Introductions

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.
It' s 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 warping 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 micro-volts per meter(μV/m). But different manufacturer has different idea about it. We hereby adopt a suitable choice for this at 1 Ohm. The following equation relates attenuation to the impedance of a shield bead in ohm.

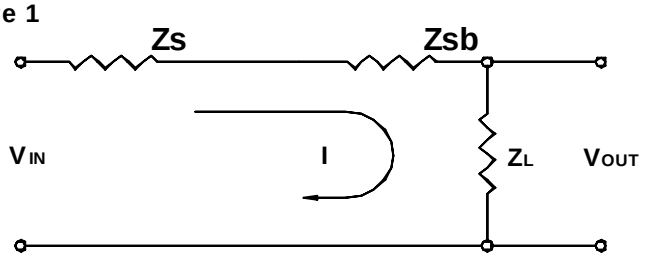
$$A = 20\log\frac{Zsb + Z_L + Zs}{Z_L + Zs}$$

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 the 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 you specific requirements.