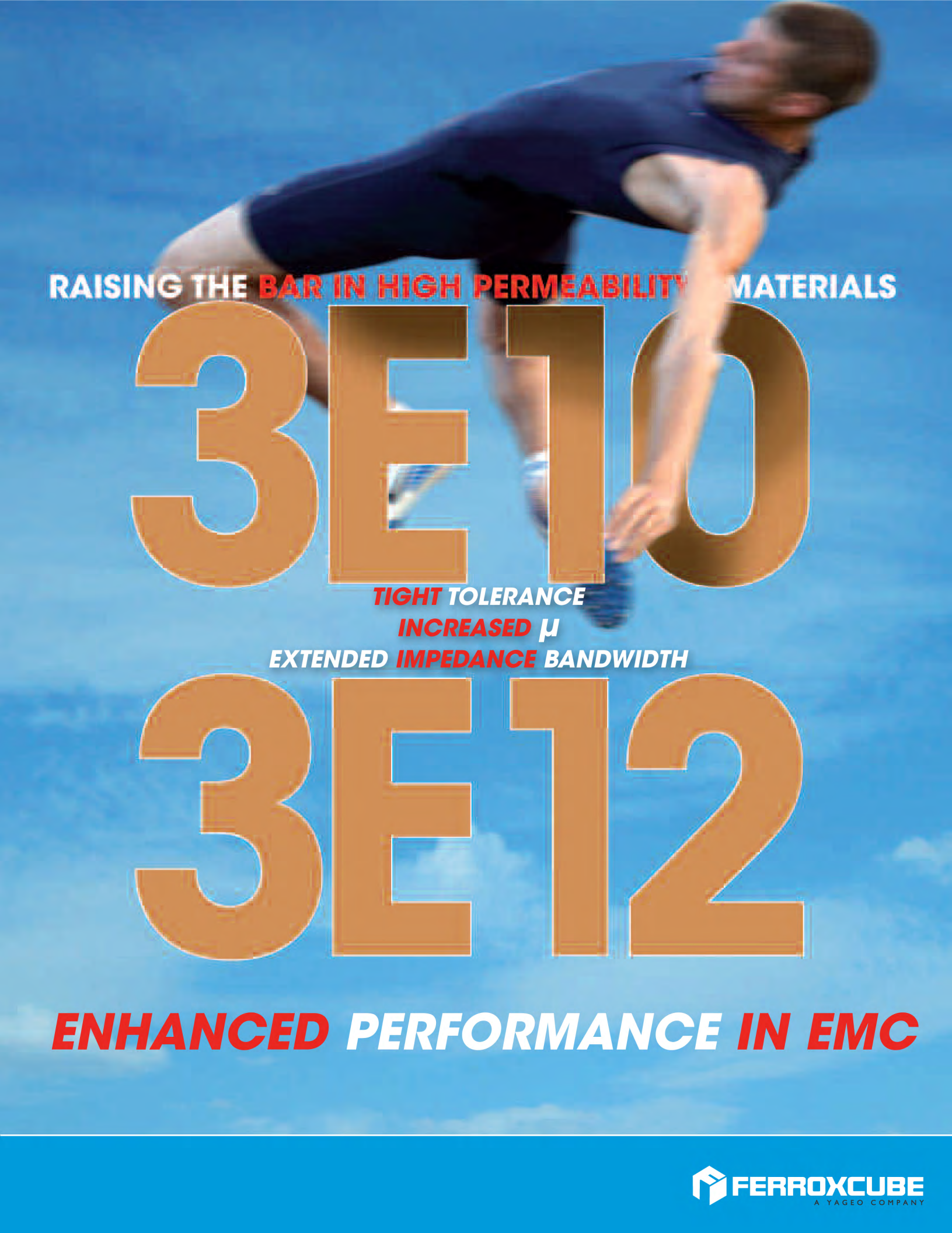
RAISING THE BAR IN HIGH PERMEABILITY MATERIALS
3E10
TIGHT TOLERANCE
INCREASED μ
EXTENDED IMPEDANCE BANDWIDTH
3E12
ENHANCED PERFORMANCE IN EMC
FERROXCUBE
A YAGEO COMPANY

3E10

3E10: The best process control with extended bandwidth

A high permeability material optimized for use in wideband transformers as well as EMI-suppression filters

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.25 mT	10000 ± 20%	
B	25 °C; 10 kHz; 1200 A/m	≈ 460	mT
	100 °C; 10 kHz; 1200 A/m	≈ 270	
$\tan\delta/\mu_i$	25 °C; 30 kHz; 0.25 mT	$\leq 5 \times 10^{-6}$	
	25 °C; 100 kHz; 0.25 mT	$\leq 20 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 0.5 \times 10^{-3}$	T^{-1}
ρ	DC; 25 °C	≈ 0.5	Ωm
T_C		≥ 130	°C
density		≈ 5000	kg/m^3

3E10 achieves the tightest tolerance in your final product (only 20%), so winding and potting operations have less impact on the permeability. This means better control of the final characteristics of the component in you specific application.

Extensive material research at Ferroxcube has lead to the improvement in permeability stability with frequency, which in turn creates reduced magnetic losses and higher common mode impedance over a wider frequency range.

3E10 is the choice when looking for a robust manufacturing process and maximum frequency stability.

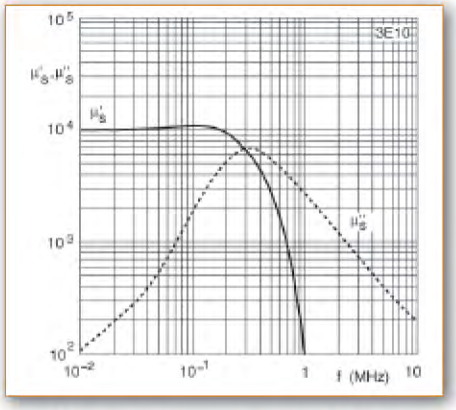

Fig. 1: Complex permeability as a function of frequency

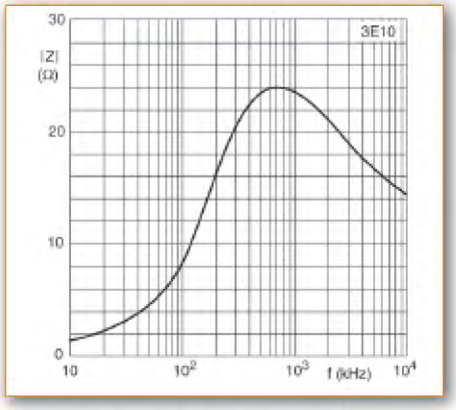

Fig. 2: Impedance as a function of frequency, measured on a toroid Ø25xØ15xh10

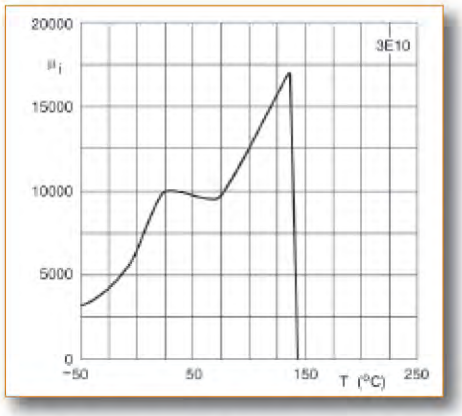

Fig. 3: Initial permeability as a function of temperature

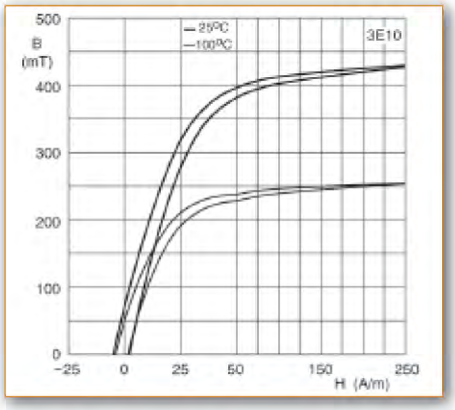

Fig. 4: Typical B-H loops

3E12

3E12: The highest impedance and permeability

A high permeability material optimized for use in wideband transformers as well as EMI-suppression filters

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.25 mT	12000 ± 30%	
B	25 °C; 10 kHz; 1200 A/m	≈ 470	mT
	100 °C; 10 kHz; 1200 A/m	≈ 290	
$\tan\delta/\mu_i$	25 °C; 30 kHz; 0.25 mT	$\leq 7 \times 10^{-6}$	
	25 °C; 100 kHz; 0.25 mT	$\leq 25 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 0.5 \times 10^{-3}$	T^{-1}
ρ	DC; 25 °C	≈ 0.5	Ωm
T_C		≥ 130	°C
density		≈ 5000	kg/m^3

3E12's superior high permeability results in:

- Ability to reduce the size of the toroid or the number of windings, and thus less DC resistance.
- Increased coupling between windings resulting in a decrease of differential mode impedance.

3E12 is your choice if you want the best inductor performance and the highest impedance.

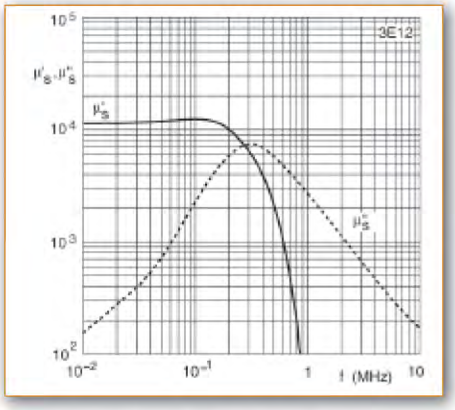

Fig. 5: Complex permeability as a function of frequency

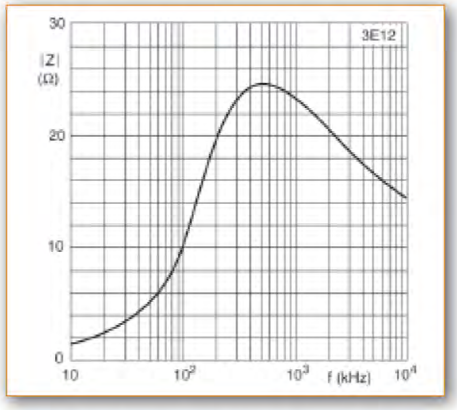

Fig. 6: Impedance as a function of frequency, measured on a toroid Ø25xØ15xh10

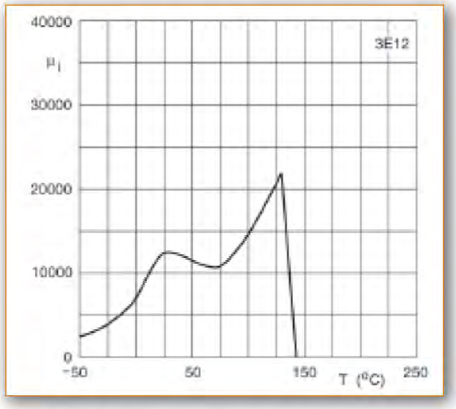

Fig. 7: Initial permeability as a function of temperature

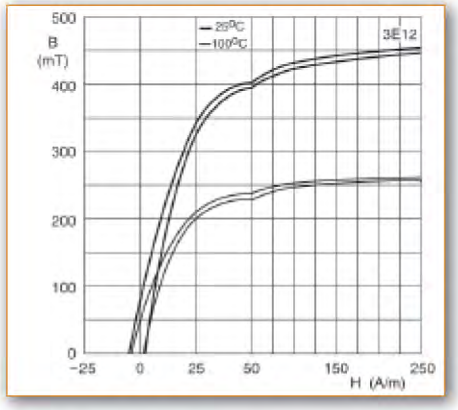

Fig. 8: Typical B-H loops

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