

New Product Range: 8th Generation of Hirst's award-winning Pulsed Field Magnetometers (PFM) released.

Release date 31.3.23

Falmouth, UK, 31.3.23, Hirst Magnetic Instruments Ltd, is pleased to announce the launch of the latest range of its award-winning Pulsed Field Magnetometer (PFM) products, the 8th generation of Hirst PFM, the PFM08. These characterise high-performance magnets and magnetic materials which are used extensively in Electric Vehicles and Wind Turbine generators. The PFM08 series is suitable for both development and production quality control. This range of PFMs is available from 31.3.23.

The PFM08 range of magnet characterisation/magnetometer can accurately measure the magnetic hysteresis curve and extract key values for all magnetic materials (Ferrite, NdFeB, SmCo, AlNiCo, plastic bonded, and coated magnets). The PFM can apply a field of up to 10.5 Tesla so even the most coercive materials and highest grades of Neodymium (NdFeB) magnets can be accurately measured. Traditional permeameters cannot measure these high coercivity materials due to pole piece saturation limitations.

Hirst PFMs perform a full 4 quadrant measurement of the magnetic hysteresis loop of the material using their integral magnetiser and demagnetiser. This means they can work with magnetised and unmagnetised samples without the need for an external magnetiser.

As well as larger sample sizes, greater levels of temperature control, and improved measurement repeatability the PFM08 generation of machines also includes a new Hirst algorithm called Self Demagnetization Field Function, SDFF™, that accurately generates an open-to-closed circuit mapping (O2C™). The SDFF™ maps the PFM open-circuit measurement onto a closed-circuit, permeameter-like measurement. The SDFF™ is part of a powerful magnetic material characterisation software suite called HirstLab v2.0. Thus, many customers will no longer need a permeameter, a magnetiser and demagnetiser - a single PFM is all that is needed as the PFM08s gives permeameter-like measurements for even the highest grades of magnets.

Hirst have worked in collaboration with the National Institute of Metrology (NIM) in China, the University of Exeter, and the UK National Physics Laboratory (NPL) on PFM development over a number of years. The HirstLab v2.0 software and Hirst proprietary SDFF™ technology has been implemented in collaboration with the National Institute of Metrology (NIM), Beijing, as part of a contract for the first PFM08-30 MT placed by NIM.

The first generation of Hirst industrial PFM was launched in 1998 and the company won an Institute of Physics business award for the PFM and SDFF™ technology in 2020.

Dr Robin Cornelius, Chief Technology Officer commented "This product launch is the culmination of years of research, development, and collaboration for SDFF™ technology and builds on Hirst's 25-year pioneering leadership in PFM technology. It's an exciting time for Hirst with the world rapidly expanding in electric vehicles and green energy generation, where magnets are the future."

Range overview

The entry level PFM in the new range is the PFM08-10 AT (Ambient Temperature) which can rapidly test samples in the range of 5-10mm diameter and 5-20mm height and can accurately measure cylinders, cuboids and arbitrary shaped samples. The fast sample test time as fast as 2 minutes make this PFM ideal for production testing and quality control in the magnet production supply chain. The PFM08-10 HT (high temperatures) features precision sample temperature control around the temperature set point of $\pm 0.2^{\circ}\text{C}$ to ensure exceptional repeatability and supports sample measurement from ambient to 200°C for development and quality control applications in both the magnet supply chain and for magnet users wishing to verify high temperature performance critical in high performance applications.

The PFM08-30 model can work with much larger magnet sample sizes, 5-30mm diameter and 5-30mm in height. Samples are automatically loaded from the sample table into the PFM test chamber for greater measurement repeatability. As sample volume is larger, this model has a much more powerful 45kJ internal magnetiser/demagnetiser capable of generating 10.5T peak fields. The high temperature (HT) version supports precision sample measurement from ambient to 200°C for development and quality control in both the magnet supply chain and for the magnet user. The larger sample size meets the requirements of magnets used in EV rotors allowing accurate quality control for batch testing of production magnets for the key performance metrics including high temperature coercivity. PFM measurements are non-destructive which is particularly important for larger, more expensive high-performance magnets. The PFM08-30 MT is aimed at magnet materials research and development and the MT model is capable of testing magnet samples down to -40°C to over 200°C with the highest level of repeatably and accuracy in the PFM08 range.

About Hirst

Hirst operates globally and are world leaders in PFM (Pulsed Field Magnetometer) magnet measurement technology, magnetic measurement equipment, magnetisers, and demagnetisers.

Over the last 60 years Hirst have provided magnetisers, gaussmeters, fluxmeters and custom magnetising fixtures to aerospace, magnet manufacturing, consumer products, medical equipment production, audio equipment such as loudspeakers, recycling and waste management and electric motor manufacturers. Hirst has two manufacturing facilities in the UK located in the Falmouth in the southwest of England and is privately owned.

<https://hirst-magnetics.com>

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