

CERAMIC PROCESSING

FERRITES

- The Ferrite Lab was set up to support ITT Magnetic Materials Division in Harlow, and was managed in the 1960s by **Ray Glaister** and then by **Eric Macklin**.
- Work was concerned with optimizing the composition and processing (particle size, pressure of compaction, time of sintering etc) of material for use in magnetic components.
- Work was also carried out to develop square plates for machining into the **waffle-iron store** and also optimizing the particle size and resin coating of the 'ink' (powder) used in the **Ferrodot high-speed printer**. For the latter, **John Poole** played a key role and **Norman Allen** optimized the conditions for the plating of the drum used to transfer the powder to the paper.
- Work on ferrites ceased around 1966.

THERMISTORS

- When work on ferrites finished, work started on investigating negative temperature coefficient (NTC) thermistors for ITT Thermistor Division, initially under **Eric Macklin** and then from 1968 under **Peter Graves**.
- The material used for the ntc thermistor was nickel manganite (NiMnO_3), and initial work was concerned with the effect of various oxide additions on the stability of the thermistor.
- A need arose through a MoD requirement for a high stability ntc thermistor, and a novel process was developed by **Peter Graves**, whereby a mixture of nickel and manganese oxalates was precipitated from an aqueous solution of their analytical grade acetates. Decomposing the oxalate precipitate produced a fine oxide mixture, which could be pressed and sintered to form the thermistor.
- In order to optimize the sintering process of the pure but very fine oxide mixture, **David Whysall** was seconded to the Institute Josef Stefan (IJS) in Ljubljana, Yugoslavia, to access its ceramic expertise on handling uranium dioxide for nuclear applications. (Note: access to

IJS was part of a deal brokered between ITT Components and ISKRA, a Yugoslavian components manufacturer).

OTHER WORK ON CERAMICS

- At some stage in the Ferrites Lab, an equipment and process for the injection moulding of ceramics was developed. *<No other details are known, but samples are available>*
- During the work on thermistors research was carried out into the decomposition of various temporary organic binders (e.g. diethyl ether, methyl cellulose, ethyl cellulose and PVA) used to bind ceramic powder during pressing. This work assisted Thermistor Division in choosing an improved binder to cornstarch it had used for years and wallpaper adhesive!

Pete Graves, August 2014