

# MAGNETIC SHIELD CORP.



**WORLDWIDE MANUFACTURER and DISTRIBUTOR**

*Since 1941*



**MAGNETIC SHIELD CORPORATION**  
Perfection Mica Company

740 N. Thomas Drive  
Bensenville, IL 60106 U.S.A.

E: [shields@magnetic-shield.com](mailto:shields@magnetic-shield.com)  
P: 630-766-7800  
F: 630-766-2813  
[www.magnetic-shield.com](http://www.magnetic-shield.com)

**MuMETAL®**

**CO-NETIC® AA**

**CO-NETIC® B**

**NETIC®**

**INTER-8®**

**SPIRA-SHIELD**

**BRAIDED SLEEVING**

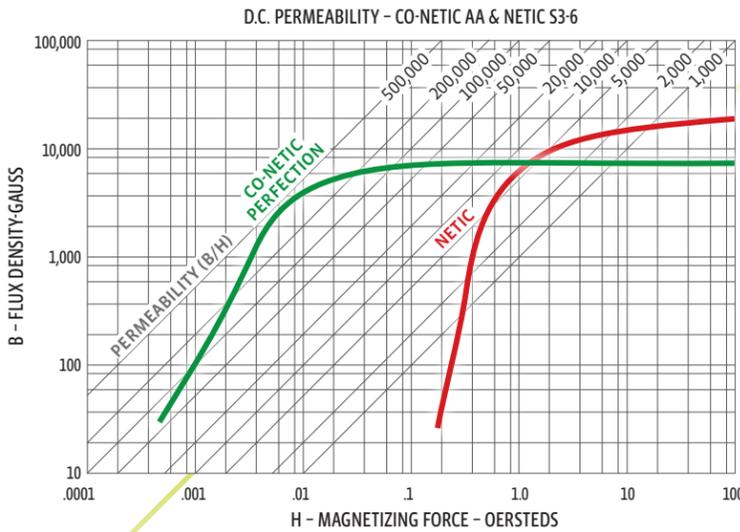
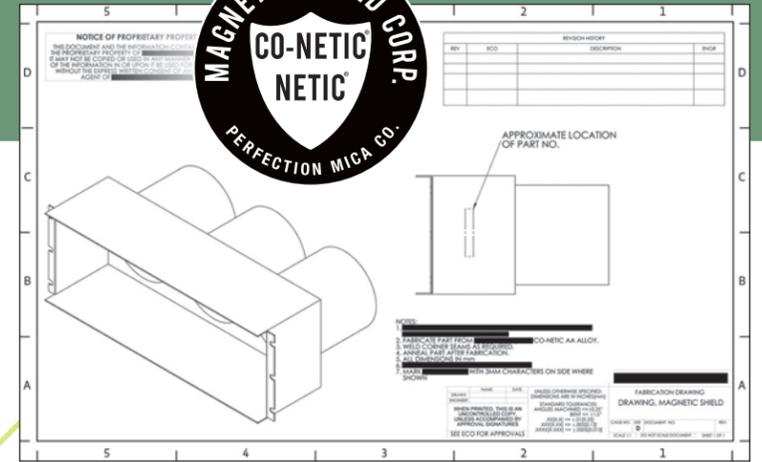
EXCLUSIVE SOURCE FOR:



Most recognized brand of magnetic shielding alloy, worldwide. We will help you determine if MuMetal® is the best alloy, or if our Netic® highest saturation, or Co-Netic® AA Perfection Annealed highest permeability specialty alloys are required.

MuMetal® is a U.S.A. registered trademark, and exclusively available from Magnetic Shield Corporation, Bensenville, IL U.S.A. All rights reserved, and use of the brand is not permitted without the express written consent of Magnetic Shield Corporation.

# THEORY EVALUATION SOLUTIONS



## EVALUATION

Usually, theory raises more questions, and provides no finite answer to technical professionals. That is why Magnetic Shield Corporation has developed practical methods of evaluating performance. Evaluation begins with calculations using our Co-Netic® Slide-Rule Calculator to determine alloy thickness required to attenuate unwanted fields. Our Slide-Rule Calculator is based on specific cylindrical shaped shields, therefore it is necessary to further evaluate using our hands-on prototyping Lab Kits to provide real evidence of success.

Our Lab Kits include product literature and instruction to aid technical professionals in product selection and use. With our Lab Kit materials, shielding can be prototyped with everyday, common hand-tools and bench-top or model-shop equipment.

Lab Kit shields can be used as evaluation & test samples, prototypes or finished parts. After evaluation, contact Magnetic Shield Corporation for fabrication solutions, made to your specifications or drawings. If you choose to fabricate to your own design, extra caution must be considered. Specialty annealing is usually required after fabrication to attain the maximum shielding performance. Contact Magnetic Shield Corporation to commercialize your shield design, and provide you with a complete shielding solution.

Lab Kits may be ordered by phone or online at:  
[www.magnetic-shield.com](http://www.magnetic-shield.com)

## THEORY

Over several decades, Magnetic Shield Corporation has performed hundreds of laboratory tests and calculated thousands of shielding equations – all in an effort to continually validate the theoretical application of magnetic interference control in both A.C. and D.C. applications and aid engineers in shield design. Theory behind the B-H curve is well documented, and it remains an effective reference tool. By use of the B-H curve, our shielding alloys MuMETAL®, CO-NETIC® and NETIC® have been developed and refined to offer the most effective shielding characteristics for a variety of applications and markets. The B-H curve (above) depicts our material capabilities to attenuate and absorb a wide range of magnetic fields.

In reality, the source field ( $H_s$ ) may not be readily recognized and its ultimate effect unknown. However, with proper measurement equipment and study, the source field intensity and direction can be measured. One of the most important design questions is whether the source field is internal or external, and which field is most economical and practical to shield. Internal interference is created by designed-in components located within a circuit, system, enclosure, piece of equipment or room. External interference is created by unwanted nearby fields radiating from items such as power lines, circuits, electrical enclosures, transformers, electro-magnetic machinery and the earth's magnetism.

Both internal and external interferences can usually be nullified by shielding with the proper alloy. Once the source field and affected area(s) are determined, shielding calculation and alloy selection begins. Material selection is a function of field intensity, type of field and required attenuation. MuMETAL®, CO-NETIC® AA and CO-NETIC® B are used primarily in fields of low intensity because of their high attenuation characteristics. NETIC® finds application in fields of high intensity because of its high magnetic saturation characteristics. If used in combination, the NETIC® layer is placed closest to the source of interference, with the MuMETAL® or CO-NETIC® layer closest to the component being shielded.

There are many factors to consider before shield design: appropriate shielding alloy and thickness, most effective shape, size and configuration, penetrations for inputs and outputs to a shielded device, and location of the shield relative to the source. In all cases, theory helps determine the best material, yet hands-on evaluation becomes the most important determining factor; providing critical information for final design and fabrication of an effective shield.



## SOLUTIONS

Magnetic Shield Corporation offers our brands of MuMETAL®, CO-NETIC® and NETIC® to worldwide markets. Upon receipt of your custom design by drawing and/or specification, our technical team can review your design, provide valuable input, and fabricate your shield. As an ISO 9001:2008 certified supplier, we are prepared to manufacture to your specifications. We are a diverse company, offering a broad range of production capabilities and solutions.

### SHEARING and SLITTING

On-demand services to reduce our stock sizes to more specifically match your needs. Reduces waste during further processing at your facility, thus cutting cost.

### ADHESION and ASSEMBLY

Our alloys are available with pressure-sensitive adhesive to allow ease of positioning and mounting. Stainless steel hardware may be added to fabricated shields for ease of assembly.

### ROLLING

By theory, cylindrical shaped shields are most effective, and we are expert in rolling a wide range of sizes from 1/8" to 96" diameter (3mm to 2500mm diameter).

### LASER, WATERJET and EDM CUTTING

For complex and critical parts that require assembly points and penetrations, specialty cutting is available.

### MACHINING and TURNING

For tight-tolerance fit, and 3D shapes, mill and lathe operations are used.

### PUNCHING, STAMPING and FORMING

For higher volume and 2D bends, a wide variety of services are available.

### WELDING

Weld continuity is critically important in shield design to minimize interference leak points. With over 30 years of experience, our welders have perfected TIG and MIG welding of assemblies. Spot and Laser welding are also effective in magnetic shield functionality.

### ANNEALING

For optimum magnetic properties, annealing is essential after fabrication, and critical to functionality. Several types of annealing are available. Final shield dimensions follow any anneal stresses so final designs should be prototyped.

### PROTOTYPING and PRODUCTION TOOLING

With an extensive range of equipment and tooling, our quick-turn prototyping and annealing services are regularly used by customers for fit and functional testing.

## CONTACT US TODAY

E: [shields@magnetic-shield.com](mailto:shields@magnetic-shield.com)  
P: 630-766-7800  
F: 630-766-2813  
[www.magnetic-shield.com](http://www.magnetic-shield.com)

Magnetic Shield Corporation's technical team has learned,

**“THEORY IS ONE THING, PRACTICALITY IS ANOTHER, EVALUATION IS EVERYTHING.”**

# MAGNETIC SHIELD CORP.



## STANDARD PRODUCT SELECTION GUIDE

### PRODUCT

### DESCRIPTION

### ADVANTAGES

Magnetic Shielding Lab Kits



Includes an assortment of shield materials in sheets, double-faced pressure-sensitive tape for easy assembly, and other shielding products for wire and cable applications. A.C. Magnetic Probe, Model EP-101A is optional, and included for use with DVM or oscilloscope to measure field intensities and attenuation ratios.

Kit enables technical professionals to create evaluation samples by accumulating layers of shielding materials (CO-NETIC® and/or NETIC®) until desired attenuation is achieved, thus establishing minimum material requirements to save costs in final design. With our hands-on Lab Kit, your design is easily and quickly evaluated and accommodated.

Gaussmeters



Three-axis, hand-held, A.C. Gaussmeters. Range: 0.1 to 599 mG. Bandwidth: 30 to 300 Hz.

An excellent tool for locating and quantifying A.C. magnetic fields. Field mapping provides before and after measurements to validate shield effectiveness and calculate attenuation ratios. Two models available.

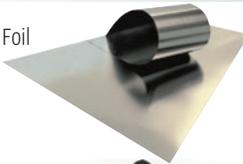
Zero Gauss Chambers



Fabricated from high permeability CO-NETIC® AA alloy in a series of two or more concentrically spaced magnetic shields. Several stock sizes available and any configuration of custom chambers available.

Scientific, industrial and commercial applications include testing, research, calibration of instruments and product manufacture.

Sheet and Foil Alloys



MuMETAL®, CO-NETIC® and NETIC® alloys are available from stock in sheet, foil and continuous strip. CO-NETIC® AA is available as Perfection Annealed for high permeability.

Available worldwide to distributors, contract fabricators, OEMs, and end-users. We offer quick-turn shearing and slitting to your specifications. Our trademarked brands are field proven, and most commonly used in walls, rooms, enclosures and custom fabricated magnetic shields.

Photomultiplier Shields



Over thirty standard sizes and any combination of custom shields available.

CO-NETIC® magnetic shields provide significant attenuation of magnetic fields, improving amplification characteristics of photomultiplier tubes. Effective shielding is ensured over wide range of field intensities.

Magnetic Field Evaluator Probes



Used with DVM or oscilloscope to determine A.C. magnetic field sources and intensities. Also, measures attenuation of magnetic shields.

Enables technical professionals to specify proper gauges of CO-NETIC® and NETIC® alloys, to form prototype shields.

Wire and Cable



INTER-8® Weave of #24 AWG wire provides superior attenuation over twisted pair. Available unshielded, or with braided CO-NETIC® shielding and outer insulation in PVC or ETFE.

Unique interlocking weave of current-carrying conductors is field proven in many applications to effectively reduce radiation that generates interference fields, more than twisted pair. INTER-8® is the only commercially available cable with braided CO-NETIC® shielding.

Conduit and Sleeving



SPIRA-SHIELD Flexible Conduit and Braided Sleeving, both made of CO-NETIC® alloy, are exclusively available from Magnetic Shield Corporation. CO-NETIC® spooled wire is available in #36 AWG and #22 AWG for custom fabrication of braid.

Flexible conduit provides high permeability magnetic shielding and greater attenuation for sensitive cables and conductors in electrical construction and OEM applications. Braided sleeving provides superior flexibility, is lighter weight than conduit and replaces wasteful foil wrap methods.

Room Shielding, Walls and Enclosures



Custom-designed to fit user needs, shielding chambers and panels of all sizes are constructed of MuMETAL® and/or CO-NETIC® AA Perfection Annealed sheet and foil. RF shielding may also be easily incorporated into these designs.

Protecting sensitive equipment, controls and personnel from external magnetic interference can assure optimum performance, safety and extend apparatus life-cycle. Practical and durable solutions to problems of magnetic interference in laboratories, medical facilities, and industrial and commercial environments.

