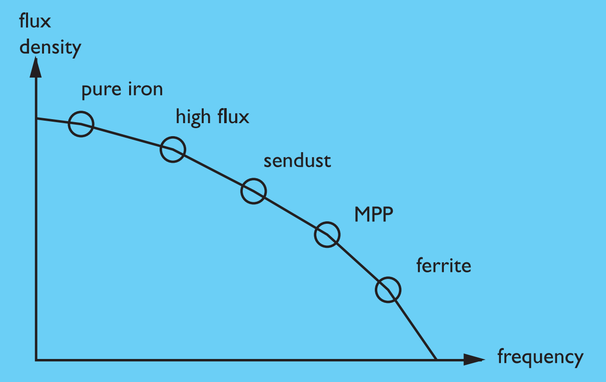
Metal alloy powder materials - General information

FERROXCUBE introduces a whole new type of materials in addition to our broad range of ferrites ! These are metal alloys, in the form of powders in an organic, insulating matrix. They can be divided into 3 classes : High Flux (Fe 50 % - Ni 50 %), Sendust (Fe 85 % - Si 10 % - Al 5 %) and Molybdenum Permalloy Powder (MPP) (Ni 80 % - Fe 20 %, with some Mo substitution). All have a higher saturation flux density than ferrites and lower losses than pure iron powder. Whereas High Flux has the highest saturation flux density and thus the highest flux carrying capability, MPP has the lowest losses and thus the highest operating frequency. Further, Sendust is the most economical of the three. The effective permeability of an insulated powder is much lower than the intrinsic permeability due to the distributed air gap. Depending on powder density, a range of permeabilities is produced in all classes, varying from 14 to 550 in the case of MPP. The permeability value is produced with a relative accuracy of ± 8 %. Special MPP materials with temperature stability and linear temperature variation are available.

	HIGH FLUX	SENDUST	MPP	UNIT
coating colour	khaki	cream	gray	
permeability range	14-160	26-125	14-550	
Curie temperature	500	500	460	°C
thermal conductivity	0.08	0.08	0.08	W.K^{-1}.mm^{-1}
linear expansion coefficient	5.8×10^{-6}	10.8×10^{-6}	12.9×10^{-6}	K^{-1}
density for 125µ	8200	7000	8700	kg/m^3

FERROXCUBE introduces its powder grades in a wide range of ring cores, with industry-standard sizes varying from 3.56 x 1.78 x 1.52 mm to 77.8 x 49.2 x 15.9 mm. All cores are covered with an insulating layer of epoxy coating, withstanding 500 Vrms between core and winding. Core sizes below 5 mm outer dimeter have no insulation guarantee. Larger core sizes can be supplied on request with higher insulation voltage. The maximum steady-state operating temperature for this coating is 200 °C. Colour indicates material class, while code and batch number are printed on the side of the coating. Alternatively, cores can be coated with Parylene to reduce the mechanical friction. Parylene is transparent, has insulation voltage 300 Vrms and maximum steady-state operating temperature 130 °C. For short moments (soldering), it can withstand temperatures of 200 °C.
Tolerance on A_L is equal to permeability tolerance ± 8 %.



Relative position of materials with respect to application conditions.

Other permeabilities have the following density relative to 125µ :

MATERIAL PERMEABILITY	RELATIVE DENSITY	MATERIAL PERMEABILITY	RELATIVE DENSITY
14µ	0.80	125µ	1.00
26µ	0.86	160µ	1.02
60µ	0.94	200µ	1.03
75µ	0.96	300µ	1.03
90µ	0.97	550µ	1.04

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A YAGEO COMPANY

New metal alloy powder grades in toroids

FERROXCUBE
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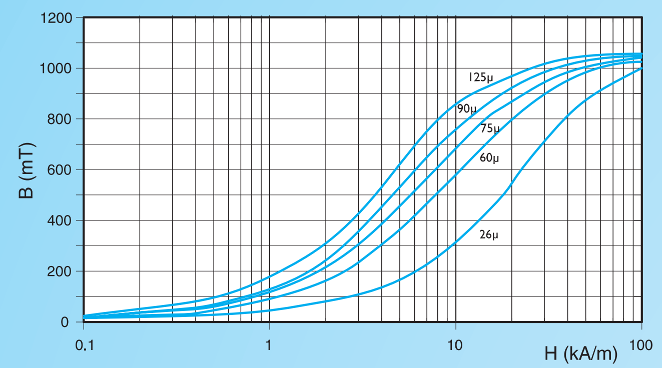
Sendust - Material Characteristics

Sendust (Fe 85% - Si 10% - Al 5%)

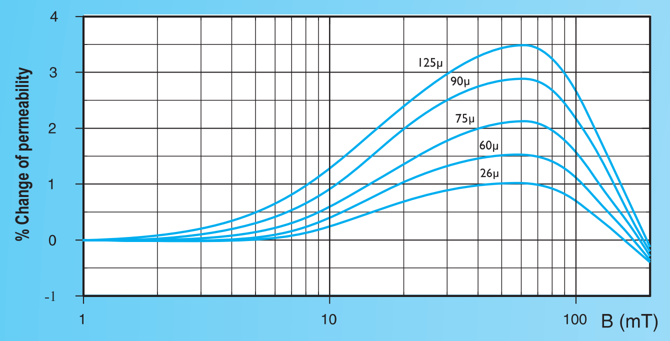
- Good core loses
- Good DC bias charactericts
- Very economical
- Perm: 26 - 60 - 75 - 90 - 125

Type number: TX23/7.6-S7-A19

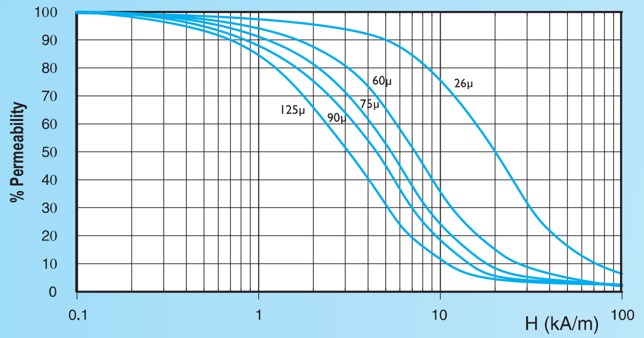
- A19: AL 19nH
- S7: Sendust material
- 23/7.6: outside diameter and height in mm
- **T**oroid Epo**X**y coated



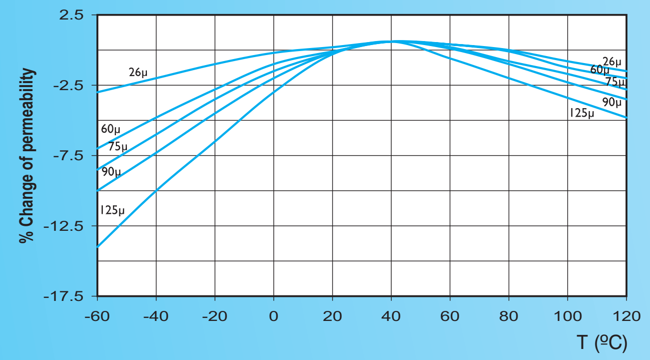
Typical B-H curves.



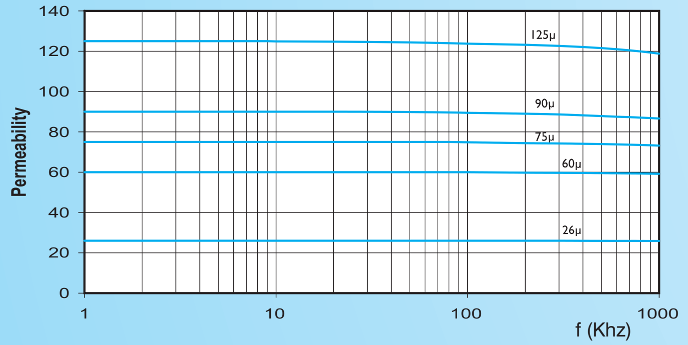
Amplitude permeability as a function of peak flux density



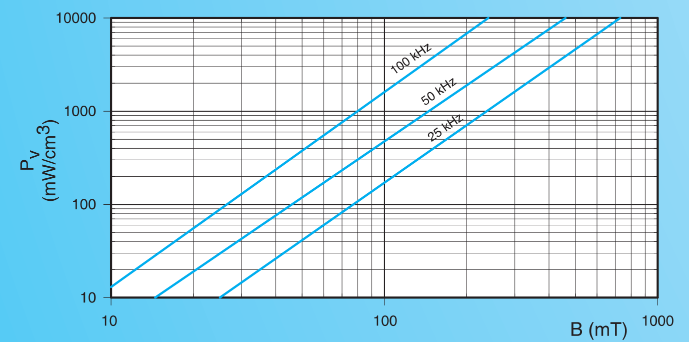
Incremental permeability as a function of magnetic field strength



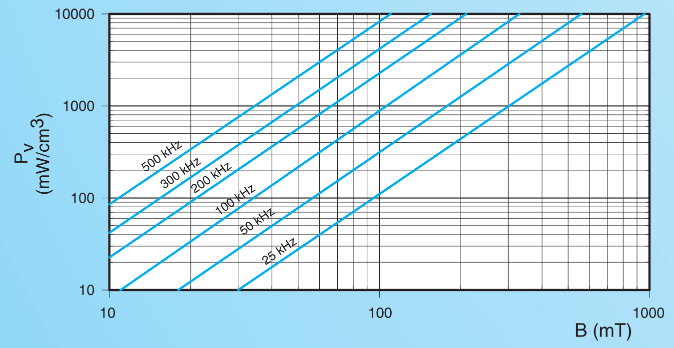
Initial permeability as a function of temperature respect 25°C



Initial permeability as a function of frequency



Specific power loss as a function of peak flux density with frequency as a parameter for material 26µ



Specific power loss as a function of peak flux density with frequency as a parameter for materials 60, 75, 90 &125µ

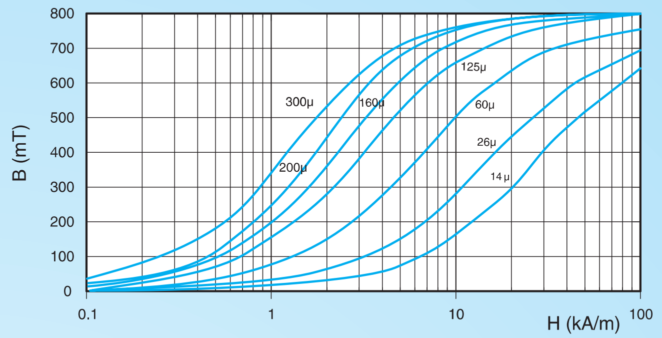
MPP - Material Characteristics

Mpp (Ni 80% - Fe 20%, with some Mo substitution)

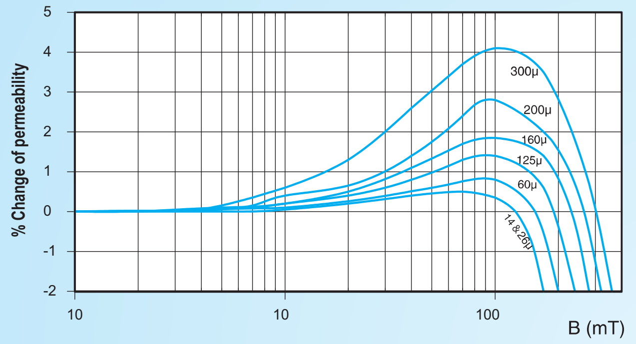
- Lowest core losses
- Excellent stability under DC Bias conditions
- Ultra stable temperature response
- Good frequency range
- Perm: 14 - 26 - 60 - 125 - 160 - 200 - 300

Type number: TX13/4.8-M2-A134

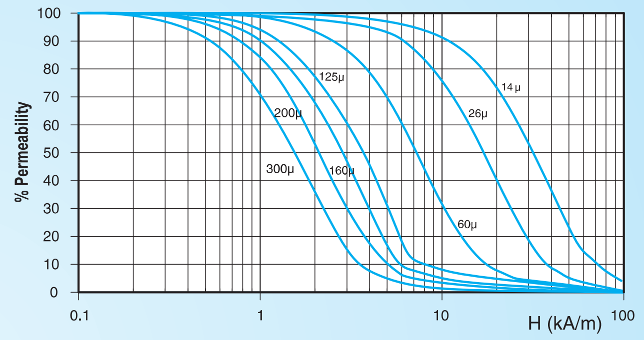
- A134: AL 134nH
- M2: Mpp material
- 13/4.8: outside diameter and height in mm
- **T**oroid Epo**X**y coated



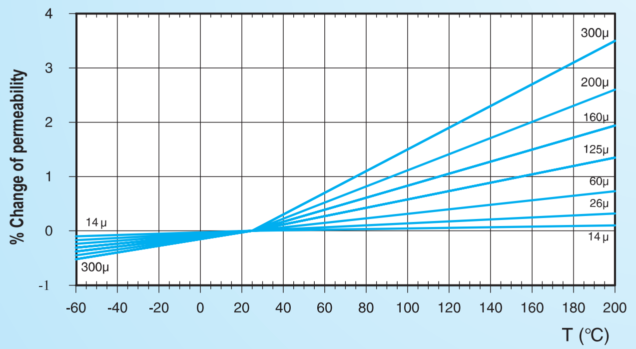
Typical B-H curves.



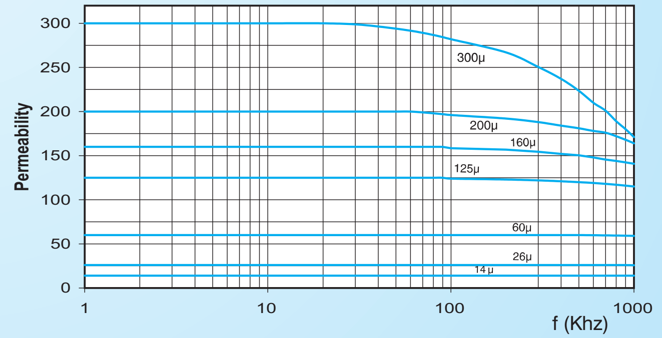
Amplitude permeability as a function of peak flux density



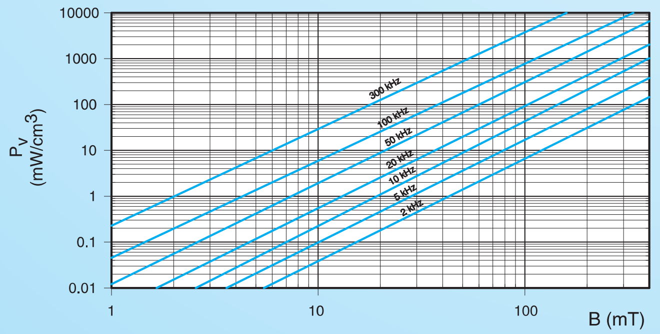
Incremental permeability as a function of magnetic field strength



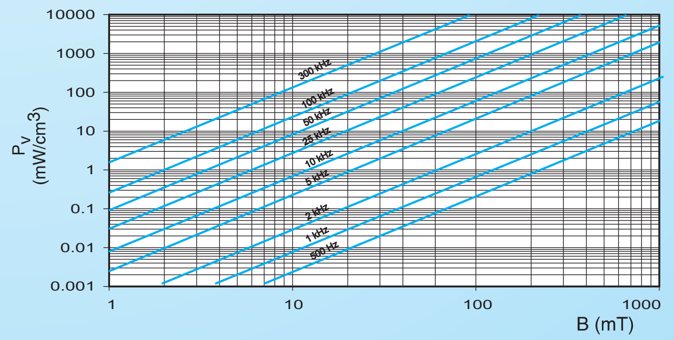
Initial permeability as a function of temperature respect 25°C



Initial permeability as a function of frequency



Specific power loss as a function of peak flux density with frequency as a parameter for material 14µ



Specific power loss as a function of peak flux density with frequency as a parameter for material 300µ

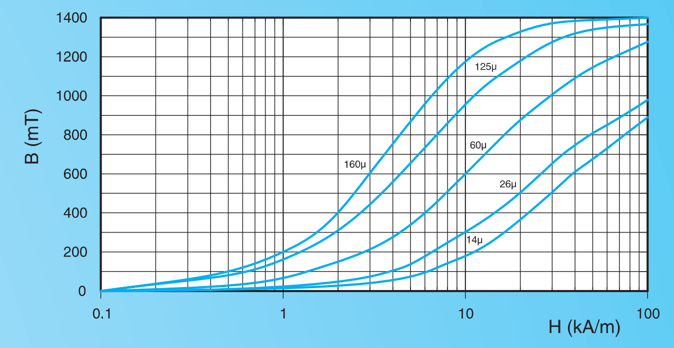
High Flux - Material Characteristics

High Flux (Fe 50% - Ni 50%)

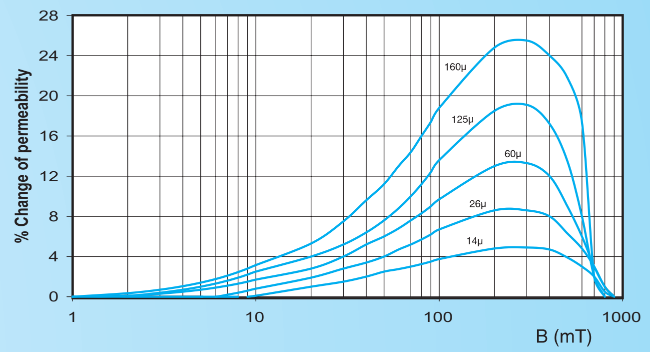
- Relative low cores losses
- Highest biasing capability
- High saturation flux density
- Perm: 14 - 26 - 60 - 125 - 160

Type number: TX40/15-H2-A168

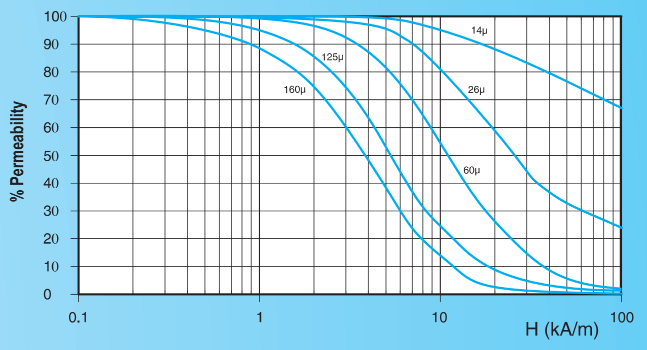
- A168: AL 168nH
- H2: High Flux material
- 40/15: outside diameter and height in mm
- **T**oroid Epo**X**y coated



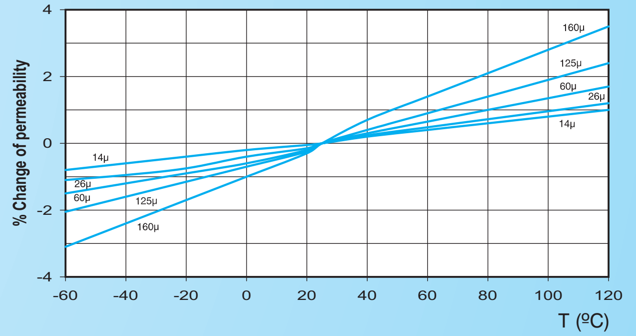
Typical B-H curves.



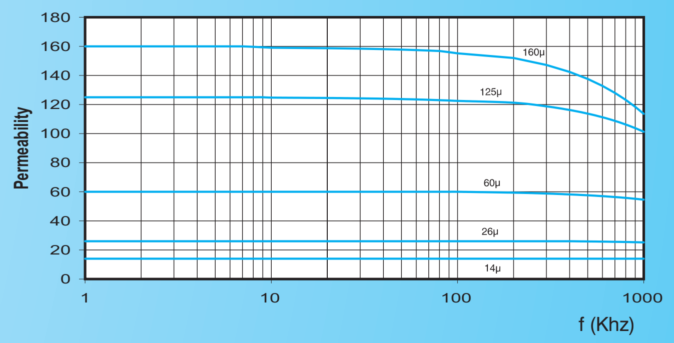
Amplitude permeability as a function of peak flux density



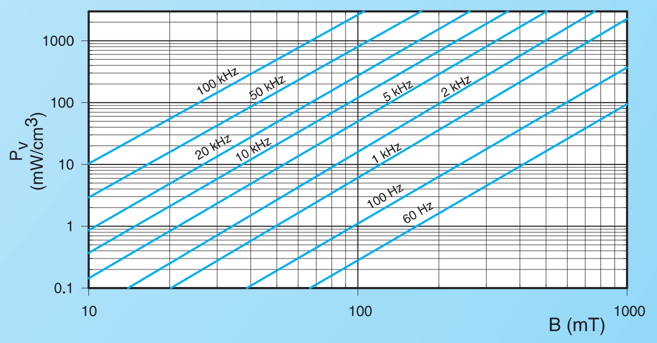
Incremental permeability as a function of magnetic field strength



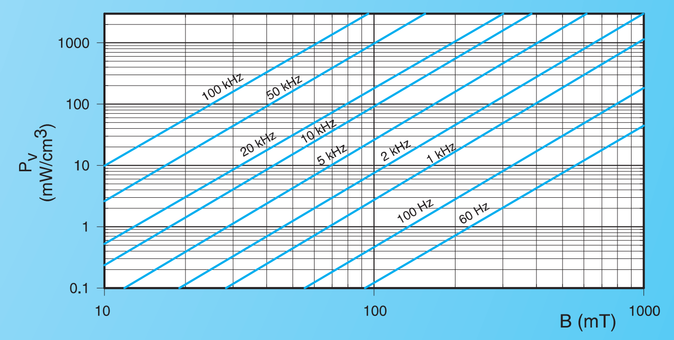
Initial permeability as a function of temperature respect 25°C



Initial permeability as a function of frequency



Specific power loss as a function of peak flux density with frequency as a parameter for material 14µ



Specific power loss as a function of peak flux density with frequency as a parameter for material 160µ