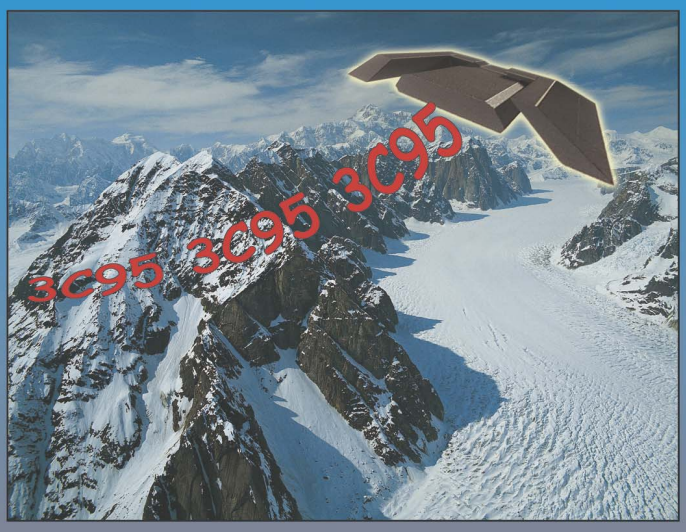
3C95

Ferroxcube's all temperature power ferrite



FERROXCUBE
A YAGEO COMPANY

3C95 - The standard for broad temperature range applications

FERROXCUBE introduces a new power material , suitable for a broad temperature range : 3C95. The power loss density versus temperature curves are very flat. Losses vary little from room temperature to over 100 °C. This holds for various conditions of frequency and flux density. Traditionally, power materials are optimized at 100 °C for use in in-house equipment. Special materials are developed for other temperature ranges. This doesn't solve the problem for other applications where large variations in operating temperatures occur, for which the new material 3C95 has been developed. Typical examples are electronic lighting ballasts and automotive electronics mounted in the neighbourhood of the engine.

FERROXCUBE has started the introduction of the new material in regular core shapes for power applications, such as E, U, EFD, ER, EQ, PQ, RM and planar shapes. Samples are available on request. The loss level competes with most current Ferroxcube grades and so does the saturation level. See below a comparison of the loss density of different materials with that of the new material 3C95. A complete specification can be found on the next page.

Applications for 3C95 can be found in various areas :

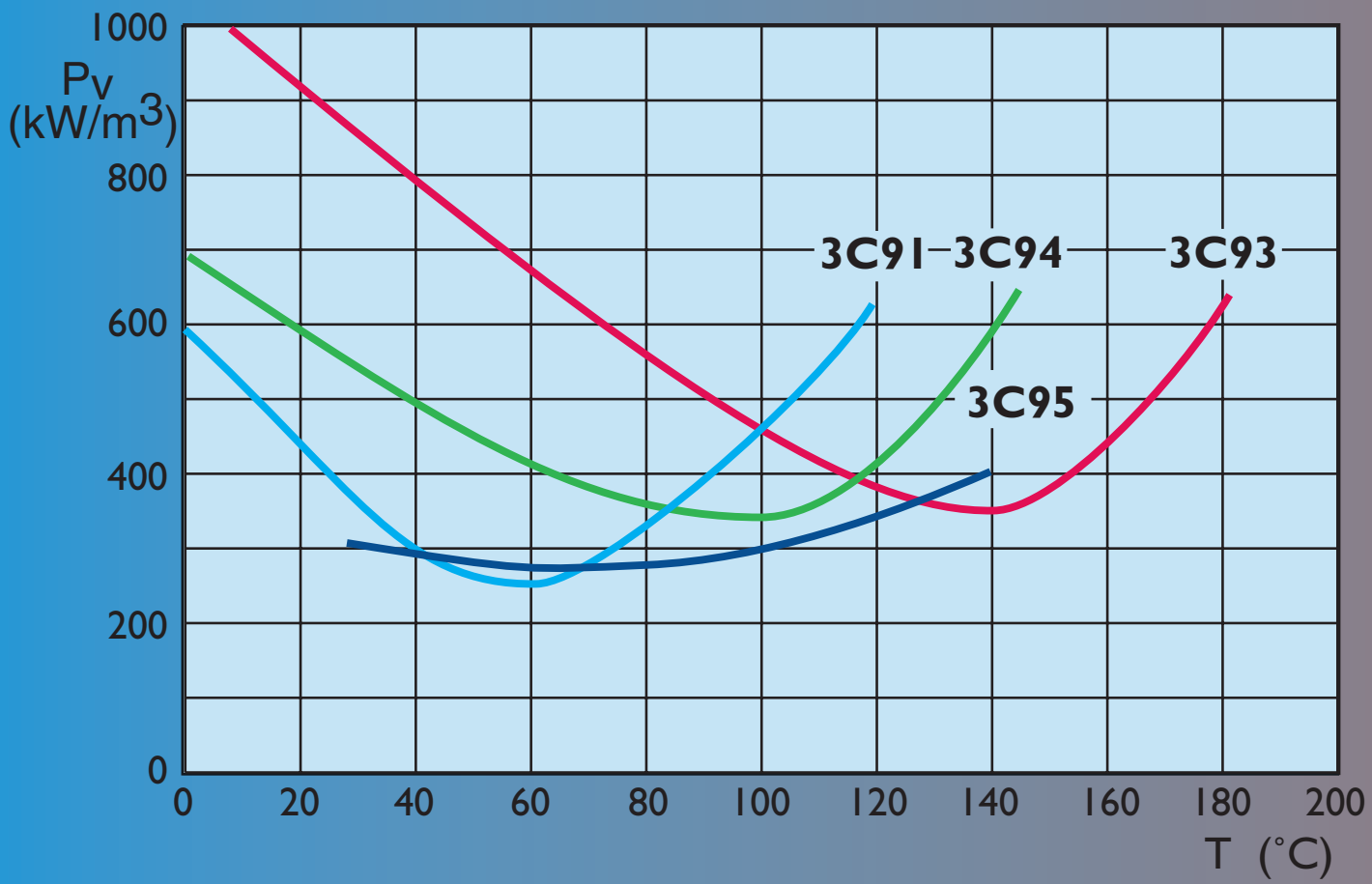
- Automotive electronics near the engine. Temperatures vary from ambient temperature at motor start, which might be below zero, to far over 100 °C for a steadily running motor. More power applications appear at the horizon like dc/dc converters for 42 V systems in hybrid vehicles.
- Electronic lighting ballasts

Also here temperatures vary from ambient temperature at ignition (think about outdoor lighting) to far over 100 °C for steady state operation in certain discharge lamps. Especially for a hot restart, conditions can be challenging.

- Mobile / handheld devices

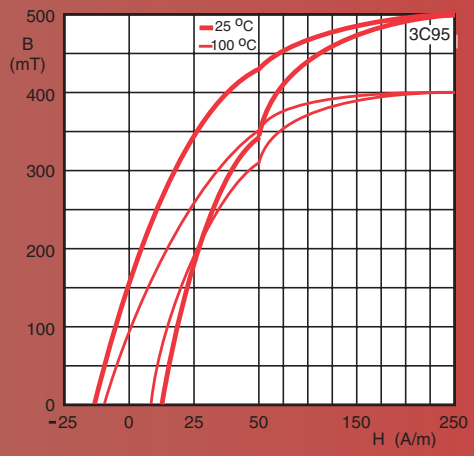
Working temperatures have to be lower than in stand alone equipment and lie more around 50 - 60 °C. This range is perfectly included in 3C95 working conditions.

Power losses at 100 kHz and 200mT as a function of temperature compared

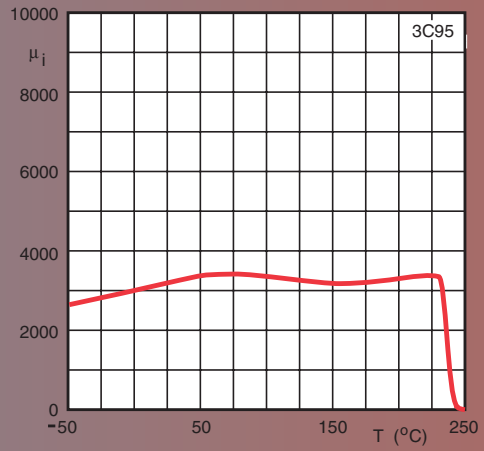


3C95 - Material Characteristics

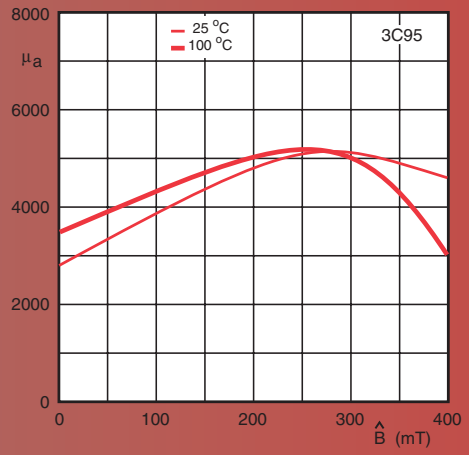
	CONDITIONS	VALUE	UNIT
μ_i	25 °C, ≤ 10 kHz, 0.25 mT	3000 ± 20 %	
μ_a	100 °C, 25 kHz, 200 mT	≈ 5000	
B	25 °C, 10 kHz, 1200 A/m 100 °C, 10 kHz, 1200 A/m	≈ 530 ≈ 410	mT
P_v	25 °C, 100 kHz, 200 mT 100 °C, 100 kHz, 200 mT	≈ 350 ≈ 290	kW/m^3
ρ	DC, 25 °C	≈ 5	Ωm
T_c		≥ 215	°C
density		≈ 4800	kg/m^3



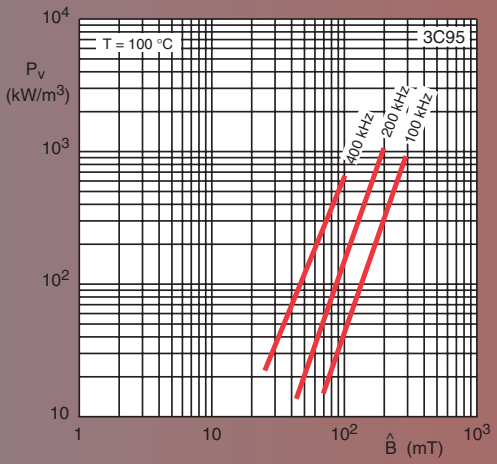
Typical B-H loops.



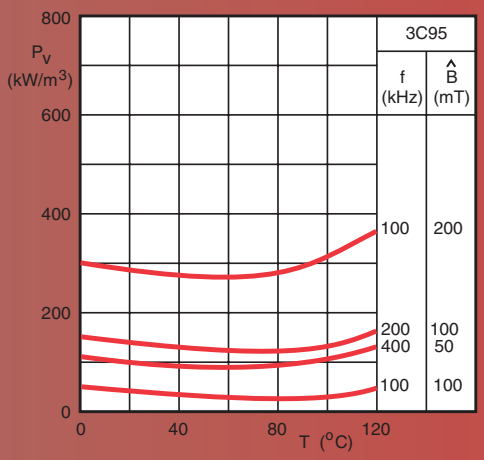
Initial permeability as a function of temperature



Amplitude permeability as a function of peak flux density



Specific power loss as a function of peak flux density with frequency as a parameter



Specific power losses for several frequency/ flux density combinations as a function of temperature