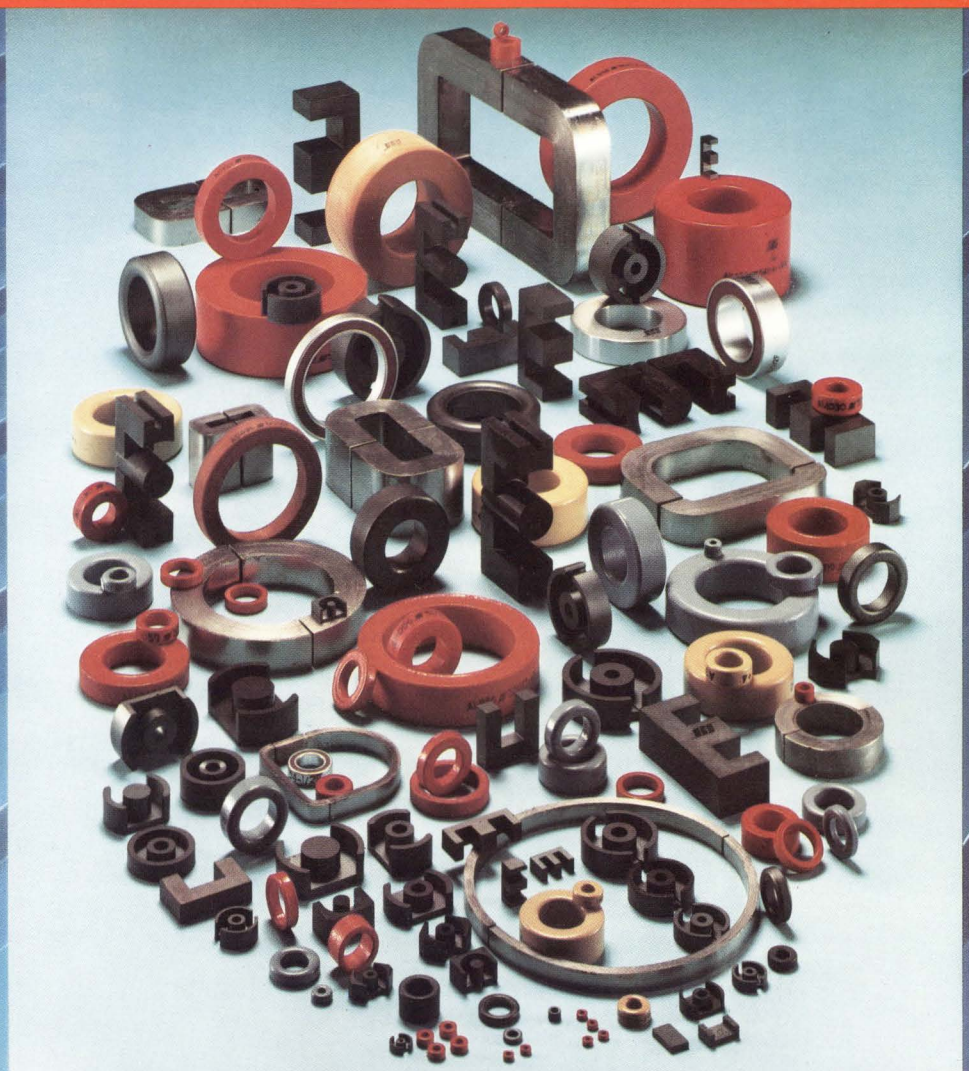
MAGNETICS®

Division of Spang & Company

FOR HIGH-TECH APPLICATIONS . . .



. . . THE BROADEST RANGE OF MAGNETIC CORES FROM A SINGLE SOURCE

MAGNETICS

A SINGLE MAGNETIC CORE SOURCE FOR ALL HIGH-TECH APPLICATIONS

- **Broadest Line Available**
  Materials
  Geometries
  Sizes
- **Guaranteed On-Time Deliveries**
  On-line computer
  Vast semifinished inventory
  Two manufacturing locations
- **Design Assistance**
  Software programs - transformer/inductor design
  Application engineering

Since 1949, Magnetics, a division of Spang & Co., has been a leading manufacturer of "soft" magnetic materials and components supplied world-wide to the electronics industry.

We specialize in research, design, and production of a broad range of high-quality magnetic cores for applications such as chokes, inductors, filters, transformers, and power supply components for end use in telecommunications, space, military, computer, medical, and other electronics systems.

Offering a comprehensive range of materials, components, and geometries, Magnetics provides the designer with an extensive selection from which he can specify and order magnetic materials that precisely meet his needs—from a single source! No other core supplier has such a complete line.

All components manufactured by Magnetics are process-controlled from alloying of raw materials to producing finished cores. This total in-house capability, coupled with a "Zero Defects" Quality control program, assures the user that his high-tech applications will be performance guaranteed. Our unexcelled service includes expert engineering design assistance, software package recommendations, and finished parts inventories to satisfy both prototyping or volume deliveries.

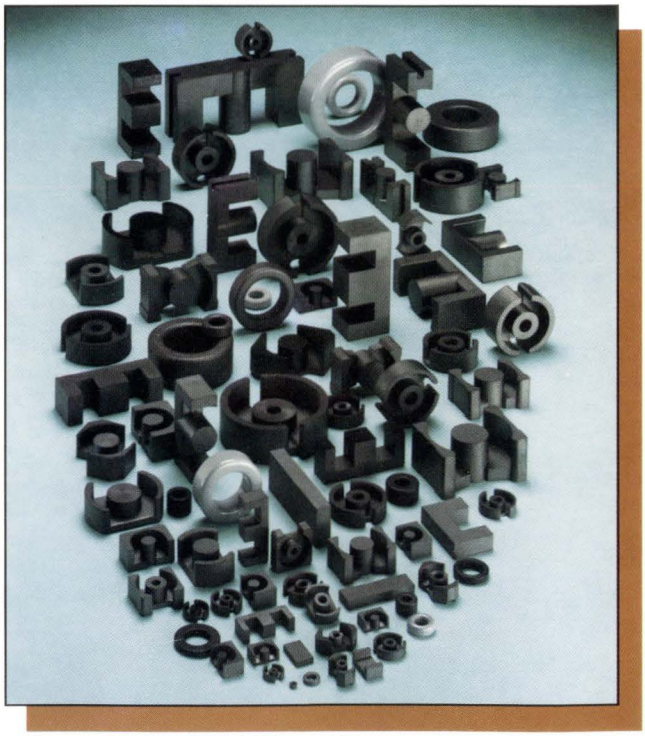
FERRITES

Ferrites are ceramic structures made from high purity oxides of manganese, zinc, and iron. They are pressed, fired, and machined to meet requirements. They can be used over a wide frequency range, having a high electrical resistivity and low eddy current losses, and are used in magnetic circuits for both low level and power applications. For most favorable combinations of low volume, low cost, high Q, and good time/temperature stability, ferrites are considered the best choice for applications in frequencies from 10 kHz to 2 MHz.

Power ferrites, available in seven permeabilities (1500 to 15,000), offer low core losses and high flux capability, and are suitable for high power/high temperature operation.

For low level applications, cores come with linear temperature characteristics in permeabilities of 750, 1400, and 2000, or flat temperature characteristics in a 2300 permeability material. For filter applications, cores are gapped to standard inductance factors.

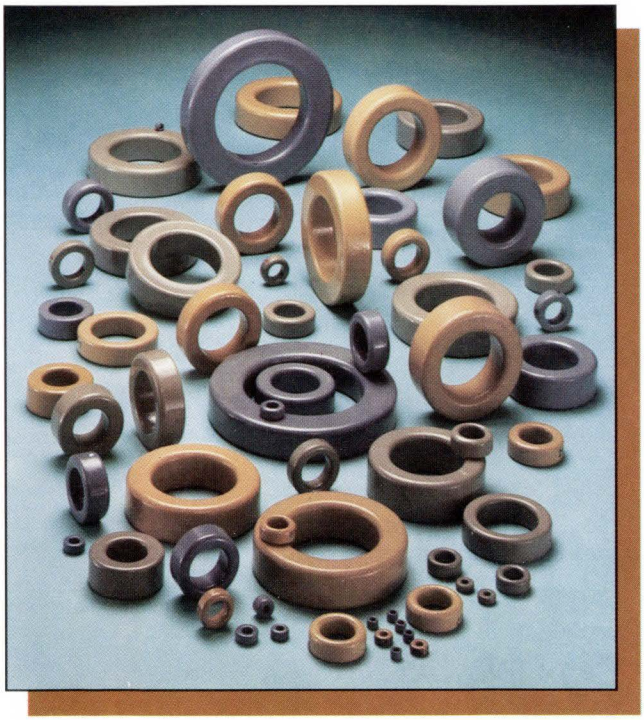
Standard geometries include E, I, and U cores: EC, ETD, PQ, RM, and slab-sided cores; toroids and pot cores. Special shapes can be machined.



MOLYPERMALLOY, HIGH FLUX and KOOL Mμ® POWDER CORES

Molypermalloy powder (MPP) cores are a distributive air gap type and have many outstanding characteristics—high resistivity, low hysteresis and eddy current losses and excellent inductance stability under both dc and ac conditions.

MPP cores are ideal where high Q, high inductance stability, and moderate coil cost are required. Below 300 kHz, they are preferred for high Q filters, loading coils, resonant circuits, and RFI filters. Made in ten permeabilities (14 to 550) with guaranteed inductance limits of ±8%, sizes range in ID's from .070″ to 1.9″ and OD's



from .14″ to 3.1″. Standard cores include both unstabilized and temperature stabilized (−65°C to +125°C) types.

High Flux powder cores, made in 6 permeabilities (60 to 160), have a saturation flux density of 15,000 gauss, compared to 7,000 gauss for MPP cores. They are ideal for in-line noise filters where inductors must support large ac voltages without core saturation occurring. In filter inductors, High Flux cores provide high energy storage.

For high frequency output inductors, low cost KOOL Mμ cores (4 permeabilities—60, 75, 90, 125) offer up to 80% reduction in core losses over powdered iron.

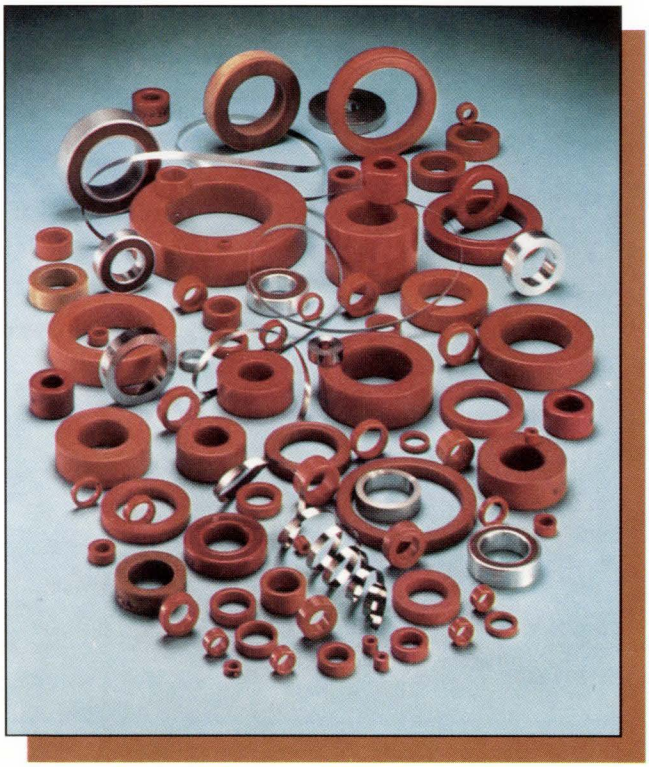
MPP, High Flux, and KOOL Mμ cores are excellent for uni-directional drive applications such as pulse or fly back transformers.

TAPE WOUND CORES and BOBBIN CORES

Tape wound cores are made from high permeability magnetic strip alloys (.0005″ to .014″ thick) of nickel-iron (80% or 50% Ni), silicon-iron, cobalt-iron, and amorphous metals. Respective tradenames are Permalloy 80, Orthonol®, Magnesil®, Supermendur, and METGLAS®. These cores have one or more desirable characteristics: high permeability, low core losses, high squareness B-H loops, high flux densities and square or round B-H loops.

Protective cases include phenolic, nylon, aluminum, and epoxy coated (sealed) aluminum boxes. Silicon-iron cores may be supplied unboxed or epoxy encapsulated. Tape cores are produced as small as .375″ in ID, to more than 20″ in OD, in over 1,000 sizes.

Bobbin cores are miniature tape cores made from ultra-thin (.000125″ to .001″ thick) nickel-iron strip (80%



Ni or 50% Ni) wound on non-magnetic stainless steel bobbins. Covered with protective caps and epoxy coated, bobbin cores are made as small as .050″ in ID and widths of .032″.

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CUT CORES

These cores are ideal for applications where low core loss is needed and core saturation is undesirable.

Supermendur (50 Co/50 Fe) "C" and "E" cores offer up to 30% reduction in weight over conventional 3% silicon-iron core designs in power transformers at frequencies up to 1500 Hz.

Permalloy 80 (80 Ni/20 Fe) "C" cores are ideal up to 25 kHz for output transformers of high frequency, high power inverters. Other uses are high power pulse transformers, high frequency inductors, and low loss current transformers.

Orthonol (50 Ni/50 Fe) "C" cores have core losses about half those of silicon-iron C cores of the same material thickness. Orthonol is especially suitable for power transformer operation at flux densities to 10,000 gauss, and frequencies to 8 kHz.

METGLAS Alloy 2605-SC cores offer low losses to 100 kHz at flux densities comparable to 50 Ni/50 Fe cores.

MACHINED FERRITES and CUSTOM COMPONENTS

Magnetics offers unique capabilities in the design and manufacture of specialized components fabricated from magnetic materials in many sizes and shapes.

Ferrites can be pressed in block form and then machined into intricate shapes. Where large sizes are required, it is possible to assemble them from two or more smaller machined or pressed sections; the variety of sizes and shapes is limitless.

Without sacrificing magnetic properties, many operations can be performed on ferrites, while maintaining strict dimensional or mechanical tolerances:

Surface grinding	Hole drilling
Cutting, slicing, slotting	Special machining
ID and OD machining	Assembly of smaller parts

Standard catalog items can also be modified, as needed, to fit your requirements.

Once your prototypes are approved, our ferrite department will be happy to quote tooling costs and quantity pricing.

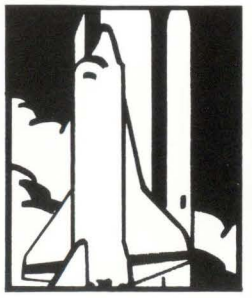
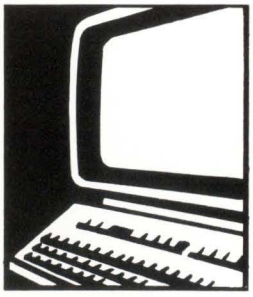
In addition to machined ferrites, components for custom applications include unusual core configurations, both cut and uncut, from strip as thin as 1/8 mil, or from stacking and bonding of stamped parts. Various shapes can also be pressed from powders and then sintered and/or annealed.

When special alloys are needed, components can be made from custom-blended alloys processed through the Spang Specialty Metals Division.

MAGNETIC CORE SELECTION

APPLICATIONS	TAPE CORES	BOBBIN CORES	CUT CORES	MPP CORES	KOOL Mμ, HIGH FLUX CORES	FERRITE CORES
Chokes			X	X	X	X
Common mode noise filters						X
Converters	X	X				
Current transformers	X		X			X
Delay lines						X
Electronic ballasts				X	X	X
Electronic transformers	X	X	X	X	X	X
EMI/RFI filters				X	X	X
Ground fault interrupters	X					X
High frequency counters		X				
Inductors - SMPS				X	X	X
Inductors - high Q filters				X		X
In-line filters				X	X	X
Inverters	X	X				
Load coils				X		X
Magnetic amplifiers	X	X				
Magnetometers		X				
Memory cores		X				
Noise filters				X	X	X
Oscillators	X	X				
Power factor correction				X	X	X
Power transformers	X		X			X
Proximity devices						X
Pulse transformers		X	X		X	X
Reactors	X					
Regulators	X					
Saturating transformers	X	X				
Static magnetic devices	X	X				
Switching regulators	X	X	X	X	X	X
Timers		X				
Wide band transformers						X




Magnetics district sales offices are located strategically throughout the U.S., and representatives are situated in most foreign countries. Please call or write for more information or for a visit by one of our sales personnel.

Other Spang & Co. divisions include:

SPANG TECHNOLOGY CENTER, Butler, PA, supports the various Spang divisions in research, development, and product process improvements. The facility boasts metallurgical, chemical, and ceramic laboratories in addition to processing and special instrumentation areas.
Of key importance to the center are pilot production facilities that duplicate existing production of major manufacturing areas.

SPANG POWER CONTROL, Sandy Lake, PA, produces AC and DC power supplies in power ranges of 500 watts to 5000 kilowatts, dry type transformers, and SCR devices for sensing, monitoring, controlling, and processing applications.

SPANG SPECIALTY METALS, Butler, PA, manufactures mill products by powder metallurgy and vacuum melting processes. Products include a variety of magnetic and electronic alloys in billet, plate, strip, or foil configurations.

TODAY'S KIDS, Booneville, AR, manufactures metal and plastic toys which are marketed in the U.S. through large retail chains.

MAGNETICS LITERATURE

General Information
- TID-100—Power Transformer and Inductor Design
- PS-01 Cores for Switched Mode Power Supplies
- SR-1A Inductor Design in Switching Regulators

Ferrites
- FC-601 Full line Ferrite catalog
- FC-509 SFP—Short form Ferrite catalog
- CG-01—A Critical Comparison of Ferrites with other Magnetic Materials
- MMPA Standard Specifications for Ferrite Pot Cores
- MMPA Standard Specifications for Ferrite U, E, I Cores

Tape Wound Cores
- TWC-400—Tape Wound Core Manual
- Lesson 1—How to Reduce Magnetic Circuit Size and Response Time
- Lesson 2—Designing Magnetic Circuits for High Frequencies
- Lesson 3—How to Design Magnetic Circuits for Extreme Temperature Environments
- Lesson 4—Environmental Effects on Magnetic Characteristics of Tape Wound Toroidal Cores
- Form 113—Shortcuts in Selection of Tape Cores for Magnetic Circuitry
- TWC-S2—How to Select the Proper Core for Saturating Transformers
- TWC-S3—Inverter Transformer Core Design and Material Selection
- TWC-S5—Composite Tape Cores
- SR-4—Mag Amp Control in Switching Regulators
- RC-1—Magnetic Cores for Ground Fault Detectors

Bobbin Cores
- BC-303—Bobbin Core Catalog

Cut Cores
- MCC-100—Nickel-Iron, Supermendur and METGLAS Cut Cores Catalog

Powder Cores
- MPP-303—Molypermalloy and High Flux Powder Core Design Manual
- KMC-02—KOOL Mμ® Powder Cores

Specialty Metals
- MPB-2—Spang Specialty Metals General Products Brochure
- SMA-7 Magnetic Shielding Materials
- SMA-7A MUMETAL®

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