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Power Ferrite

Measuring Setup EMMA 2.1

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Introduction

Formerly a Philips Components company FERROXCUBE now belongs to Yageo Corporation, one of the world's strongest suppliers of passive components.
As a leading innovator in ferrite-ceramic technology, we build on our Philips magnetic components heritage to offer a broad range of soft ferrite cores. We also offer extensive design-in support including application information and software to help equipment manufacturers optimize their new designs.
Our research and development laboratories located in Eindhoven, The Netherlands, can build on 50 years' experience in ferrite technology. This means we know everything about ferrite cores but also about what's needed to make and test them.
The specifications and tolerances required for the industrial equipment are generally very demanding and critical. We bring along with us the experience gained by building our own measuring setups since the early years of the ferrite industry.

We offer a complete power ferrite measuring setup as it is used in all Ferroxcube facilities. This will contribute to a standardization of measurement methods throughout the ferrite industry.

The EMMA 2.1 is a computer controlled test unit fully equipped to characterise all important magnetic properties of soft ferrite cores in a wide temperature range. It is a vital tool in research and development as well as for sample testing in production.

The following magnetic properties of power ferrite cores can be measured with the "Standard Application Package":

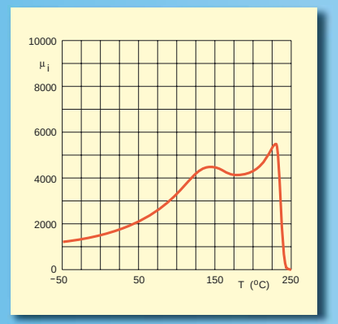
- Power loss density (P_V)
- Peak flux density (B_p)
- Amplitude permeability (μ_a)
- Curve of B-H-loop

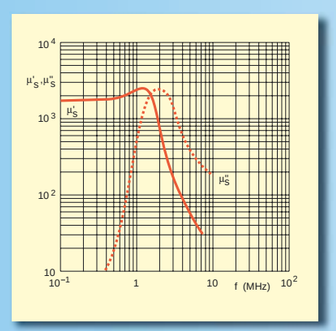
To measure power losses the Digitizing Oscilloscope Method is used. Voltage on and current through the DUT are sampled in a few cycles of the BH-loop to avoid self-heating of the ferrite.

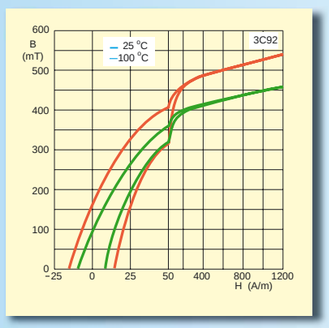
With the "Supplement Application Package" the system has the following measuring capabilities:

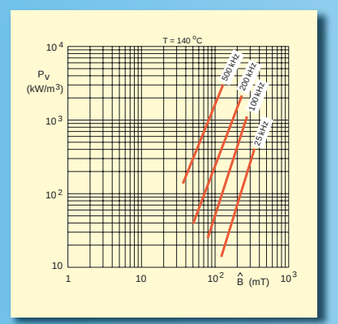
- Initial permeability (μ_i)
- Temperature factor (α_F).
- Disaccomodation factor (D_F)
- Inductance factor (A_L)
- Temperature curve of permeability
- Loss factor ($\tan\delta/\mu_i$)
- Hysteresis material constant (η_B)
- Resistivity (ρ)
- Curie temperature (T_c)

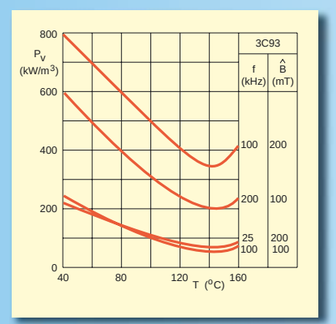
Contact us to find out more!

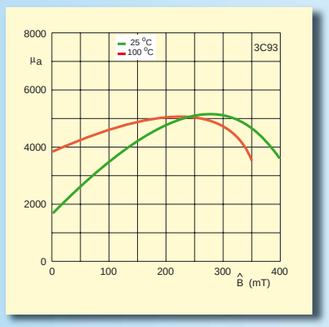


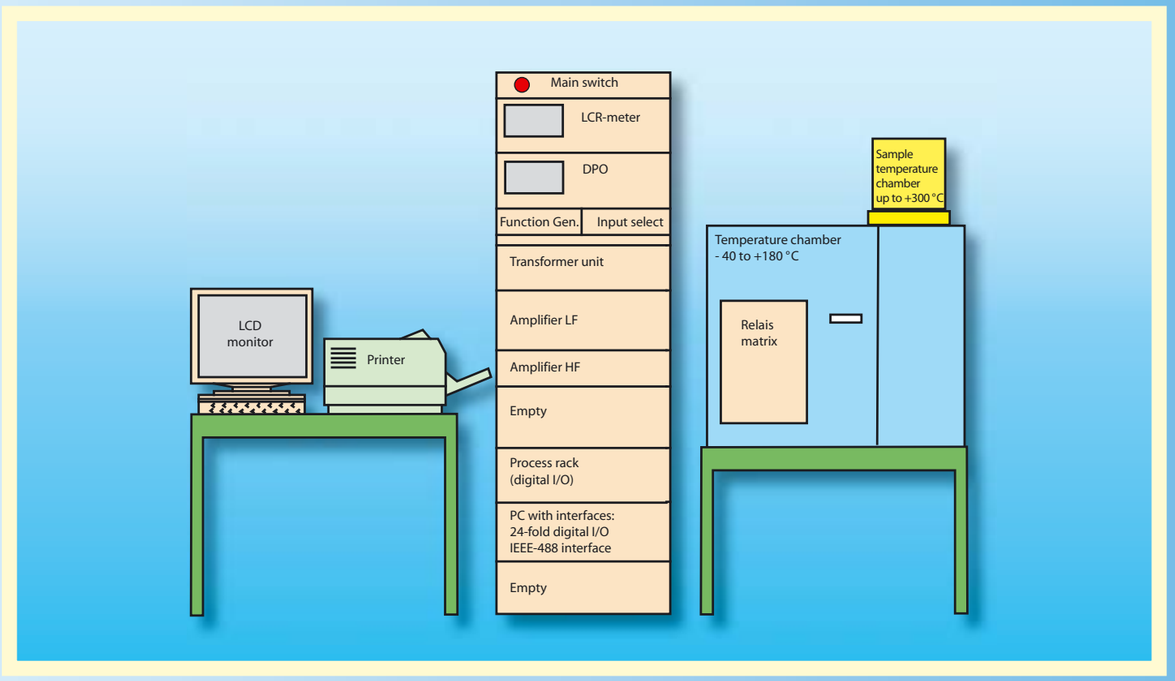












Description of setup

The EMMA 2.1 is built in a Rittal cabinet with:

- LCR-meter 0 - 1 MHz
- Function generator 20 kHz - 10 MHz
- Digital Processing Oscilloscope (DPO)
- LF and HF amplifier
  frequency range: DC - 3 MHz
  voltage: 0 - 100 V peak
  current: 6 A peak
  (depending on load and frequency)
- Temperature chamber with 16-fold 4-pole relay matrix
  temperature range: –40 to 180 ºC.
- Sample temperature chamber
  temperature range: up to 300 ºC
- Industrial PC with I/O boards, modem and LAN.

The system will be delivered with:

- Flat LCD monitor and printer
- Windows 2000 and application software
- Remote diagnostics
- Set of certified test and calibration cores.
- Drawing package and documentation.

Measuring range and accuracy

Power loss: 10 kHz - 3 MHz
Voltage (B): ± 1%
Current (H): ± 1%
Temperature around 100 ºC: ± 1%

The accuracy of the loss measurement depends on the DPO, the inductance value of the DUT and the applied voltage (see graph).

General technical data

Connected power:

Cabinet:
110/230 V, 50/60 Hz, 1.0 kW

Temperature chamber:
110/230 V, 50/60 Hz, 2.4 kW

Environment temperature:
15 - 25 °C (climate control needed)

$$\Delta P = \frac{V^2}{L} \cdot 33 \cdot 10^{-3}\ (mW)$$