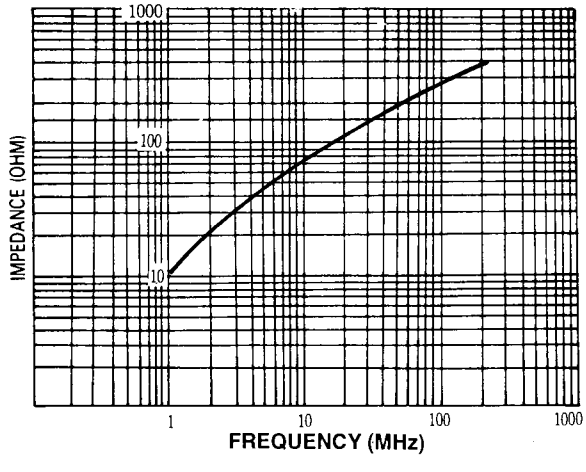
BFH 28.5 x 7.5 x 15.0

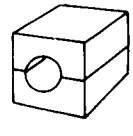


BFH 30.0 x 9.4 x 18.7



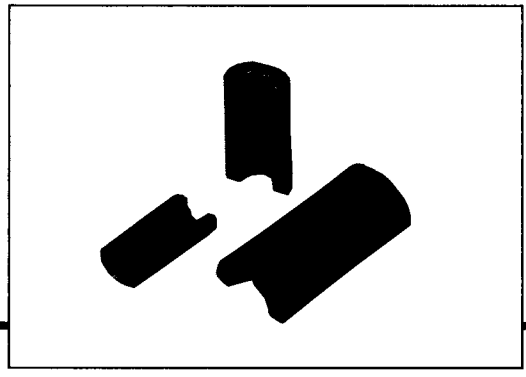
BFH 29.7 x 13 x 25.9





TEST METER:
HP 4191A RF IMPEDANCE ANALYZER
TEST FIXTURE:
HP 16092A SPRING CLIP FIXTURE
TEST WIRE: 0.8 ϕ CABLE WIRE (L:220mm)
TEST WINDING: $\frac{1}{2}$ Ts.

EMI CORES / FH TYPE



1. Shape

FIG. 1

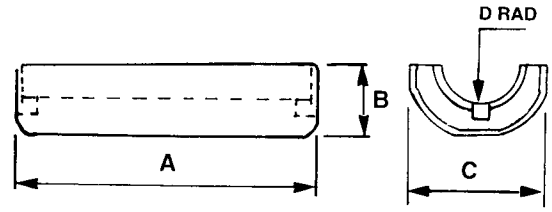
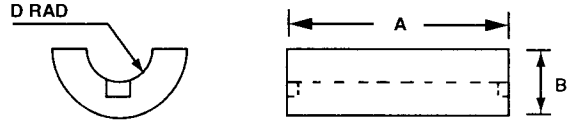


FIG. 2



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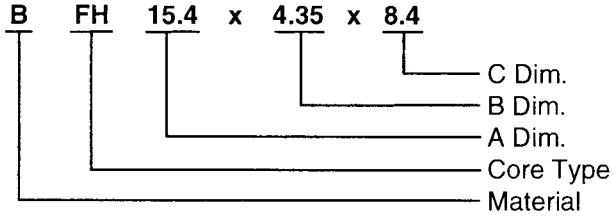


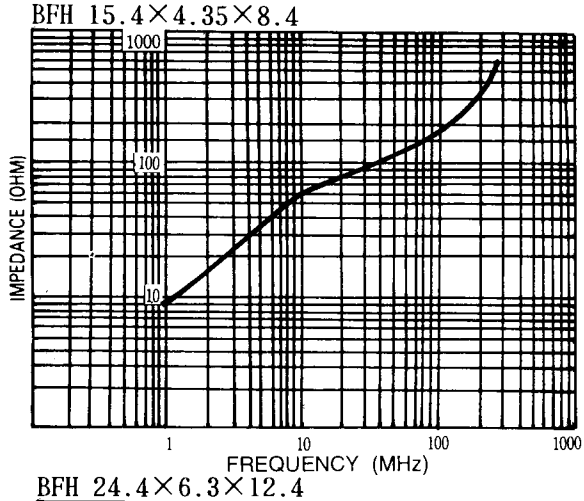
3. Material:

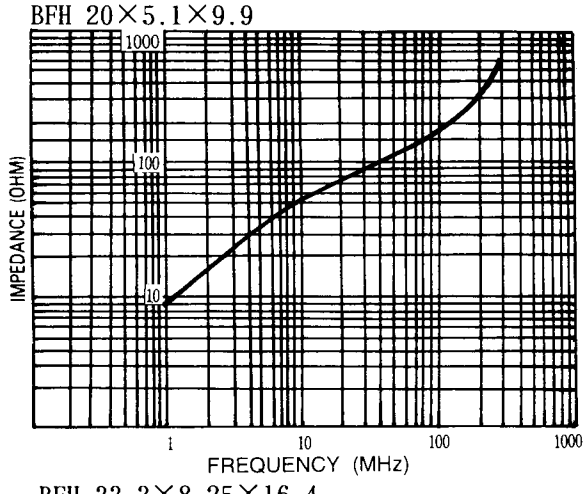
B

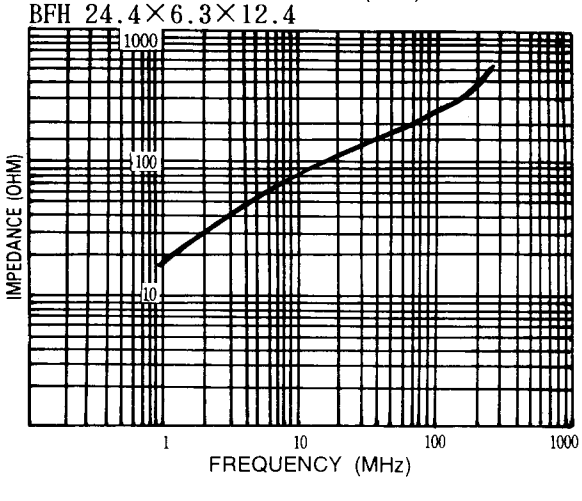
TEST METER:
HP 4191A RF IMPEDANCE ANALYZER
TEST FIXTURE:
HP 16092A SPRING CLIP FIXTURE
TEST WIRE: 0.8ϕ CABLE WIRE (L:220mm)
TEST WINDING: 1/2 Ts.

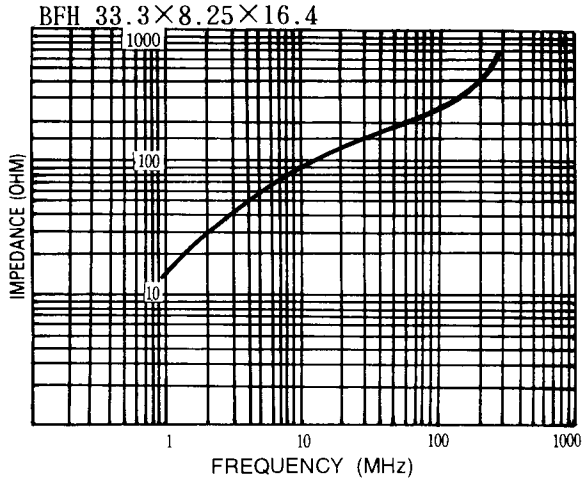
4. Dimensions

Fig	CORES	A m/m	B m/m	C m/m	D m/m	Z (OHM) MIN. 25 MHz	Z (OHM) MIN. 100 MHz	REMARK
1	BFH 15.4X4.35X8.4	15.4 ± 0.5	4.35 ± 0.3	8.4 ± 0.4	1.9 ± 0.15	64	160	LF 35
1	BFH 20X5.1X9.9	20 ± 0.6	5.1 ± 0.3	9.9 ± 0.4	2.65 ± 0.15	64	160	LF 50
1	BFH 24.4X6.3X12.4	24.4 ± 0.3	6.3 ± 0.25	12.4 ± 0.5	3.15 ± 0.15	100	175	LF 60
1	BFH 29.2X7.7X14.4	29.2 ± 0.4	7.7 ± 0.25	14.4 ± 0.5	3.8 ± 0.15	100	190	LF 75
1	BFH 33.3X8.25X16.4	33.3 ± 0.4	8.25 ± 0.25	16.4 ± 0.5	4.65 ± 0.15	105	190	LF 90
2	B246 FH 14X12X24	14 ± 0.5	12 ± 0.4	24 ± 0.5	5.7 ± 0.3	-	320	-

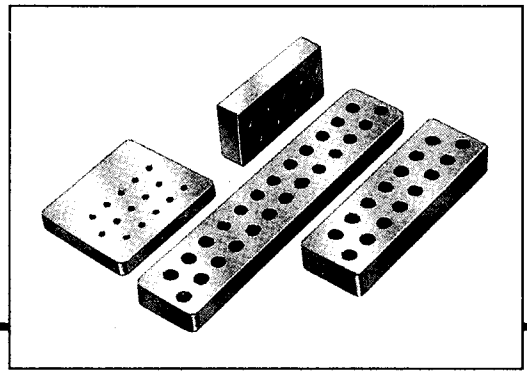








"D"TYPE Connector Suppressor Elements



1. Shape

Figure 1

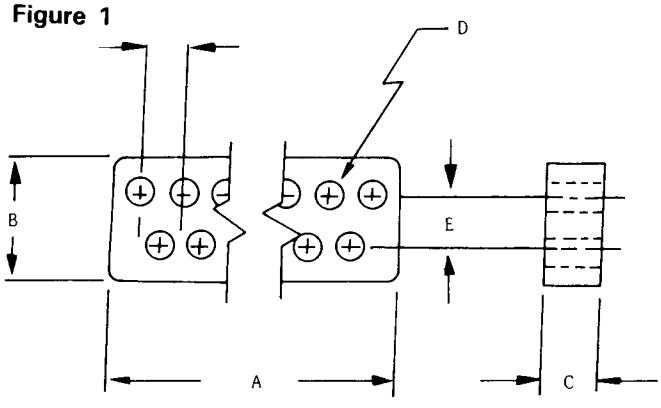
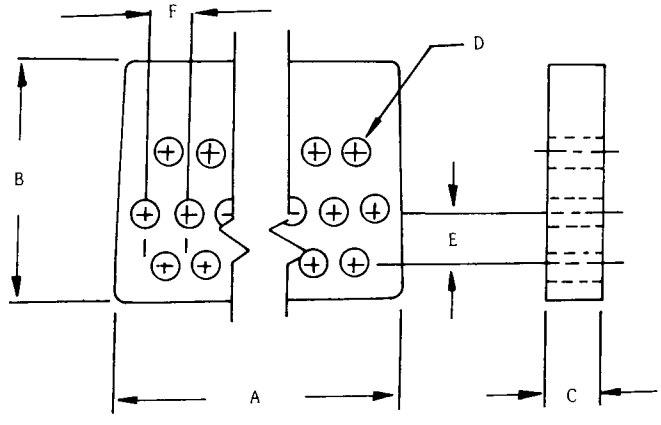


Figure 2



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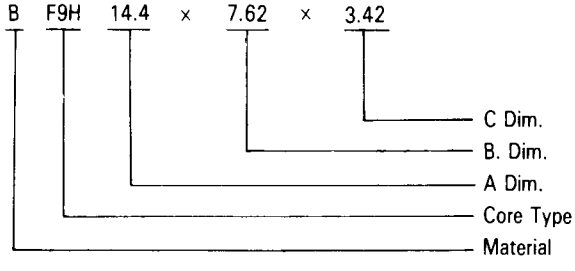


3. Material:

B

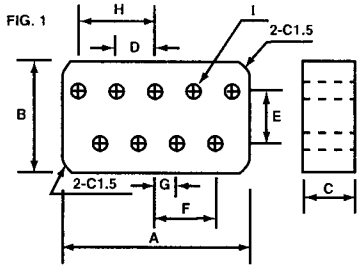
4. Dimensions.

PART NUMBER	Fig	A m/m	B m/m	C m/m	D m/m	E m/m	F m/m	Z (OHM) MIN. @25 MHz	Z (OHM) MIN. @100 MHz
BF9H 14.4 x 7.62 x 3.15	1	14.25/14.55	7.49/ 7.75	3.00/3.25	1.35/1.65	3.20	2.80	25	40
BF15H 22.85 x 7.7 x 3.15	1	22.65/23.05	7.50/ 7.75	3.00/3.25	1.35/1.65	2.70	2.80	25	40
BF25H 36.32 x 7.62 x 3.15	1	35.94/36.70	7.49/ 7.75	3.10/3.20	1.35/1.65	2.85	2.77	25	40
BF15H 15 x 12.7 x 1.9	2	14.80/15.20	12.50/12.90	1.80/2.00	0.71/1.01	2.54	2.29	25	40

* Measurements are made on a 1" length of #22 AWG TCW between the probe terminals of a Hewlett-Packard 4193A Impedance Analyzer.
* TEST WIRE 0.65ϕ T.C.W. x 25mm, $\frac{1}{2}$ Ts.
* Z values are for inner holes

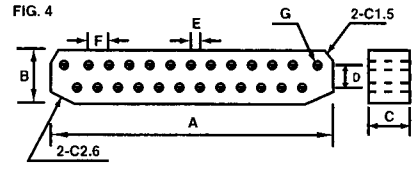
"D"TYPE Connector Suppressor Elements

FIG. 1



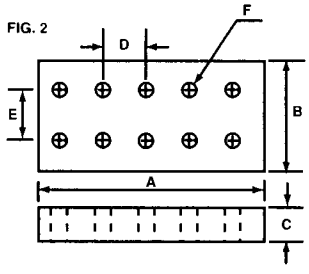
BF9H 14.5 X 7.6 X 2.6		
A	14.5 ± 0.5	m/m
B	7.6 ± 0.5	m/m
C	2.6 ± 0.1	m/m
D	2.74 ± 0.08	m/m
E	2.84 ± 0.08	m/m
F	4.11 ± 0.08	m/m
G	1.37 ± 0.08	m/m
H	5.49 ± 0.08	m/m
I	$1.57^{+0.1}_{-0}$	m/m

FIG. 4



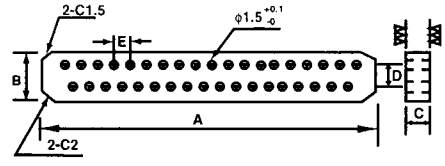
BF25H 36.4 X 7.6X 2.6		
A	36.4 ± 0.5	m/m
B	7.6 ± 0.5	m/m
C	2.6 ± 0.1	m/m
D	2.84 ± 0.08	m/m
E	1.39 ± 0.08	m/m
F	2.77 ± 0.08	m/m
G	$1.57^{+0.1}_{-0}$	m/m

FIG. 2



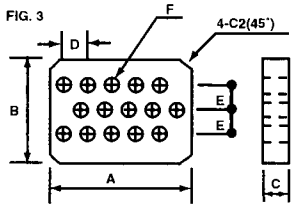
BF10H 13 X 6.1X 2		
A	13^{+0}	m/m
B	6.1± 0.1	m/m
C	2 ± 0.1	m/m
D	2.54 REF	m/m
E	2.54 REF	m/m
F	$1^{+0.1}_{-0}$	m/m

FIG. 5



BF37H 53 X 7.7 X 2.8		
A	53^{+0}	m/m
B	7.7 ± 0.5	m/m
C	2.8 ± 0.1	m/m
D	2.84 ± 0.08	m/m
E	2.77 ± 0.08	m/m

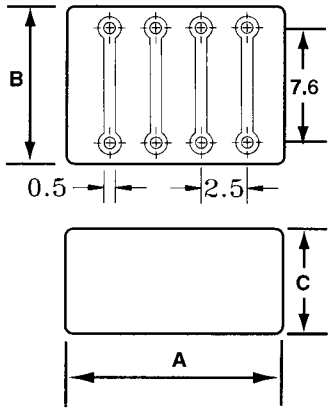
FIG. 3



BF15H 15.1 X9.4 X 2		
A	15.1 ± 0.3	m/m
B	9.4 ± 0.5	m/m
C	2 ± 0.1	m/m
D	2.29 ± 0.1	m/m
E	2.54 ± 0.1	m/m
F	$1^{+0.1}_{-0}$	m/m

EMI PC BEADS

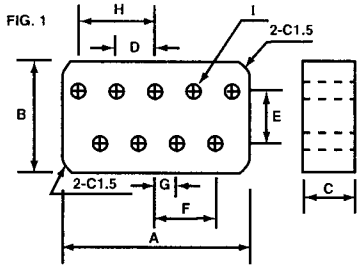
Dimensions [Unit: mm]



TYPE	A	B	C
BF6H 8.34 X 10.88 X 3.81	8.34±0.25	10.88±0.25	3.81±0.25
BF6H 8.34 X 10.88 X 5.08			5.08±0.25
BF6H 8.34 X 10.88 X 6.35			6.35±0.25
BF6H 8.34 X 10.88 X 7.62			7.62±0.25
BF6H 8.34 X 10.88 X 8.09			8.09±0.25
BF6H 8.34 X 10.88 X 10.15			10.15±0.25
BF8H 10.88 X 10.88 X 3.81	10.88±0.25	10.88±0.25	3.81±0.25
BF8H 10.88 X 10.88 X 5.08			5.08±0.25
BF8H 10.88 X 10.88 X 6.35			6.35±0.25
BF8H 10.88 X 10.88 X 7.62			7.62±0.25
BF8H 10.88 X 10.88 X 8.09			8.09±0.25
BF8H 10.88 X 10.88 X 10.15			10.15±0.25
BF10H 13.42 X 10.88 X 3.81	13.42±0.25	10.88±0.25	3.81±0.25
BF10H 13.42 X 10.88 X 5.08			5.08±0.25
BF10H 13.42 X 10.88 X 6.35			6.35±0.25
BF10H 13.42 X 10.88 X 7.62			7.62±0.25
BF10H 13.42 X 10.88 X 8.09			8.09±0.25
BF10H 13.42 X 10.88 X 10.15			10.15±0.25

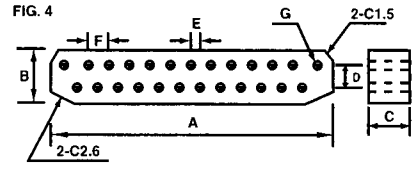
"D"TYPE Connector Suppressor Elements

FIG. 1



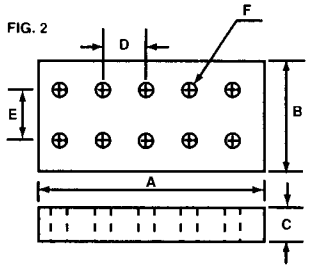
BF9H 14.5 X 7.6 X 2.6		
A	14.5 ± 0.5	m/m
B	7.6 ± 0.5	m/m
C	2.6 ± 0.1	m/m
D	2.74 ± 0.08	m/m
E	2.84 ± 0.08	m/m
F	4.11 ± 0.08	m/m
G	1.37 ± 0.08	m/m
H	5.49 ± 0.08	m/m
I	$1.57^{+0.1}_{-0}$	m/m

FIG. 4



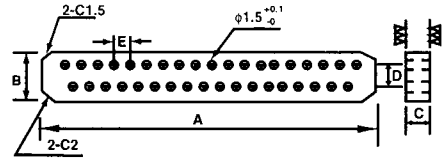
BF25H 36.4 X 7.6X 2.6		
A	36.4 ± 0.5	m/m
B	7.6 ± 0.5	m/m
C	2.6 ± 0.1	m/m
D	2.84 ± 0.08	m/m
E	1.39 ± 0.08	m/m
F	2.77 ± 0.08	m/m
G	$1.57^{+0.1}_{-0}$	m/m

FIG. 2



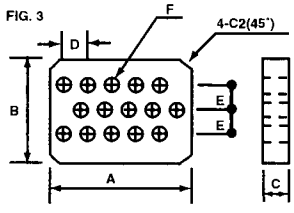
BF10H 13 X 6.1X 2		
A	13^{+0}	m/m
B	6.1± 0.1	m/m
C	2 ± 0.1	m/m
D	2.54 REF	m/m
E	2.54 REF	m/m
F	$1^{+0.1}_{-0}$	m/m

FIG. 5



BF37H 53 X 7.7 X 2.8		
A	53^{+0}	m/m
B	7.7 ± 0.5	m/m
C	2.8 ± 0.1	m/m
D	2.84 ± 0.08	m/m
E	2.77 ± 0.08	m/m

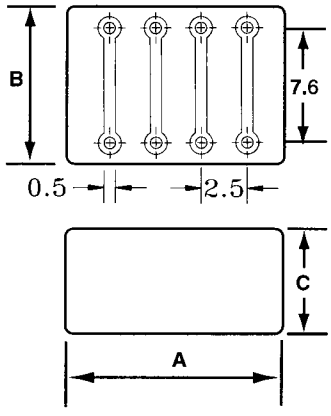
FIG. 3



BF15H 15.1 X9.4 X 2		
A	15.1 ± 0.3	m/m
B	9.4 ± 0.5	m/m
C	2 ± 0.1	m/m
D	2.29 ± 0.1	m/m
E	2.54 ± 0.1	m/m
F	$1^{+0.1}_{-0}$	m/m

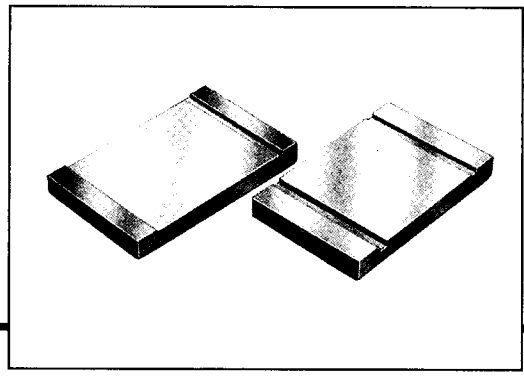
EMI PC BEADS

Dimensions [Unit: mm]



TYPE	A	B	C
BF6H 8.34 X 10.88 X 3.81	8.34±0.25	10.88±0.25	3.81±0.25
BF6H 8.34 X 10.88 X 5.08			5.08±0.25
BF6H 8.34 X 10.88 X 6.35			6.35±0.25
BF6H 8.34 X 10.88 X 7.62			7.62±0.25
BF6H 8.34 X 10.88 X 8.09			8.09±0.25
BF6H 8.34 X 10.88 X 10.15			10.15±0.25
BF8H 10.88 X 10.88 X 3.81	10.88±0.25	10.88±0.25	3.81±0.25
BF8H 10.88 X 10.88 X 5.08			5.08±0.25
BF8H 10.88 X 10.88 X 6.35			6.35±0.25
BF8H 10.88 X 10.88 X 7.62			7.62±0.25
BF8H 10.88 X 10.88 X 8.09			8.09±0.25
BF8H 10.88 X 10.88 X 10.15			10.15±0.25
BF10H 13.42 X 10.88 X 3.81	13.42±0.25	10.88±0.25	3.81±0.25
BF10H 13.42 X 10.88 X 5.08			5.08±0.25
BF10H 13.42 X 10.88 X 6.35			6.35±0.25
BF10H 13.42 X 10.88 X 7.62			7.62±0.25
BF10H 13.42 X 10.88 X 8.09			8.09±0.25
BF10H 13.42 X 10.88 X 10.15			10.15±0.25

EMI CORES / FP TYPE



1. Shape FIG. 1

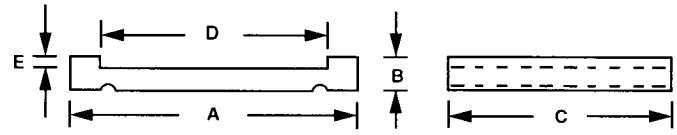
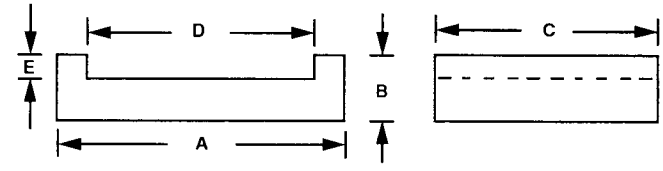
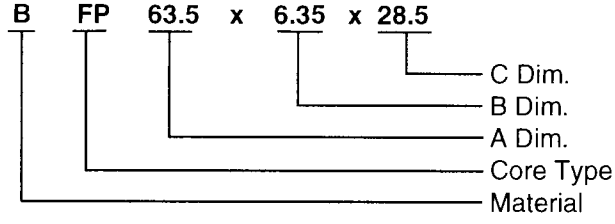


FIG. 2



2. Ordering Code.



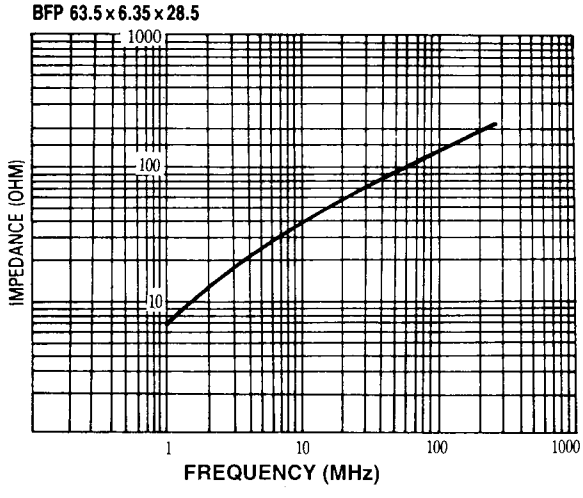
3. Material:

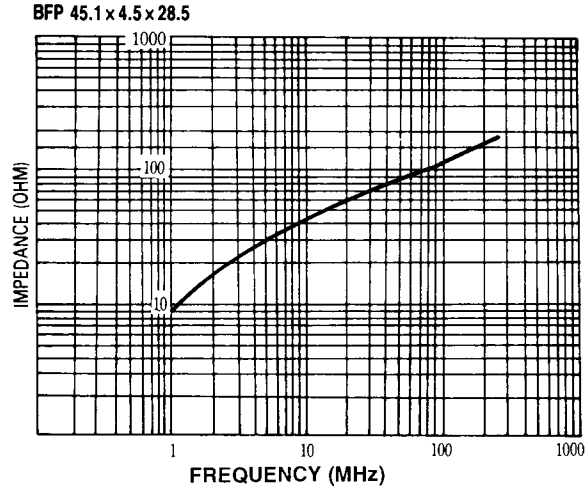
B

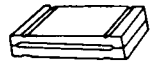
4. Dimensions

CORES	Fig	A Dim m/m	B Dim m/m	C Dim m/m	D Dim m/m	E Dim m/m	TYPICAL IMPEDANCE (OHM)	
							25 MHz	100 MHz
BFP 63.5 x 6.35 x 28.5	1	63.5 ± 1.5	6.35 ± 0.5	28.5 ± 0.8	52.1 ± 1.5	0.8 ± 0.2	60	124
BFP 45.1 x 4.5 x 28.6	1	45.1 ± 0.8	4.5 ± 0.5	28.6 ± 0.8	34.4 ± 0.8	0.6 ± 0.2	64	107
BFP 16.5 x 3.5 x 6.3	2	16.5 ± 0.2	3.5 ± 0.15	6.3 ± 0.2	11.5 ± 0.2	1 ± 0.15	—	—
BFP 16.5 x 5 x 6.3	2	16.5 ± 0.2	5 ± 0.15	6.3 ± 0.2	11.5 ± 0.2	2.5 ± 0.15	—	—

5. Characteristics.

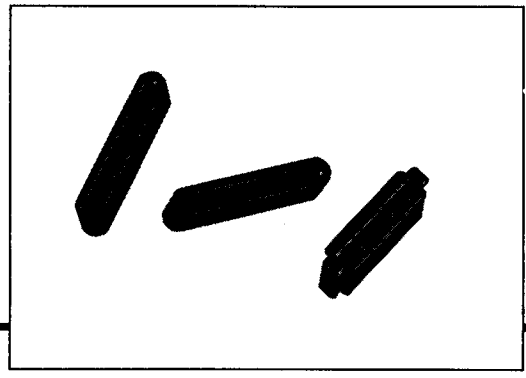






TEST METER:
HP 4191A RF IMPEDANCE ANALYZER
TEST FIXTURE:
HP 16092A SPRING CLIP FIXTURE
TEST WIRE: 16 PIN CABLE WIRE (L:160mm)
TEST WINDING: $\frac{1}{2}$ Ts.

EMI CORES / FS TYPE



1. Shape

FIG. 1

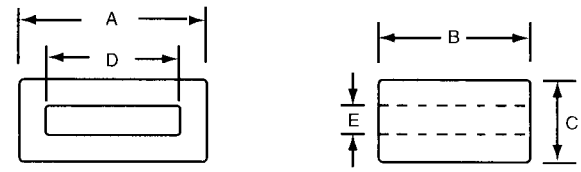
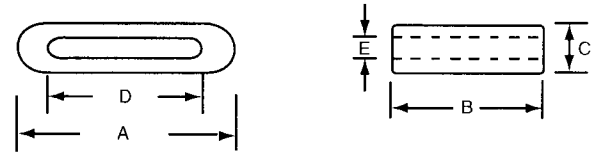


FIG. 2



2. Ordering Code.

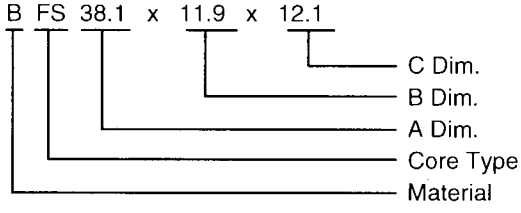
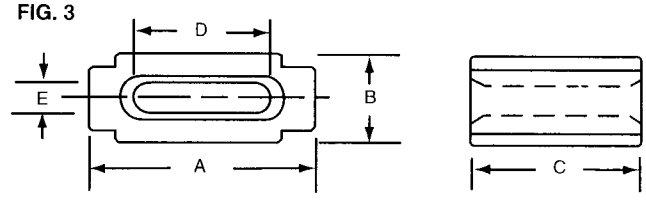


FIG. 3



3. Material:

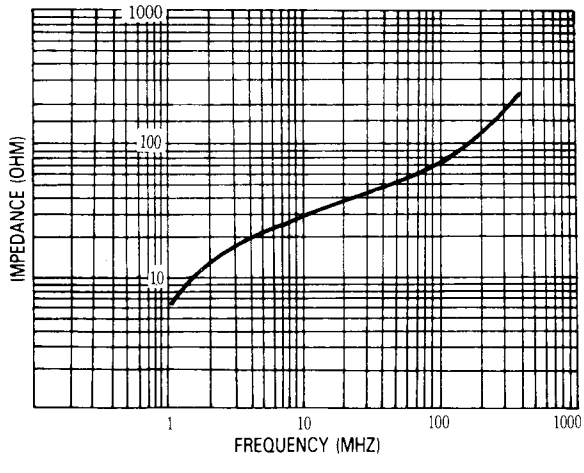
B , B246

4. Dimensions.

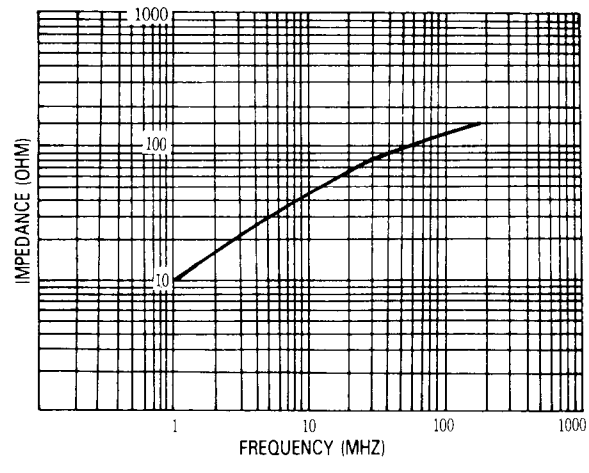
Fig	CORES	A Dim m/m	B Dim m/m	C Dim m/m	D Dim m/m	E Dim m/m	TYPICAL IMPEDANCE (Ω)	
							@25 MHz	@100 MHz
1	BFS 38.1X11.9X12.1	38.1±1.0	11.9±0.8	12.1±0.3	26.6±0.7	1.9±0.35	44	76
1	BFS 38.1X25.4X12.1	38.1±1.0	25.4±0.8	12.1±0.3	26.6±0.7	1.9±0.35	76	125
2	BFS 19X12X6.5	19±0.8	8±0.3	6.5±0.3	13.5±0.4	1.5±0.15	21	48
2	BFS 33.5X8X6.5	33.5±1.0	12±0.3	6.5±0.3	28±0.7	1.5±0.15	-	-
2	BFS 33.5X10X6.5	33.5±1.0	10±0.3	6.5±0.3	28±0.7	1.5±0.15	23	50
2	BFS 33.5X12X6.5	33.5±1.0	12±0.3	6.5±0.3	28±0.7	1.5±0.15	28	55
2	BFS 33.5X15X6.5	33.5±1.0	15±0.3	6.5±0.3	28±0.7	1.5±0.15	30	56
2	BFS 40X12X6.5	40±1.0	12±0.3	6.5±0.3	34.8±0.7	1.9±0.35	-	-
2	B246FS 45.2X8X6.5	45.2±1.0	8±0.3	6.5±0.3	40±0.7	1.3±0.15	18	43
2	B246FS 45.2X10X6.5	45.2±1.0	10±0.3	6.5±0.3	40±0.7	1.3±0.15	19	45
3	BFS 28X14.6X7.7	28±0.9	14.6±0.3	7.7±0.3	23±0.7	1.5±0.15	-	-

5. Characteristics.

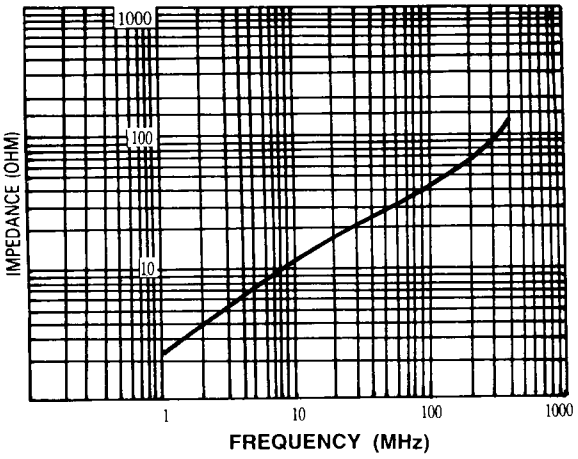
BFS 38.1 x 11.9 x 12.1



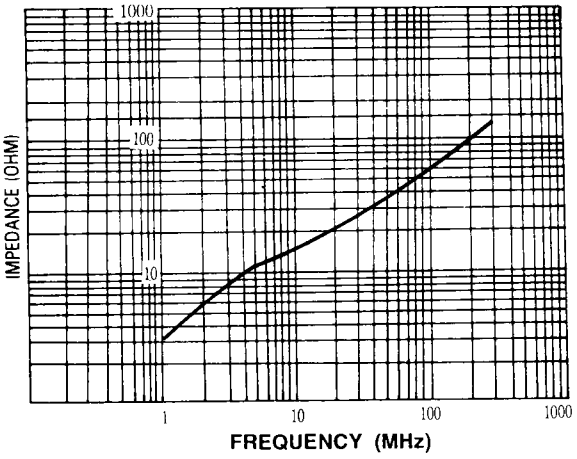
BFS 38.1 x 25.4 x 12.1



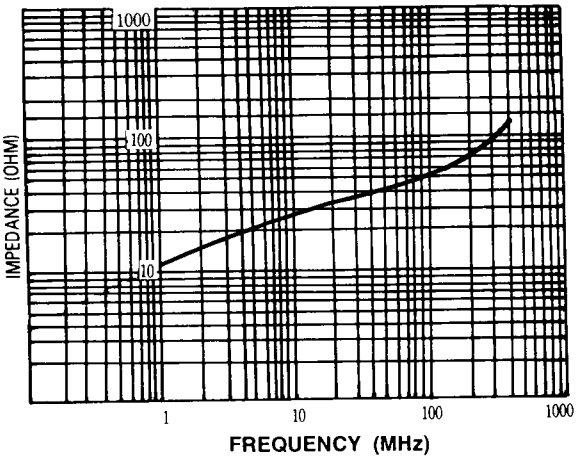
BFS 33.5 x 8 x 6.5



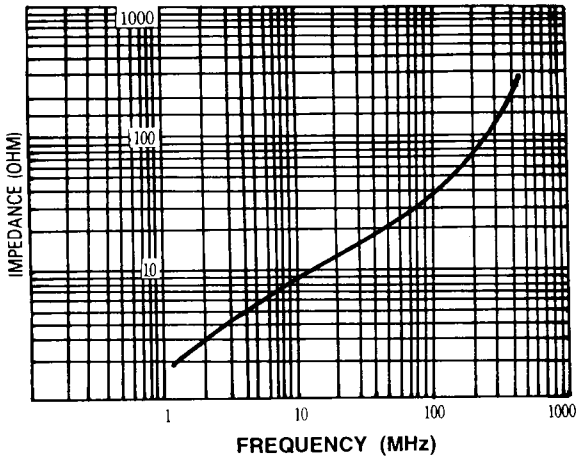
BFS 33.5 x 10 x 6.5



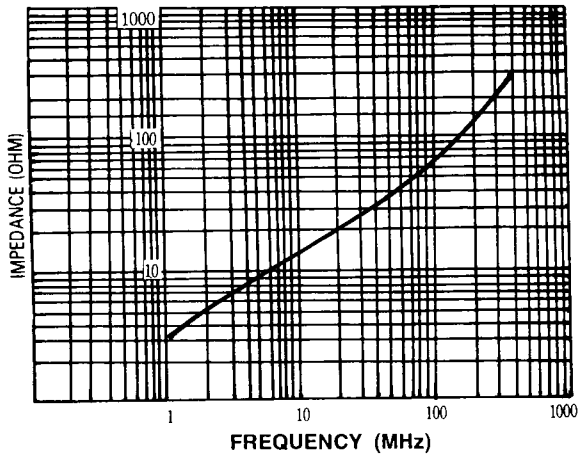
BFS 33.5 x 12 x 6.5



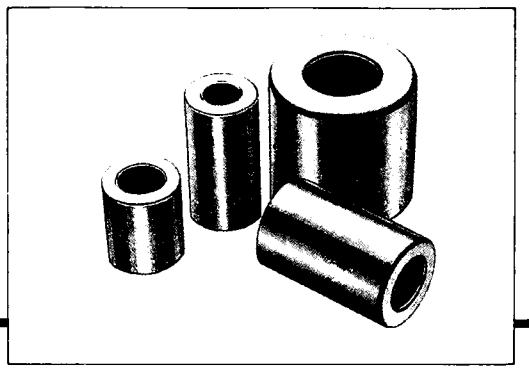
B246FS 45.2 x 8 x 6.5



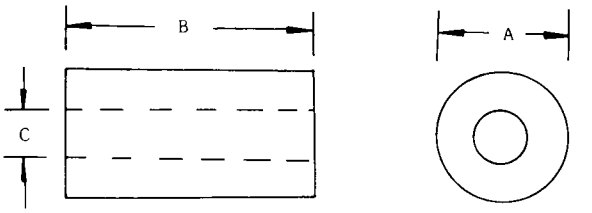
B246FS 45.2 x 10 x 6.5



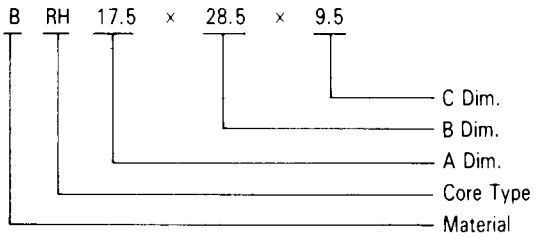
EMI CORES/RH TYPE



1. Shape



2. Ordering Code.



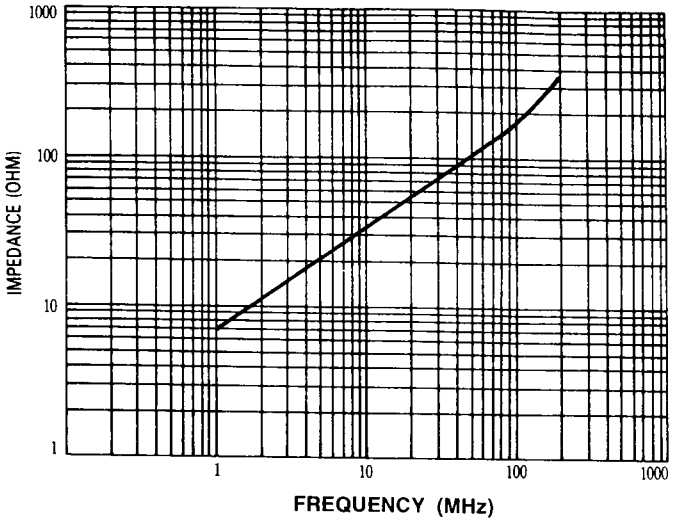
3. Material.

B

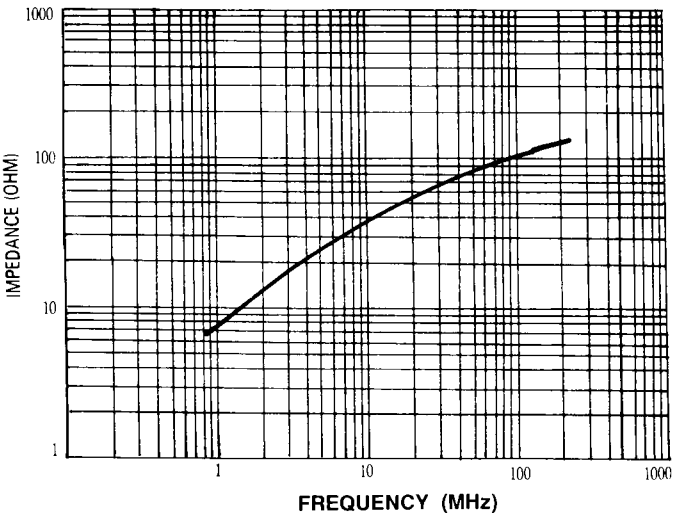
4. Dimensions

CORES	A m/m	B m/m	C m/m	TYPICAL IMPEDANCE (OHM)	
				25 MHz	100 MHz
RH 9.5 X 4.8 X 4.80	9.5 ± 0.25	4.8 ± 0.20	4.80 ± 0.20	26	47
RH 9.5 X 9.5 X 4.80	9.5 ± 0.25	9.5 ± 0.30	4.80 ± 0.20	44	70
RH 9.5 X 12.7 X 4.80	9.5 ± 0.25	12.7 ± 0.30	4.80 ± 0.20	50	81
RH 10.5 X 10.2 X 7.30	10.5 ± 0.25	10.2 ± 0.40	7.30 ± 0.25	30	50
RH 10.5 X 20.0 X 7.30	10.5 ± 0.25	20.0 ± 0.60	7.30 ± 0.25	75	165
RH 11.5 X 15.0 X 5.00	11.5 ± 0.30	15.0 ± 0.40	5.00 ± 0.25	–	124
RH 11.5 X 18.5 X 5.00	11.5 ± 0.30	18.5 ± 0.50	5.00 ± 0.25	138	210
RH 11.5 X 28.5 X 5.00	11.5 ± 0.30	28.5 ± 0.75	5.00 ± 0.25	172	235
RH 12.1 X 15.5 X 7.30	12.1 ± 0.40	15.5 ± 0.40	7.30 ± 0.25	74	160
RH 14.2 X 15.0 X 6.35	14.2 ± 0.50	15.5 ± 0.40	6.35 ± 0.25	94	175
RH 14.2 X 28.5 X 6.35	14.2 ± 0.50	28.5 ± 0.75	6.35 ± 0.25	158	275
RH 14.2 X 28.5 X 8.20	14.2 ± 0.50	28.5 ± 0.75	8.20 ± 0.25	120	220
RH 15.5 X 28.5 X 7.30	15.5 ± 0.50	28.5 ± 0.75	7.30 ± 0.25	170	280
RH 15.5 X 28.5 X 9.00	15.5 ± 0.50	28.5 ± 0.75	9.00 ± 0.25	121	222
RH 15.5 X 28.0 X10.50	15.5 ± 0.50	28.0 ± 0.75	10.50 ± 0.30	98	210
RH 16.0 X 13.0 X 8.00	16.0 ± 0.50	13.0 ± 0.40	8.00 ± 0.25	82	150
RH 16.0 X 16.0 X 8.00	16.0 ± 0.50	16.0 ± 0.40	8.00 ± 0.25	100	190
RH 16.0 X 28.5 X 8.00	16.0 ± 0.50	28.5 ± 0.75	8.00 ± 0.25	151	255
RH 17.5 X 12.7 X 9.50	17.5 ± 0.50	12.7 ± 0.40	9.50 ± 0.25	72	159
RH 17.5 X 28.5 X 9.50	17.5 ± 0.50	28.5 ± 0.75	9.50 ± 0.25	133	239
RH 17.5 X 28.5 X10.00	17.5 ± 0.50	28.5 ± 0.75	10.00 ± 0.30	120	210
RH 25.9 X 28.5 X12.90	25.3 ± 0.80	28.5 ± 0.75	12.90 ± 0.30	147	258
RH 28.5 X 28.5 X14.00	28.5 ± 0.80	28.5 ± 0.75	14.00 ± 0.30	140	245

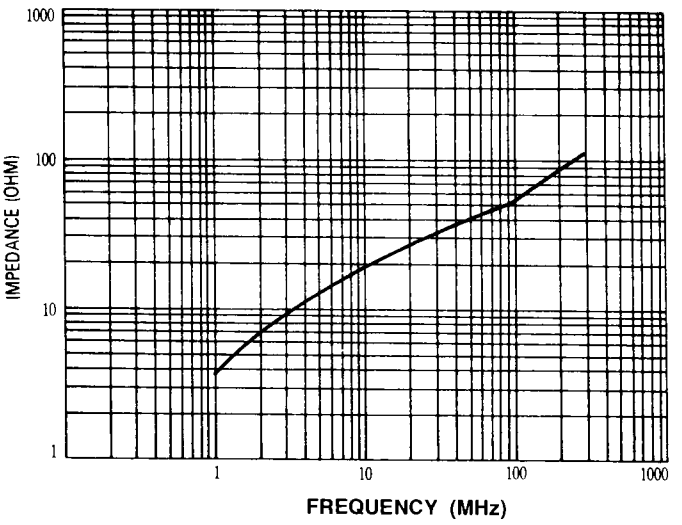
BRH 9.5 x 9.5 x 4.8



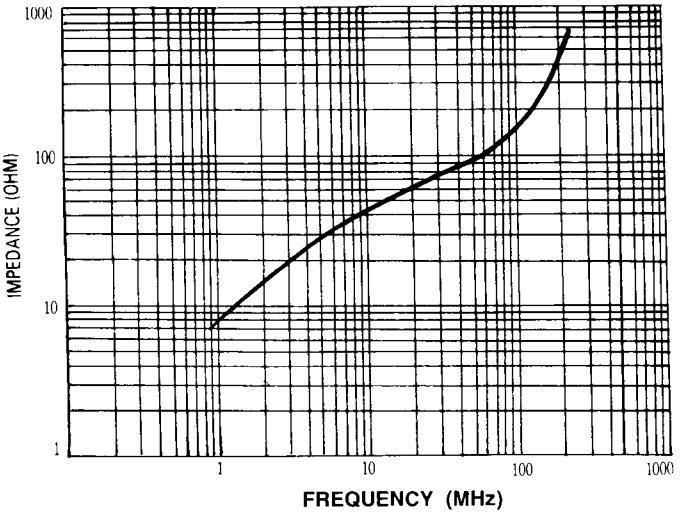
BRH 9.5 x 12.7 x 4.8



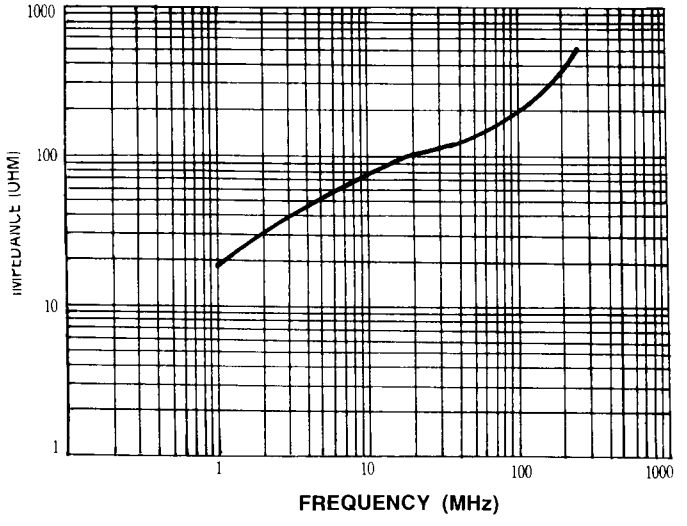
BRH 10.5 x 10.2 x 7.3



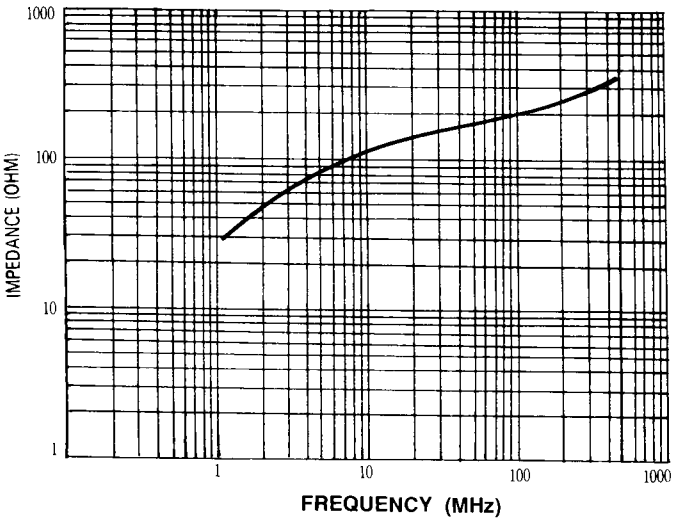
BRH 10.5 x 20 x 7.3



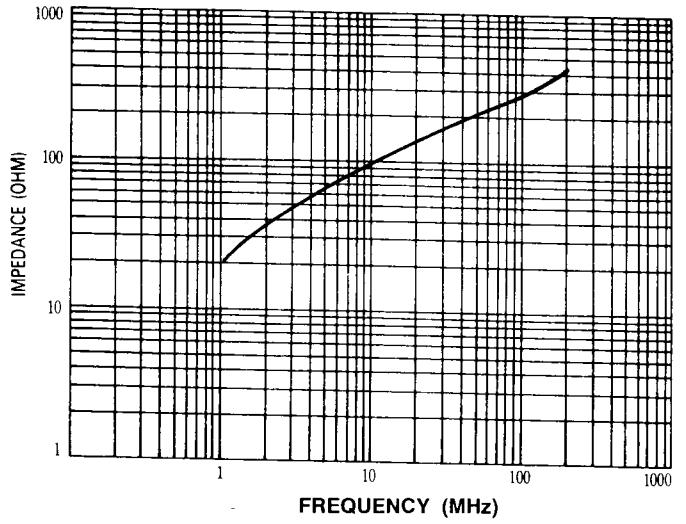
BRH 11.5 x 18.5 x 5.0



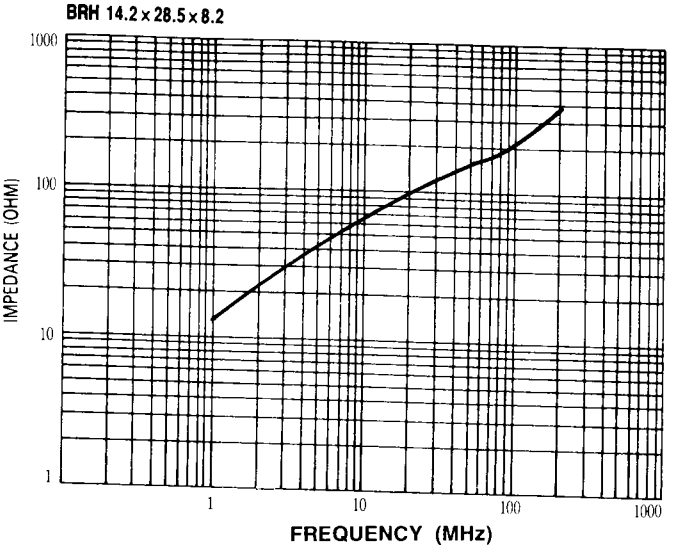
BRH 11.5 x 28.5 x 5.0



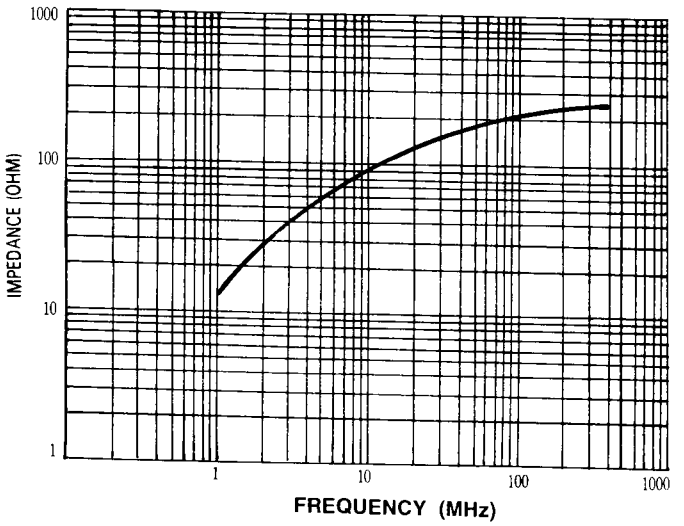
BRH 14.2 x 28.5 x 6.35



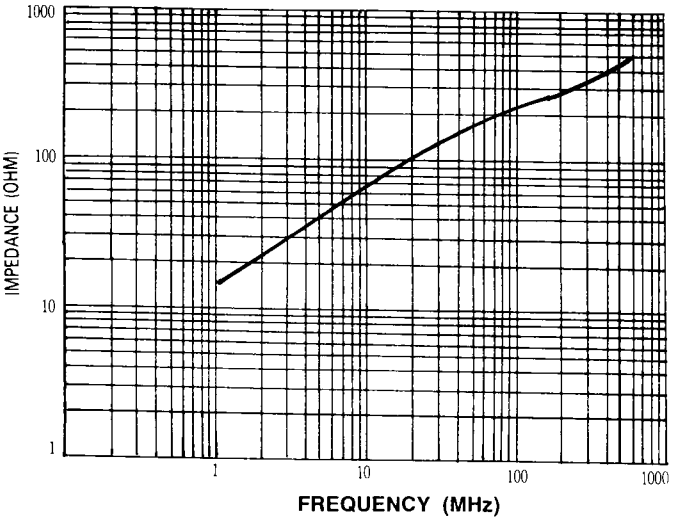
BRH 14.2 x 28.5 x 8.2



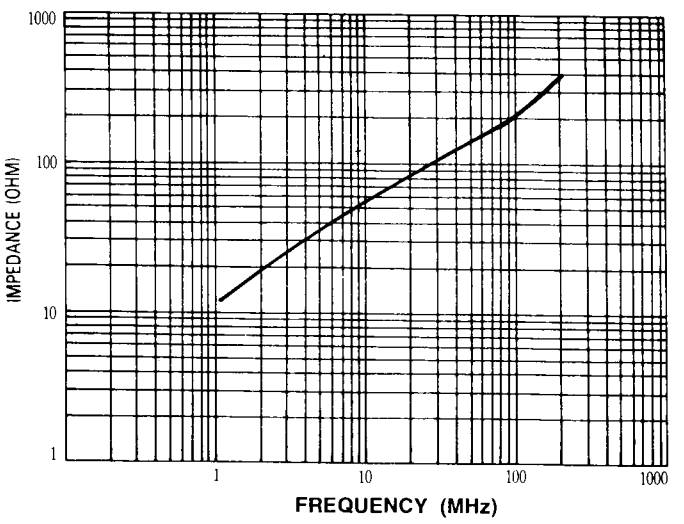
BRH 15.5 x 28.5 x 7.3



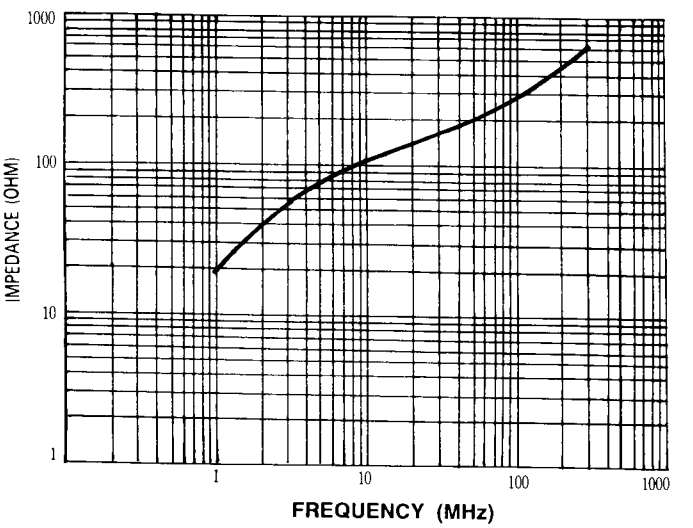
BRH 15.5 x 28 x 9.0



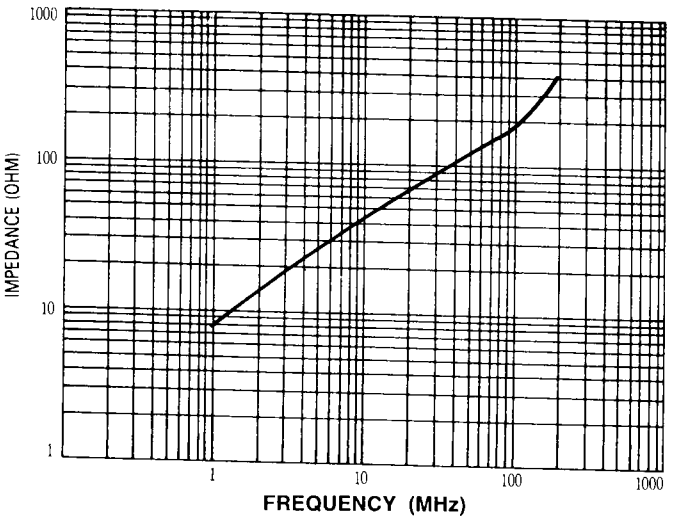
BRH 15.5 x 28.0 x 10.5



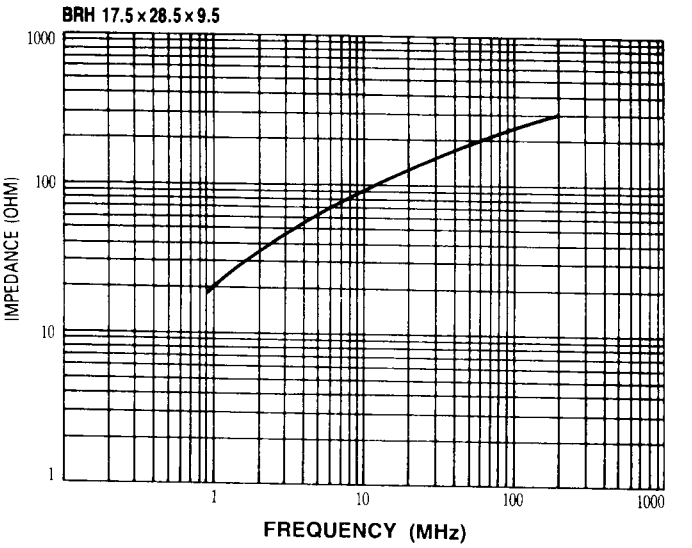
BRH 16 x 28.5 x 8.0



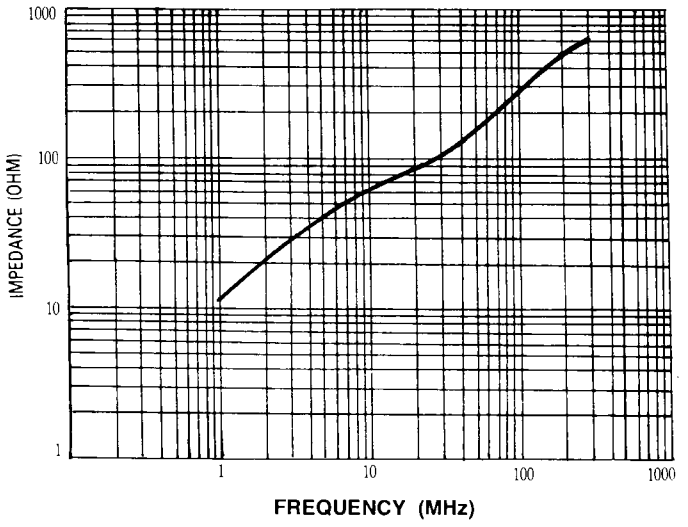
BRH 17.5 x 12.7 x 9.5



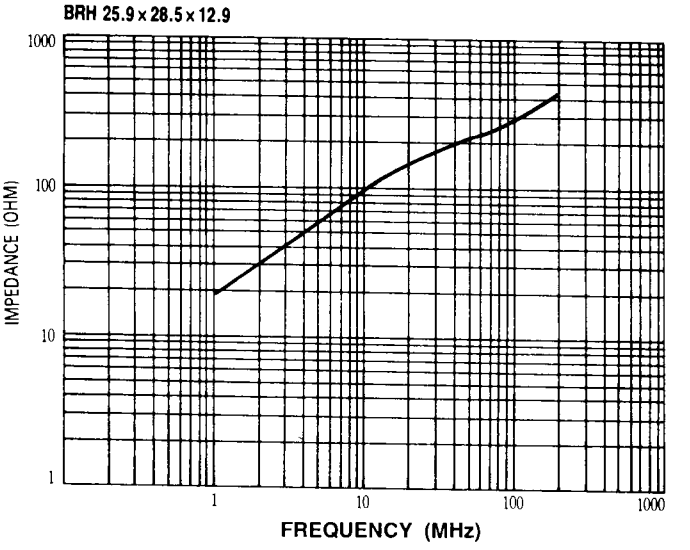
BRH 17.5 x 28.5 x 9.5



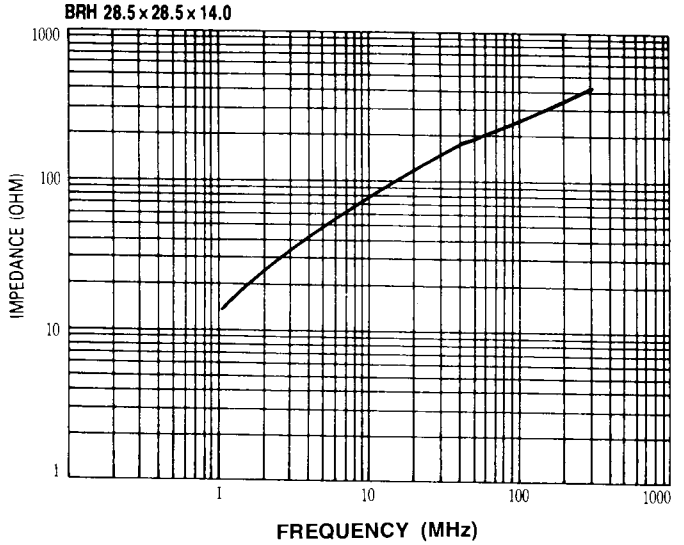
BRH 17.5 x 28.5 x 10

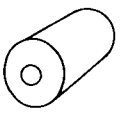


BRH 25.9 x 28.5 x 12.9



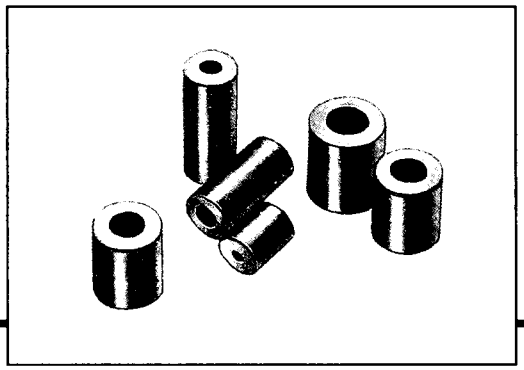
BRH 28.5 x 28.5 x 14.0





TEST METER:
HP 4191A RF IMPEDANCE ANALYZER
TEST FIXTURE:
HP 16092A SPRING CLIP FIXTURE
TEST WIRE: 0.8φ CABLE WIRE (L:220mm)
TEST WINDING: ½ Ts.

BEAD CORES/RH TYPE



Ferrite bead cores
The ferrite bead cores are the tubular shaped ferrite cores to be passed through beads of other elements or used as inductors by passing through wire. They are used for high frequency choking cancelling of parasitical oscillation and noise.

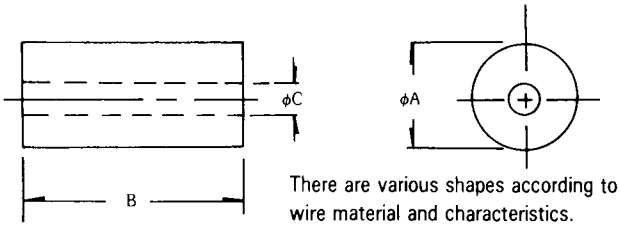
1. Ordering Code.

B RH 3.5 × 3 × 1.2
- 1.2 — φC Dim
- 3 — B Dim
- 3.5 — φA Dim
- RH — Core Type
- B — Material

2. Material.

Y_7 B B_{246}

3. Shape:



There are various shapes according to wire material and characteristics.

4. Dimensions

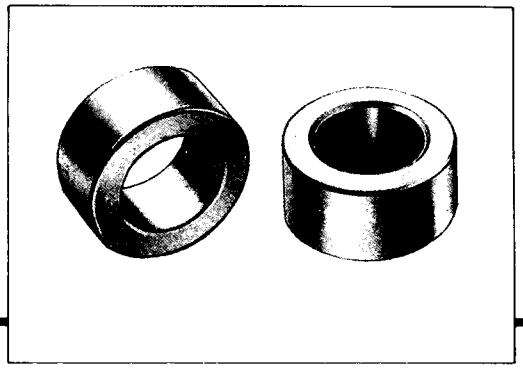
Unit: mm

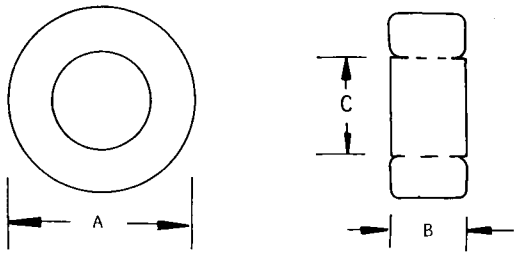
CORES	A m/m	D m/m	C m/m	Z(OHM) MIN. 25 MHZ	Z(OHM) MIN. 100 MHZ
BRH 2.5×1.5×0.76	2.5±0.15	1.5±0.10	0.76±0.10	5	20
BRH 2.5×3.0×0.76	2.5±0.15	3.0±0.15	0.76±0.10	8	25
BRH 2.5×4.0×0.76	2.5±0.15	4.0±0.15	0.76±0.10	12	32
Y7RH 2.5×7.0×0.76	2.5±0.15	7.0±0.20	0.76±0.15	20	58
Y7RH 3.5×4.5×0.76	3.5±0.20	4.7±0.20	0.76±0.15	18	60
BRH 3.5×4.5×0.76	3.5±0.20	4.5±0.20	0.76±0.15	20	45
Y7RH 3.5×6.0×0.76	3.5±0.20	6.0±0.30	0.76±0.15	22	70
BRH 3.5×6.0×0.76	3.5±0.20	6.0±0.30	0.76±0.15	25	65
Y7RH 3.5×7.8×0.76	3.5±0.20	7.8±0.30	0.76±0.15	25	100
Y7RH 3.5×8.3×0.76	3.5±0.20	8.3±0.30	0.76±0.15	30	110
B246RB 3.5×9×0.76	3.5±0.20	9.0±0.40	0.76±0.15	60	100
Y7RH 3.5×9.5×0.76	3.5±0.20	9.5±0.40	0.76±0.15	35	110
Y7RH 3.5×11.5×0.76	3.5±0.20	11.5±0.40	0.76±0.15	45	145
BRH 3.5×3.0×1.2	3.5±0.20	3.0±0.20	1.20±0.15	8	30
Y7RH 3.5×4.5×1.2	3.5±0.20	4.5±0.20	1.20±0.15	16	40
BRH 3.5×6.0×1.2	3.5±0.20	6.0±0.30	1.20±0.15	18	44
Y7RH 3.5×14×1.2	3.5±0.20	14.0±0.40	1.20±0.15	40	100
BRH 4.1×3.2×1.6	4.1±0.20	3.2±0.20	1.60±0.15	9	25
BRH 4.1×4.0×1.6	4.1±0.20	4.0±0.20	1.60±0.15	10	30
BRH 5.0×6.0×1.2	5.0±0.30	6.0±0.30	1.20±0.15	22	60
BRH 5.0×6.0×1.5	5.0±0.30	6.0±0.30	1.50±0.15	20	48
BRH 5.0×6.0×2.4	5.0±0.30	6.0±0.30	2.40±0.15	13	30
BRH 6.5×10.0×4.3	6.5±0.30	10.0±0.40	4.30±0.20	8	30
BRH 6.6×9.5×3.2	6.6±0.30	9.5±0.40	3.20±0.20	20	50
BRH 7.6×7.5×2.4	7.5±0.30	7.5±0.30	2.40±0.15	22	55
BRH 7.6×16.0×2.8	7.6±0.30	16.0±0.40	2.80±0.15	35	95
BRH 8.0×10.0×1.0	8.0±0.30	10.0±0.40	1.00±0.15	50	130
BRH 8.0×10.0×1.5	8.0±0.30	10.0±0.40	1.50±0.15	35	105
BRH 8.0×10.0×3.5	8.0±0.30	10.0±0.40	3.50±0.20	25	55

NOTES:
IMPEDANCE TO BE MEASURED BY USING HP4191A IMPEDANCE ANALYZER, WITH COMPONENT MOUNTING ASSY 16092A.

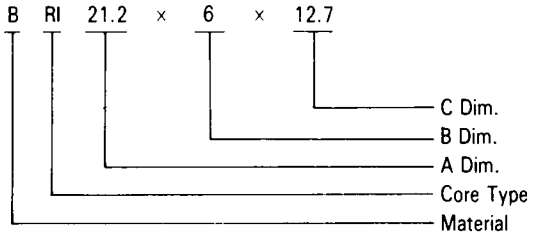
EMI CORES/RI TYPE

1. Shape.





2. Ordering Code.



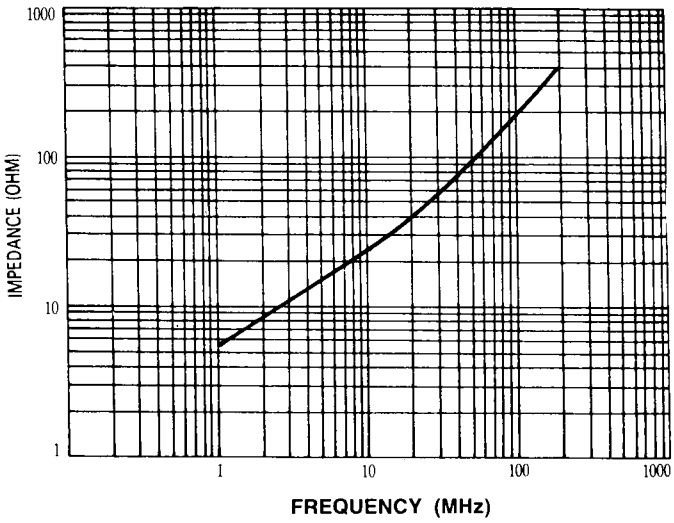
3. Material.

B

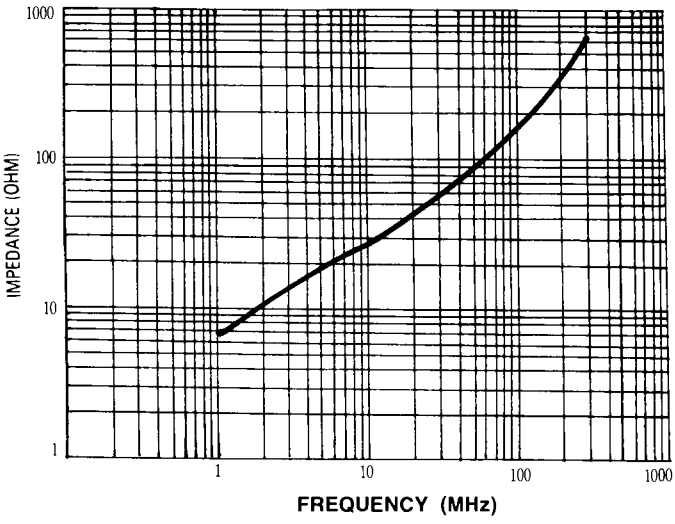
4. Dimensions.

CORES	A m/m	B m/m	C m/m	TYPICAL IMPEDANCE (OHM)	
				25 MHz	100 MHz
RI 12 X 6 X 6	12.0 ± 0.4	6.00 ± 0.3	6.0 ± 0.3	33	45
RI 12.7 X 6.35 X 7.9	12.7 ± 0.4	6.35 ± 0.3	7.9 ± 0.3	42	128
RI 14 X 5 X 8.4	14.0 ± 0.4	5.00 ± 0.3	8.4 ± 0.3	-	-
RI 14 X 8 X 10	14.0 ± 0.4	8.00 ± 0.3	10.0 ± 0.3	-	-
RI 15.8 X 8 X 9.5	15.8 ± 0.4	8.00 ± 0.3	9.5 ± 0.3	49	125
RI 18 X 6.5 X 10	18.0 ± 0.5	6.50 ± 0.3	10.0 ± 0.3	50	139
RI 20 X 10 X 10	20.0 ± 0.5	10.00 ± 0.3	10.0 ± 0.3	68	148
RI 21.2 X 6 X 12.7	21.2 ± 0.5	6.00 ± 0.3	12.7 ± 0.3	40	140
RI 22.5 X 6.4 X 13.8	22.5 ± 0.5	6.40 ± 0.3	13.8 ± 0.3	44	126
RI 25 X 12 X 15	25.0 ± 0.5	12.00 ± 0.4	15.0 ± 0.3	60	125
RI 25.9 X 15 X 16	25.9 ± 0.5	15.00 ± 0.4	16.0 ± 0.4	77	158
RI 28 X 7.5 X 18	28.0 ± 0.6	7.50 ± 0.3	18.0 ± 0.4	45	152
RI 28 X 13 X 16	28.0 ± 0.6	13.00 ± 0.4	16.0 ± 0.4	50	190
RI 29.5 X 7.7 X 19	29.5 ± 0.6	7.70 ± 0.3	19.0 ± 0.4	55	155
RI 31.5 X 16 X 19	31.5 ± 0.8	16.00 ± 0.4	19.0 ± 0.4	80	167
RI 35.6 X 7.5 X 25.4	35.6 ± 0.8	7.50 ± 0.3	25.4 ± 0.5	39	127
RI 35.6 X 12.7 X 22.9	35.6 ± 0.8	12.70 ± 0.4	22.9 ± 0.5	60	178

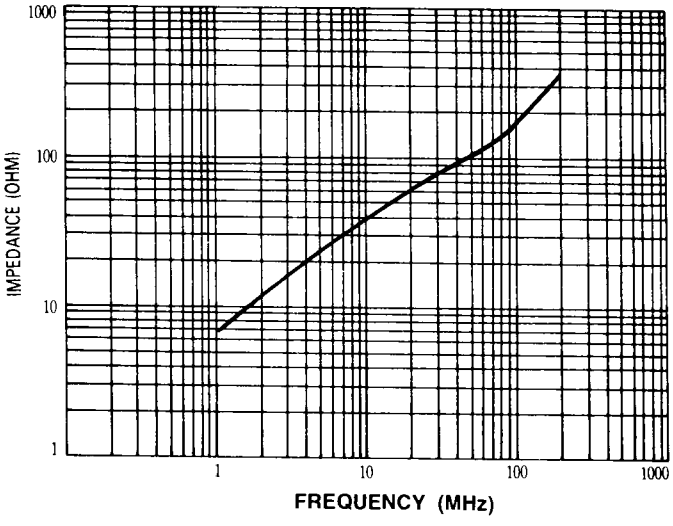
BRI 12.7 x 6.35 x 7.9



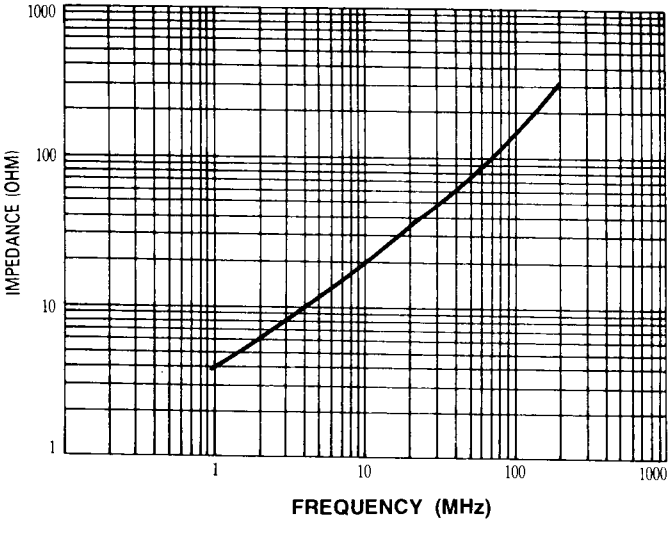
BRI 15.8 x 8.0 x 9.5



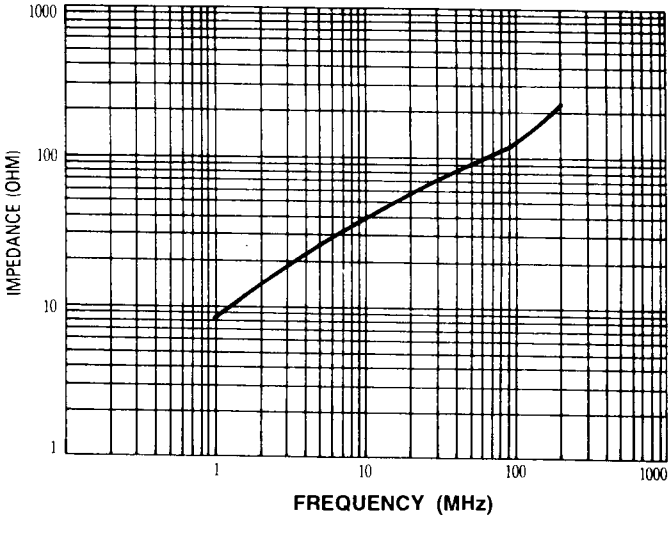
BRI 20 x 10 x 10



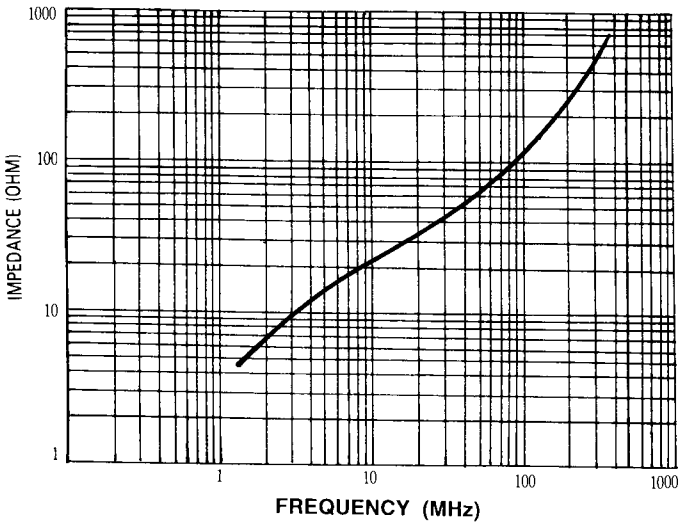
BRI 21.2 x 6 x 12.7



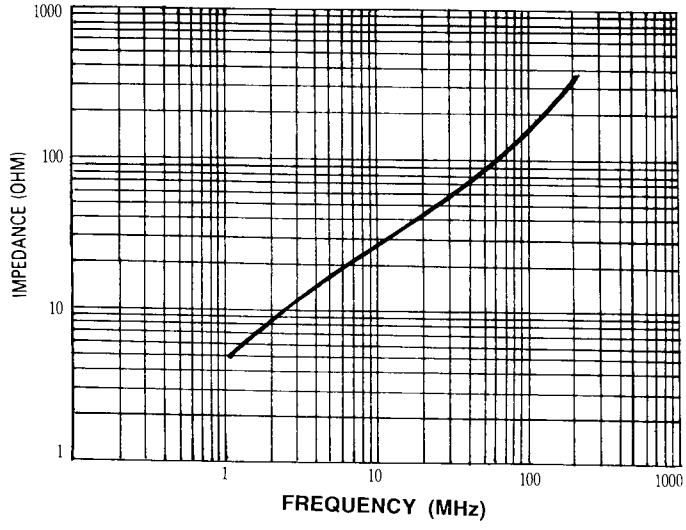
BRI 25 x 12 x 15



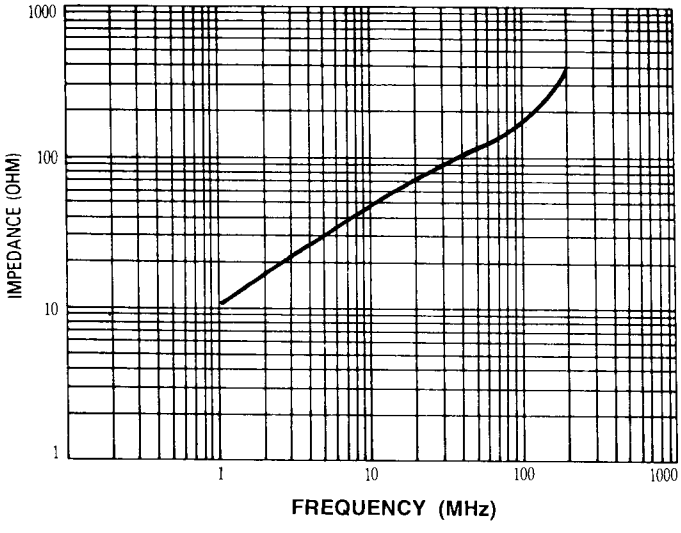
BRI 28 x 7.5 x 18.0



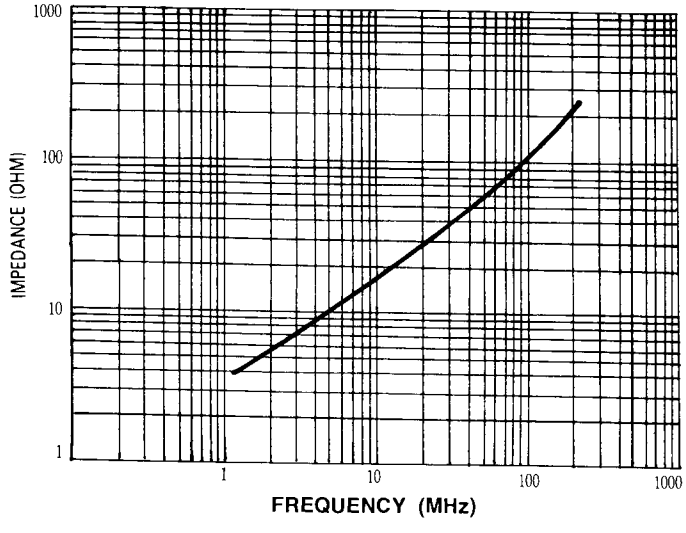
BRI 29.5 x 7.7 x 1 9



BRI 31.5 x 16 x 19

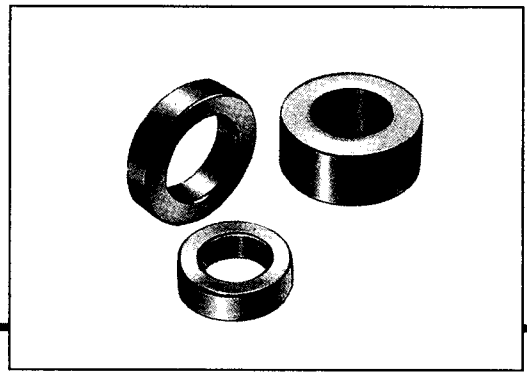


BRI 35.6 x 7.5 x 25.4



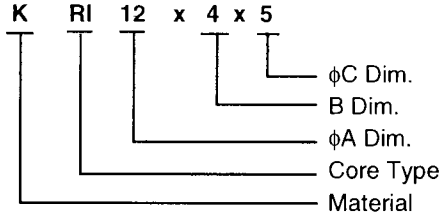
TEST METER:
HP 4191A RF IMPEDANCE ANALYZER
TEST FIXTURE:
HP 16092A SPRING CLIP FIXTURE
TEST WIRE: 0.8φCABLE WIRE (L:220mm)
TEST WINDING: ½ Ts.

TOROID CORES / RI TYPE



The ring configurations provide the ultimate in utilization of the properties of ferrites. Pulse transformer filter inductors loading coil and balun transformers are a few of the application for this type core.

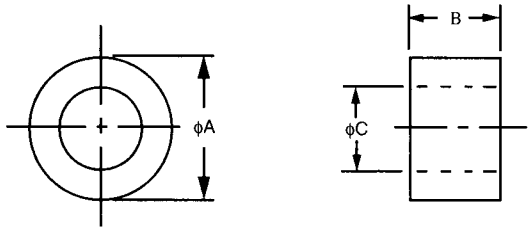
1. Ordering Code.



2. Material.

B B246 D2 K O1 Y4 Y7

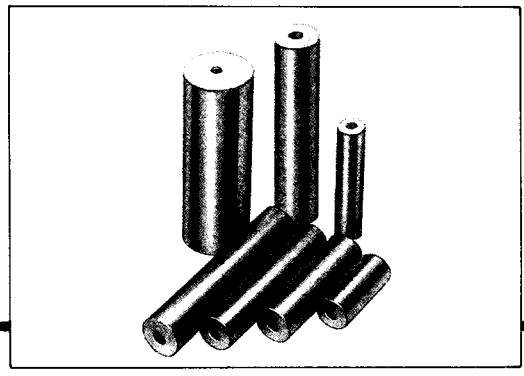
3. Shape.



4. Dimensions Unit: mm

CORES	A m/m	B m/m	C m/m
RI 2.8X1.2X1.7	2.8 ± 0.2	1.2 ± 0.15	1.7 ± 0.15
RI 3.43X1.52X1.78	3.43 ± 0.2	1.52 ± 0.2	1.78 ± 0.15
RI 4X1.5X2	4 ± 0.2	1.5 ± 0.2	2 ± 0.15
RI 4.4X1.2X2.8	4.4 ± 0.2	1.2 ± 0.15	2.8 ± 0.2
RI 6X2X3	6 ± 0.2	2 ± 0.2	3 ± 0.2
RI 6X2.8X3	6 ± 0.2	2.8 ± 0.2	3 ± 0.2
RI 6X3X3	6 ± 0.2	3 ± 0.2	3 ± 0.2
RI 8X3X4	8 ± 0.2	3 ± 0.2	4 ± 0.2
RI 9X4X5	9 ± 0.3	4 ± 0.2	5 ± 0.2
RI 9.5X4.8X4.8	9.5 ± 0.3	4.8 ± 0.2	4.8 ± 0.2
RI 10X3.7X5	10 ± 0.3	3.7 ± 0.2	5 ± 0.2
RI 10.8X5X5.5	10.8 ± 0.3	5 ± 0.3	5.5 ± 0.2

ROD CORE / RWW TYPE



RWW TYPE CORES are used for peaking coils, choke coils and micro inductors.

1. Ordering Code.

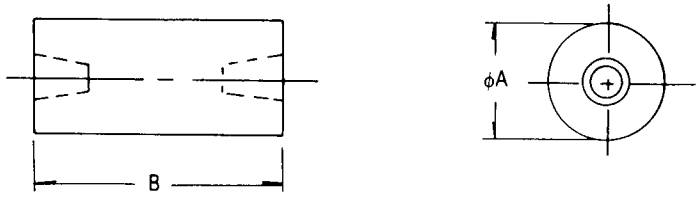
K RWW 5 × 20

- B Dim
- ϕA Dim
- Core Type
- Material

2. Material.

B B246 K D2 X129

3. Shape.

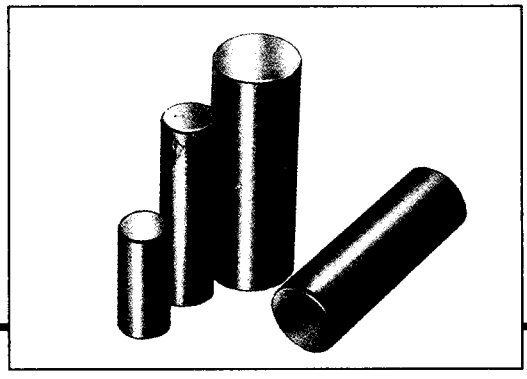


4. Dimensions

Unit: mm

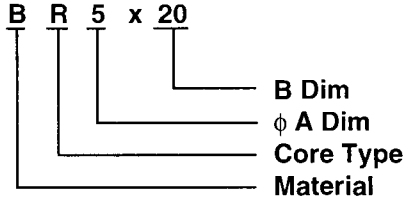
Dim / CORES	ϕA	B
RWW 1.5×4.5	1.5±0.15	4.5±0.2
RWW 1.7×4.5	1.7±0.15	4.5±0.2
RWW 2×6	2±0.15	6±0.3
RWW 2×8	2±0.15	8±0.3
RWW 3×6	3±0.2	6±0.3
RWW 3×8	3±0.2	8±0.3
RWW 3×10	3±0.2	10±0.3
RWW 3×12	3±0.2	12±0.4
RWW 4×10	4±0.2	10±0.4
RWW 4×12	4±0.2	12±0.4
RWW 4×15	4±0.2	15±0.4
RWW 5×15	5±0.3	15±0.4
RWW 5×20	5±0.3	20±0.5
RWW 5×25	5±0.3	25±0.5
RWW 6×20	6±0.3	20±0.5
RWW 6×25	6±0.3	25±0.5
RWW 6×30	6±0.3	30±0.8
RWW 10×30	10±0.5	30±0.8

ROD CORES / R TYPE



R TYPE is mainly used as the magnetic cores of the coils which do not require adjustments as well as magnetic shield.

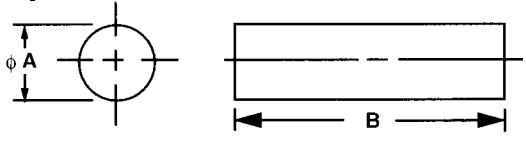
1. Ordering Code.



2. Material.

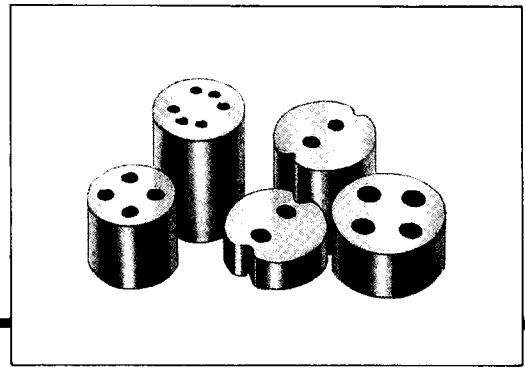
B B246 D2 D1

3. Shapes.



CORES	ϕ A m/m	ϕ B m/m
R 2X4	2 ± 0.2	4 ± 0.3
R 2X8	2 ± 0.2	8 ± 0.3
R 2X10	2 ± 0.2	10 ± 0.3
R 3X8	3 ± 0.2	8 ± 0.3
R 3X10	3 ± 0.2	10 ± 0.3
R 3X12	3 ± 0.2	12 ± 0.3
R 4X10	4 ± 0.2	10 ± 0.3
R 4X12	4 ± 0.2	12 ± 0.3
R 4X15	4 ± 0.2	15 ± 0.4
R 4X19	4 ± 0.2	19 ± 0.4
R 5X15	5 ± 0.3	15 ± 0.4
R 5X20	5 ± 0.3	20 ± 0.5
R 6X15	6 ± 0.3	15 ± 0.4
R 6X20	6 ± 0.3	20 ± 0.5
R 6X25	6 ± 0.3	25 ± 0.5
R 6X30	6 ± 0.3	30 ± 0.8
R 6.34X25.4	6.34 ± 0.3	25.4 ± 0.5
R 8X15	8 ± 0.4	15 ± 0.4
R 8X20	8 ± 0.4	20 ± 0.5
R 8X30	8 ± 0.4	30 ± 0.8
R 10X20	10 ± 0.4	20 ± 0.5
R 10X30	10 ± 0.4	30 ± 0.8

BALUN CORES / RHH, R4H, R6H, R8H TYPE



Balun Cores employed in balance-unbalance transformers find wide application today not only in the input circuits to TV and FM tuners but also in CATV networks and installations.

1. Order Code.

A RHH 7 × 5.5
- B Dim
- φA Dim
- Core Type
- Material

2. Material.

A B B_{246} D_2 K

3. Shape.

FIG. 1

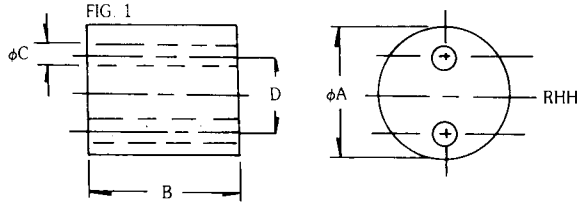


FIG. 2

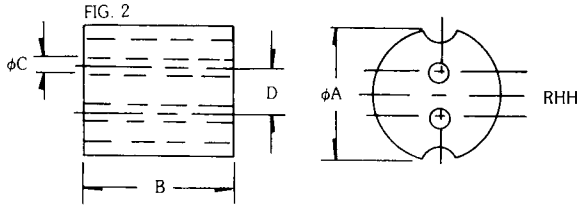


FIG. 3

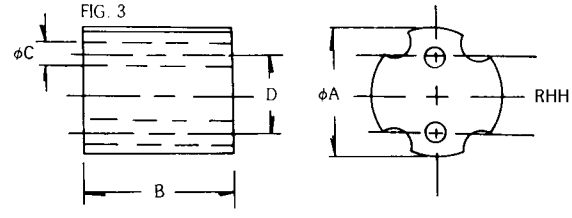


FIG. 4

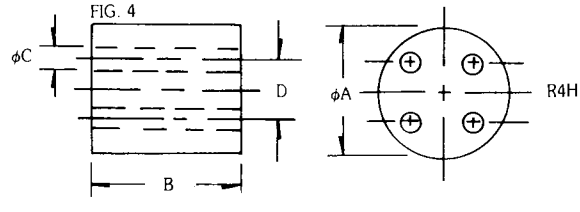


FIG. 5

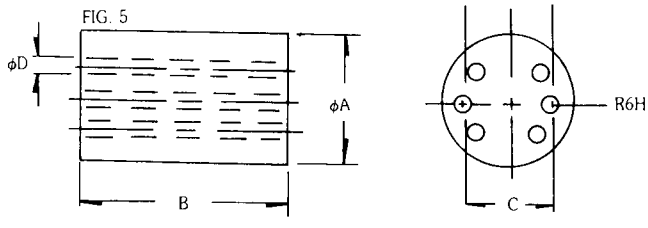
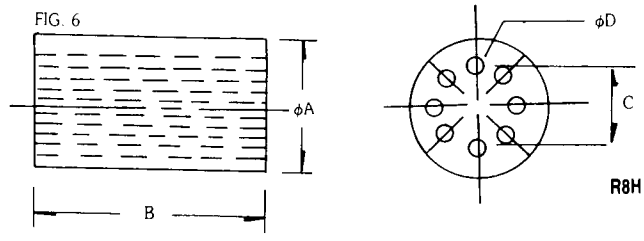


FIG. 6

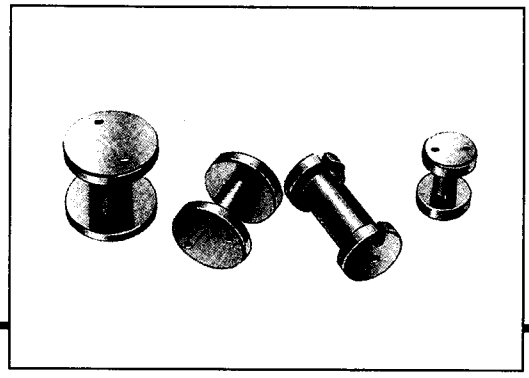


4. Dimensions

Unit: mm

Dim / CORES	A	B	C	D	FIG
RHH 6×3	6±0.2	3±0.2	1.3±0.15	3±0.15	1
RHH 6.35×12	6.35±0.3	12±0.5	1.5±0.15	3±0.15	1
RHH 7×5.5	7±0.2	5.5±0.3	1.5±0.15	3±0.15	1
RHH 7.2×5.5	7.2±0.2	5.5±0.3	1.3±0.15	3±0.15	2
RHH 7.6×4.2	7.6±0.2	4.2±0.3	1.5±0.15	3±0.15	3
R4H 6.3×6.5	6.3±0.2	6.5±0.3	1.1±0.15	2.4±0.15	4
R4H 8×5	8.0±0.2	5±0.3	1.5±0.15	3.2±0.15	4
R6H 6×10×0.85	6.0±0.2	10±0.4	3.4±0.15	0.85±0.1	5
R8H 5.2×10×0.85	$5.33^{+}0.2$	$10^{+}0.4$	$3.3^{+}0.15$	0.85±0.1	6

DRUM CORES DR / TYPE



1. Ordering Code. B DR 9 × 12 (5-6.7-4)

- B — Material
- DR — Core Type
- 9 — ϕA Dime
- 12 — B Dime
- (5-6.7-4) — Clas No
- C Dim
- ϕD Dime

2. Material. B B_{246} K D_2 O_1

FIG. 1 ϕ D — Class 1

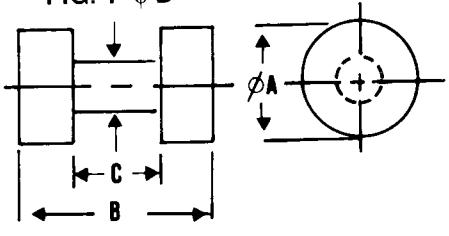


FIG. 3 ϕ D — Class 5

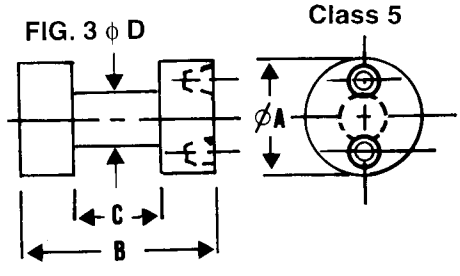


FIG. 2 ϕ D — Class 4

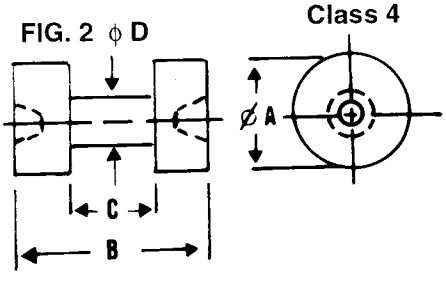
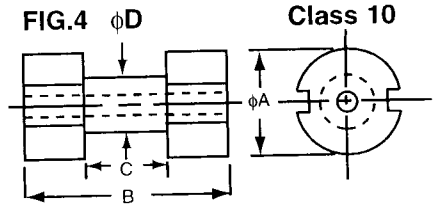


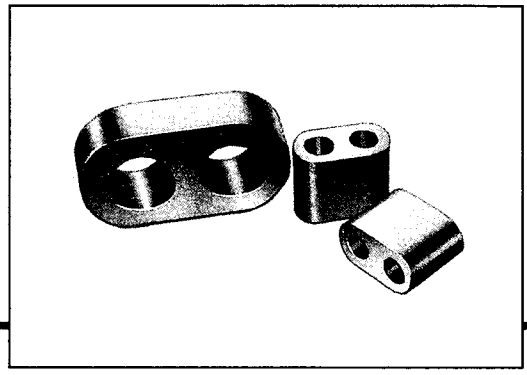
FIG.4 ϕD — Class 10



4. Dimensions

NO	CORES	Fig	ϕ A	B	C	ϕ D
1	DR 1.5X2.2 (1-0.6-1)	1	1.5±0.2	2.2±0.2	0.6	1
2	DR 2.2X3.5 (1-1.2-1.5)	1	2.2±0.2	3.5±0.2	1.2	1.5
3	DR 2.2X3.5 (1-1.4-1.2)	1	2.2±0.2	3.5±0.2	1.4	1.2
4	DR 4X4.5 (1-2.4-1.5)	1	4±0.2	4.5±0.3	2.4	1.5
5	DR 1.8X2 (4-1-1)	2	1.8±0.15	2±0.2	1	1
6	DR 2.2X4 (4-2-1.5)	2	2.2±0.15	4±0.3	2	1.5
7	DR 2.2X6.5 (4-4-1.5)	2	2.2±0.2	6.5±0.3	4	1.5
8	DR 2.5X2.2 (4-1.1-1.4)	2	2.5±0.2	2.2±0.2	1.1	1.4
9	DR 2.5X2.6 (4-1.2-1.4)	2	2.5±0.2	2.6±0.2	1.2	1.4
10	DR 3X6 (4-3-2)	2	3±0.2	6±0.3	3	2
11	DR 3X7 (4-3.5-2)	2	3±0.2	7±0.3	3.5	2
12	DR 3.5X6 (4-2.8-2)	2	3.5±0.2	6±0.3	2.8	2
13	DR 5X12 (4-10-3.5)	2	5±0.15	12±0.4	10	3.5
14	DR 6.5X13 (4-10-4)	2	6.5±0.3	13±0.4	10	4
15	DR 7X11 (4-6.5-5)	2	7±0.3	11±0.4	6.5	5
16	DR 9.1X20.5 (4-14.5-4.8)	2	9.1±0.3	20.5±0.6	14.5	4.8
17	DR 9.6X19.3 (4-12-5.3)	2	9.6±0.3	19.3±0.5	12	5.3
18	DR 10X16 (4-10.5-5)	2	10±0.4	16±0.5	10.5	5
19	DR 10.5X20.5 (4-14.5-6.2)	2	10.5±0.4	20.5±0.6	14.5	6.2
20	DR 4X5.5 (5-2-1.75)	2	4±0.2	5.5±0.3	2	1.75
21	DR 4X5.5 (5-1.5-1.8)	3	4±0.2	5.5±0.3	1.5	1.8
22	DR 4.3X5.5 (5-1.5-1.8)	3	4.3±0.2	5.5±0.3	1.5	1.8
23	DR 4.3X6.5 (5-2.8-2)	3	4.3±0.2	6.5±0.3	2.8	2
24	DR 6X8 (5-4-2.5)	3	6±0.3	8±0.3	4	2.5
25	DR 8X9 (5-4-3)	3	8±0.3	9±0.3	4	3
26	DR 8X10 (5-4.6-3.5)	3	8±0.3	10±0.4	4.6	3.5
27	DR 9X12 (5-6.7-3.8)	3	9±0.3	12±0.4	6.7	3.8
28	DR 10X16 (5-10.5-6)	3	10±0.4	16±0.5	10.5	6
29	DR 13X15 (5-10-4.8)	3	13±0.4	15±0.5	10	4.8
30	DR 14X15 (5-9-5)	3	14±0.4	15±0.5	9	5
31	DR 16X18 (5-12.3-8)	3	16±0.3	18±0.5	12.3	8
32	DR 16.5X20.5 (10-12.5-13)	4	16.5±0.5	20.5±0.6	12.5	13

BALUN CORES / RID TYPE



RID CORES are used for wideband transformers up to high frequencies and to balance unbalanced transformers.

1. Ordering Code.

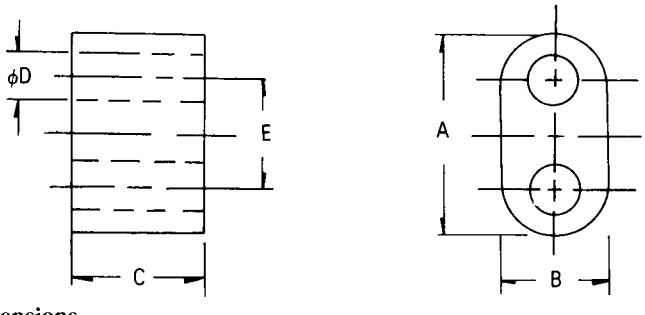
A RID 13.5 x 7.5 x 7

- C Dim
- B Dim
- A Dim
- Core Type
- Material

2. Material.

A A_3 B B_{246} D_2 X_{129} Y_4 Y_7

3. Shape.

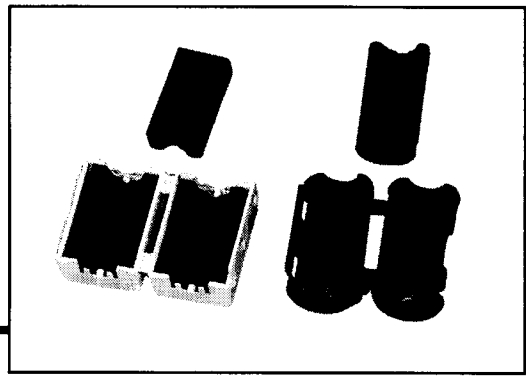


4. Dimensions

Unit: mm

CORES	A m/m	B m/m	C m/m	D m/m	E m/m
RID 4.24X2.54X3.2	4.24 ± 0.3	2.54 ± 0.2	3.2 ± 0.15	1 ± 0.15	2
RID 3.5X2X2.5	3.5 ± 0.3	2 ± 0.2	2.5 ± 0.15	1 ± 0.15	2
RID 5X3X2	5 ± 0.3	3 ± 0.2	2 ± 0.2	1.2 ± 0.15	2.6
RID 5X3X5	5 ± 0.3	3 ± 0.2	5 ± 0.3	1.2 ± 0.15	2.6
RID 6.4X3.5X3.2	6.4 ± 0.3	3.5 ± 0.2	3.2 ± 0.2	1.8 ± 0.15	3
RID 6.4X3.5X5	6.4 ± 0.3	3.5 ± 0.2	5 ± 0.3	1.8 ± 0.15	3
RID 7X4X3	7 ± 0.3	4 ± 0.2	3 ± 0.2	2 ± 0.15	3
RID 7X4X6.5	7 ± 0.3	4 ± 0.2	6.5 ± 0.3	2 ± 0.15	3
RID 13.5X7.5X4	13.5 ± 0.5	7.5 ± 0.3	4 ± 0.3	4 ± 0.25	5.5
RID 13.5X7.5X7	13.5 ± 0.5	7.5 ± 0.3	7 ± 0.3	4 ± 0.25	5.5
RID 13.5X7.5X14	13.5 ± 0.5	7.5 ± 0.3	14 ± 0.5	3.8 ± 0.25	5.8
RID 13.5X7.5X28	13.5 ± 0.5	7.5 ± 0.3	28 ± 0.8	3.8 ± 0.25	5.8

EMI CORES WITH PLASTIC CASE / ZLF TYPE



1. Ordering Code.

ZLF — 65 — □

- CASE COLOR (B:Black W:White)
- SERIES NUMBER
- TYPE

2. Shapes

Fig 1

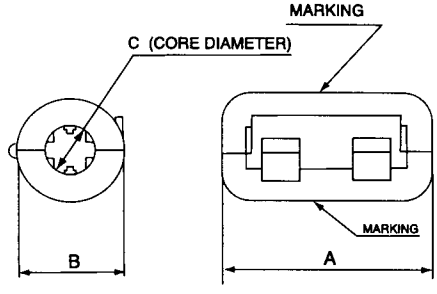


Fig 2

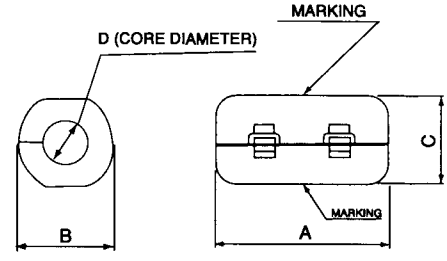


Fig 3

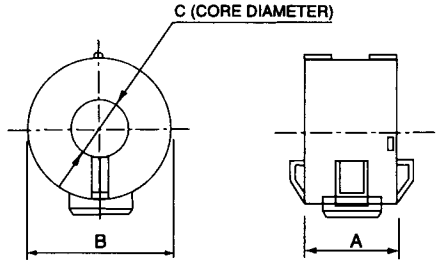
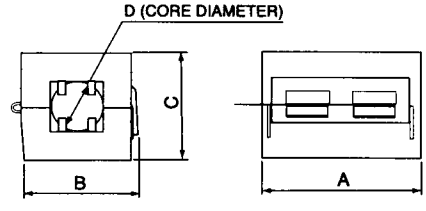


Fig 4



3. Dimensions

Unit: mm

FIG	PART NO	A	B	C	D	Z(Ω) Min		REMARK
						25MHz	100MHz	
1	ZLF-35□	25.5 ± 1	15.0 ± 1	3.8 ± 1		50	80	0.65φ T.C.W* 63mm* 1/2 TS
1	ZLF-50□	29.2 ± 1	16.0 ± 1	5.3 ± 1		64	160	0.80φ cable wire* 22cm* 1/2 TS
1	ZLF-75□	39.0 ±1	20.0 ± 1	7.6 ± 1		100	190	0.80φ cable wire* 22cm* 1/2 TS
1	ZLF-90□	43.5 ± 1	22.5 ± 1	9.3 ± 1		105	190	0.80φ cable wire* 22cm* 1/2 TS
2	ZLF-110□-1	36.0 ± 1	20.5 ± 1	19.0 ± 1	11.0 ± 1	65	135	0.80φ cable wire* 22cm* 1/2 TS
2	ZLF-127□	32.8 ±1	24.0 ± 1	22.6 ± 1	12.7 ± 1	70	140	0.80φ cable wire* 22cm* 1/2 TS
3	ZLF-120□	18.0 ± 1	28.0 ± 1	11.4 ± 1		150	320	UL1007 AWG26* 90mm*1 1/2 TS
4	ZLF-65□	32.0 ± 1	19.5 ± 1	19.0 ± 1	6.5± 1	120	220	0.80φ cable wire* 22cm* 1/2 TS
4	ZLF-100□	33.0 ± 1	24.5 ± 1	23.0 ± 1	10.0 ± 1	90	205	0.80φ cable wire* 22cm* 1/2 TS
4	ZLF-130□	32.0 ± 1	31.5 ± 1	30.0 ± 1	13.0 ± 1	90	205	0.80φ cable wire* 22cm* 1/2 TS