



Magnetic Shielding Realities

Many scientific calculations (solutions to problems) assume that something goes to infinity. Our Calculator is based on this assumption. Now it's very difficult to work with a magnetic shield that is infinitely long so use these guidelines. If your shield must be open ended (a can with the ends cut off). Extend the shield one "D" dimension on each open end. So if you have a part that is 3" long going into a 1" diameter open ended shield try to make the shield 5" long (1"+3"+1"). If you're able to cap one end then shorten the shield by one "D" or you don't need to lengthen it at all if both ends are closed. It won't be as efficient as an infinitely long shield but it is a viable compromise.

Magnetic fields are vector quantities which means they have both magnitude and direction. Optimal shielding takes place when the magnetic field is perpendicular to the axis of the shield. Magnetic Shield's Calculator assumes this is the case so if it isn't you won't get the amount of shielding calculated.

Often times it is necessary to put openings into a shield to bring in wiring or for some other reason. Keep in mind that openings, whether they be open ends or something in the side, reduce the effectiveness of the shield. Another good reason to build a prototype.

Magnetic Shield's Calculator provides a theoretical selection for the thickness of the shield based on the shield being infinitely long, without openings and in a magnetic field acting perpendicular to its axis. Of course none of this is likely to be true in the real world so consider selecting a thicker material if your application warrants it. From a manufacturing point of view there other considerations which may also make it necessary to go thicker.

Although Co-Netic AA comes in various thicknesses it is a rather soft material and may prove to be difficult to work with if it is too thin. Keep this in mind making your selection. Anything below 0.025" thick is difficult to weld other than with spot welding. If you are going to weld the material use the Stress annealed rather than the Perfection and furnace anneal the finished part. We can provide annealing specifications.

Even if you start with a perfect part the annealing process will distort it. This is especially true as the parts get larger. Make the shield as simple and dimensionally forgiving as possible. For parts that don't require a lot of shearing and bending use the Perfection annealed material as long as you aren't going to do any welding or drawing. Perfection will come to you already annealed and its magnetic properties won't be significantly reduced with normal sheet metal processes as long as it isn't drawn or welded.

If the shield is going to be used to support a part, either inside or out, take the the following into consideration. Co-Netic AA is soft and not extremely strong after annealing. Magnetic Shield does not recommend tapping it in order to attach brackets or other parts. Welding the bracket to the shield would be preferred and it should be made from a non-ferromagnetic material (300 Series stainless steel would be an example). Keep the part to be shielded from touching the shield. It doesn't need to be far from the shield but we prefer they don't touch. Be careful not to build a precision watch. Annealing will unpredictably and uncontrollably make dimensional changes to the fabricated part. Depending on the load to be supported by the shield consider using a thicker wall for additional strength.

Why do electromagnetic fields need magnetic shielding?

EMI, or electromagnetic interference can be a problem to designers of many products. Personal Computer manufacturers must design to meet the FCC Part 15 regulations to prevent PC's from interfering with other office equipment. Cell phone designers have to incorporate RFI shielding to stop unwanted RF emissions as well as to prevent other electrical equipment from interfering with the cellular telephone's operation. Designers may find that densely packed electronic assemblies may have internal components that interfere with each other, requiring electro magnetic shielding. When the electromagnetic interference includes low frequency radiation, magnetic shielding is essential to assure proper operation of the electronic equipment.

Is a special shield required for stereo speakers, and do you stock them?

Due to the broad range of speaker sizes and configurations, it is not feasible to maintain an inventory of completed shields. Two options are available. First, you can purchase raw



materials (CO-NETIC AA or NETIC alloys) and fabricate your own shields. Secondly, you can provide the necessary information and have Magnetic Shield's staff design and construct custom shields, configured for your needs.

Has Magnetic Shield investigated developing a magnetically driven motor which could run without external power being required?

Magnetic Shield is aware that groups are attempting to develop a magnetically driven motor and has supplied shielding material which we believe has been used on such projects. Our high-permeability materials offer excellent magnetic properties for experimentation. We have not taken part in these projects other than to supply the material. It simply is not our area of expertise.

How can I get shields built to my drawing?

Magnetic Shield Corporation stocks standard products, but also has full manufacturing facilities for fabrication of all types of custom magnetic shields complete to print, including Perfection Annealing for optimum magnetic properties. You can go directly to our [Quote Form](#) and submit your drawings and information via this web site.

What file formats can you accept?

If you prefer you can either mail or fax your print and quantity requirements, or send electronic files in a variety of formats by email for a prompt quotation.