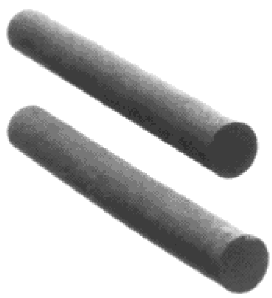
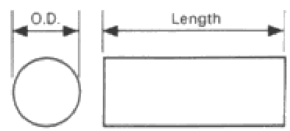
Back - Home - Kits - Books I II III IV V VI Pricing - Purchase - Read!

FERRITE RODS, BARS, PLATES AND TUBES

Ferrite rods, bars, plates and tubes are primarily used in radio antennas and chokes. They are available in materials from permeability of 20 to 10, 000.

Only rods with #61 (u_i - 125), and #33 (u_i = 800) materials are standard stocking items. All other materials are custom manufactured, readily available with lead time for delivery.





Standard Stocking Rods

Part number	Material	Permeability	Diameter (in)	Length (in)	A_L value mh/1000t	Ampere turns
R61-025-400	61	125	.25	4.0	26	110
R61-037-300	61	125	.37	3.0	32	185
R61-050-400	61	125	.50	4.0	43	575
R61-050-750	61	125	.50	7.5	49	260
R33-037-400	33	800	.37	4.0	62	290
R33-050-200	33	800	.50	2.0	51	465
R33-050-400	33	800	.50	4.0	59	300
R33-050-750	33	800	.50	7.5	70	200

Other dimensions and materials are available. Please call for your other requirements.

FERRITE RODS are available as standard stocking items in various sizes in the #33 and #61 materials. Ferrite rods of other materials are available with lead time. The most common use of a ferrite rod is for antenna and choke applications.

ANTENNAS: Ferrite Rods are widely used as loop antennas for such as broadcast-band receivers, direction-finder receivers, etc.The #61 material rods are widely used for commercial AM (550 KHz to 1660 KHz) radio antennas and by radio amateurs (2 MHz to 30 MHz). The #33 material rods are more suitable for very low frequency ranges (100 KHz to 1 MHz). The table below lists the recommended frequency ranges for a few different materials. Loop antennas have a height factor called effective height, h_e (in m), which when multiplied with field strength, F (in uV/m), provides the loop-induced voltage (in uV).

$$h_e = \frac{2\pi N A \mu_e}{\lambda} \text{, in meter.}$$

$$\text{Loop Induced Voltage} = Fh_e = \frac{2\pi N A \mu_e F}{\lambda} \text{, in } \mu V.$$

Where:
N = number of turns
A = area in square meters (m2)
^ = wavelength in meters
u_e = effective permeability of rod, and
d/^ < 1, d = diameter of rod.

It can be seen from the equation that the highest induced voltage occurs when the windings occupied the entire rod (when N is largest).

Initial Permeability, ui	Maximum Permeability, um	Saturation Flux Density, Bs, at 13 Oe	Recommended Frequency *Range (MHz)	Material
20	--	2000 at 40 Oe	80-100	68
40	--	3000 at 20 Oe	10-80	67
125	450	2350	0.2-10	61
250	375	2200	0.05-4	64
300	3600	3900	0.001-5	83
850	3000	2750	0.01-1	43
2000	4600	1150	0.001-2	77

*Frequency ratings are for optimum Q in narrow-band tuned circuits.

CHOKE applications: Both the #33, and the #61 rods are used extensively in choke applications. The #33 material should be selected for the 3.75 - 7.5 MHz (40-80 meters band). The #33 rods are also often used in speaker cross-over networks. The #61 material is most suitable for the 7.5-30 MHz (10-40 meters band) range. Due to the open magnetic structure of the rod configuration, considerable current can be tolerated before it will saturate.

There are several factors that have a direct bearing on the effective permeability of a ferrite rod, which in turn will effect inductance and 'Q', as well as the A_L value of the rod and its ampere-turns rating. These are: (1) Length to diameter ratio of the rod, (2) Placement of the coil on the rod, (3) Spacing between turns and, (4) Air space between the coil and the rod. In some cases, the effective permeability of the rod will be influenced more by a change in the length to diameter ration than by a change in the initial permeability of the rod. At other times, just the reverse will be true.

Greatest inductance and A_L value will be obtained when the winding is centered on the rod rather than placed at either end. The best 'Q' will be obtained with the winding covers the entire length of the rod.

Because of all of the above various conditions it is very difficult to provide workable A_L values. However we have attempted to provide a set of A_L and NI values for various types of rods in our stick. These figures are based on a closely wound coil of #22 wire, placed in the center of the rod and covering nearly the entire length. Keep in mind that there are many variables and that the inductance will vary according to winding technique.

EFFECTIVE PERMEABILITY

Coil placements and the length of windings on the rods, bars, plates and tubes affect the effective permeability of these devices. The corrected permeability for variation in coil length versus rod length is:

$$\mu' = \mu_e \sqrt[3]{(\ell_r / \ell_c)}$$

Where u' = corrected u
u_e = effective permeability from the chart
l_r = rod length in cm or inches
l_c = length of coil windings in cm or inches

EFFECTS ON 'Q'

The spacing between the turns has a significant effect on the 'Q', and the inductance of the rods. The best values of 'Q' are obtained when the coil turns are spaced one wire diameter apart, with the windings located at the center of the rod. Litz wire provides the highest level of 'Q'.

Except for those rods (#61 & #33) listed above, the following plates, rods, tubes and strips are non-stocking items. Non-stocking items are custom manufactured parts with lead times. Please call for information on pricing and delivery. Those stocking item rods can be shipped out immediately. The materials available are: #68 (u_i = 20), #67 (u_i = 40), #61 (u_i = 125, #33 (u_i = 800), #77 (u_i = 2000), #73 (u_i = 2500), #F (u_i = 3000), #J (u_i = 5000), and #W (u_i = 10, 000). The rods, tubes and strips can be manufactured in lengths up to a maximum of 12 inches. The dimensional tolerances for rods, tubes, and strips are approximately +/- 6%, and for plates are +/- 2%. All length tolerances are +/- 2%. The camber tolerance is 0.11 per inch. (dimensional graphics and tables)

Part numbering: Insert ( ) for material desired and insert (_ _ _) for
length desired when ordering. All dimensions are in inches.

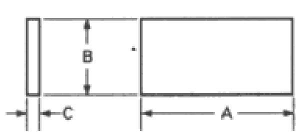


figure 1

ANTENNA PLATES

Part No.	*Fig.*	*A*	*B*	*C*
AP( )-1070	1	2.187	1.437	0.187
AP( )-1049-1	1	3.500	3.500	0.250
AP( )-996	1	4.500	4.500	0.250
AP( )-1053	1	5.500	2.750	0.375
AP( )-1051	1	5.500	5.500	0.500
AP( )-1052-2	1	13.000	2.125	0.250

ANTENNA RODS

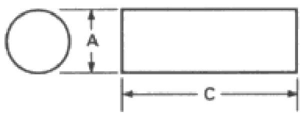


figure 2

Part No.	*Fig.*	*A*	*B*	*C*
R( )-125-(_ _ _)	2	0.125		7.500
R( )-187-(_ _ _)	2	0.187		7.500
R( )-250-(_ _ _)	2	0.250		7.500
R( )-312-(_ _ _)	2	0.312		7.500
R( )-330-(_ _ _)	2	0.330		7.500
R( )-375-(_ _ _)	2	0.375		7.500
R( )-500-(_ _ _)	2	0.500		7.500
R( )-625-(_ _ _)	2	0.625		7.500
R( )-750-(_ _ _)	2	0.750		7.500
R( )-850-(_ _ _)	2	0.875		7.500
R( )-1000-(_ _ _)	2	1.00		7.500

ANTENNA TUBES

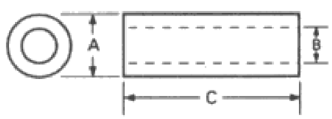


figure 3

Part No.	*Fig.*	*A*	*B*	*C*
AT( )-218-(_ _ _)	3	0.218	0.063	7.500
AT( )-250-(_ _ _)	3	0.250	0.125	7.500
AT( )-375-(_ _ _)	3	0.375	0.125	7.500
AT( )-500-(_ _ _)	3	0.500	0.250	7.500
AT( )-750-(_ _ _)	3	0.750	0.375	7.500
AT( )-875-(_ _ _)	3	.0875	.0431	7.500
AT( )-1000-(_ _ _)	3	1.000	0.500	7.500
AT( )-1250-(_ _ _)	3	1.250	0.500	7.500

ANTENNA STRIPS

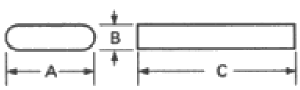


figure 4

Part No.	*Fig.*	*A*	*B*	*C*
AS( )-350-(_ _ _)	4	0.350	0.200	7.500
AS( )-480-(_ _ _)	4	0.480	0.125	7.500
AS( )-725-(_ _ _)	4	0.725	0.125	7.500
AS( )-780-(_ _ _)	4	0.780	0.165	7.500
AS( )-1000-(_ _ _)	4	1.000	0.090	7.500
AS( )-1000-(_ _ _)	4	1.000	0.375	7.500
AS( )-1250-(_ _ _)	4	1.250	0.250	7.500
AS( )-1375-(_ _ _)	4	1.375	0.250	7.500

Contact ByteMark

353 West Grove Avenue, Orange, CA 92865, U.S.A.

800-679-3184

Last Updated 10/13/2006 16:27:09

CWS ByteMark is no longer affiliated with or its associates.