Hirst Magnetic Instruments PFM 12 Pulsed Field Magnetometer is one of the range of Pulsed Field Magnetometers suitable for non destructive testing of industrial permanent magnets.

Designed for industrial use, the PFM 12 offers fast, non contact full loop measurements of all industrial magnets, in industrial shapes, with unparalleled speed and precision.

The PFM 12 can measure manually loaded virgin permanent magnets, measure their full loop characteristic and deliver a demagnetised magnet in a fraction of the time taken by any other technique. The results are immediately available at the PC (including PASS/FAIL information). The PFM21 extracts key magnetic data automatically.

The PFM 12 system is controlled via a comprehensive and extensive windows based application with extensive data base facilities storing full data on every single measurement. Data can be exported in a variety of formats.
Hirst Magnetic Instruments PFM 12 is a pulsed field magnetometer capable of the non destructive testing of industrial permanent magnet materials (in their industrial shapes) to measure their full loop characteristic in a rapid, non contact, open circuit process. The process needs no premagnetisation of magnets (unlike permeameters/hysterisographs) and delivers a demagnetised magnet at the end of the rapid measurement process.

Hard Ferrite, Plastic Bonded NdFeB and Sintered 270/95h NdFeB.

Suitable for all materials including bonded and sintered:- Ferrite, NdFeB, Sm2Co17 and SmCo5.

Operation

The magnet to be tested is loaded into the sample holder and inserted into the PFM measurement chamber. At the press of a button The PFM 12 then proceeds to measure the full loop characteristics and displays the results immediately with all critical parameters automatically extracted.

The measurement process involves generating large "pulsed" magnetic fields. It is these pulsed magnetic fields that drive the magnet around its major hysteresis loop. Suitably placed pickup coils detect the applied field and the magnets response to the applied field. These two signals are fed via the integrators to the PC where they are processed to form JH and BH loops representing the characteristics of the material.

For an eddy current effect corrected measurement two measurements pulses are applied at different frequencies. These two measurements are used to deduce the eddy current effect and generate a eddy current free hysteresis loop. This is known as the "f/2f" process.

Software

All Hirst PFM systems are supplied with comprehensive software. The software uses the familiar Windows environment to give enormous power, a simple and effective user interface.

All the PFM's functions are accessible through the user interface as well as extensive data processing and storage features.

Software features

- Familiar windows environment
  - Comprehensive Windows software is provided. The software follows similar design to many other applications that run on Microsoft Windows™ creating a familiar environment and reducing the time to learn the software.
Measurement database for 100% traceability
A measurement database stores every measurement made on the system ensuring 100% traceability and making it impossible to lose a measurement. A more traditional system of entering filenames is also available but it is not a requirement to use it. Especially useful for industrial QC and similar applications. The database could be redirected from a local file to any ODCB data source including SQL servers allowing measurements to be logged over a network.

Sample database for easy cataloguing
Details of sample bulk properties, dimensions and required measurement parameters can be stored. When the sample details are recalled, the measurement options are automatically set up based on the parameters stored with the sample. The sample details are also used in the processing of data to produce JH and BH loops that are calibrated to unit volume.

Automatically extracts critical measurement parameters
HcJ, HcB, BHMax and B, are all automatically extracted from every measurement and displayed separately along side JH and BH loops. Custom points can also be defined and used for pass fail checking.

Full digital processing
The software's data processing features in built digital filters to remove any noise from the signal, with a user definable corner frequency, as well as the advanced f/2f processor for eddy current correction of two different duration measurements of the same material.

Data export facilities
Comprehensive data export facilities allow data to be easily migrated to other software. Supporting clipboard operations data can be exported be simply clicking the mouse on the required trace and it is copied to the clipboard in a numerical format.

Full backup, including backup to CD
Measurements can be backed up to CD (subject to CD writer, optional). This is a fully integrated process to the software. A simple selection of the batch of measurements to be backed up is all that is required. The software takes care of the CD writing process. Data can easily be recalled directly from CD without restoring the data to the hard disk.

Full graphical display
The software can simultaneously display multiple loops either in one or separate window for easy comparison of measurements. Measurements available as hard copy with optional printer. Loops can easily be printed with a choice of data (JH,BH or both), with user definable extents.
## Specifications

<table>
<thead>
<tr>
<th>PFM Model</th>
<th>PFM 12/30mm/6.5/22kJ</th>
<th>PFM 12/40mm/4.5/22kJ</th>
<th>PFM 12/15mm/31/6kJ</th>
<th>PFM 12/5mm/51/6kJ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material Types</strong></td>
<td>Sm\textsubscript{2}Co\textsubscript{17}, SmCo\textsubscript{5}, NdFeB and Hard ferrite</td>
<td>NdFeB and Hard ferrite</td>
<td>Hard ferrite</td>
<td>NdFeB and Hard Ferrite</td>
</tr>
<tr>
<td><strong>System Parameters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum system energy</td>
<td>22 kJ</td>
<td>22kJ</td>
<td>6kJ</td>
<td>6kJ</td>
</tr>
<tr>
<td>Maximum working voltage</td>
<td>3 kV</td>
<td>3 kV</td>
<td>3kV</td>
<td>3kV</td>
</tr>
<tr>
<td>Cycle time</td>
<td>20 seconds per magnet</td>
<td>20 seconds per magnet</td>
<td>15 seconds per magnet</td>
<td>15 seconds per magnet</td>
</tr>
<tr>
<td><strong>Measurement method</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum applied field (H)</td>
<td>7.5 Tesla (5.96 MA/m)</td>
<td>5.8 Tesla (4.51MA/m)</td>
<td>3.9 Tesla (3.10MA/m)</td>
<td>6.4 Tesla (5.09 MA/m)</td>
</tr>
<tr>
<td>Maximum reverse field (H)</td>
<td>6.5 Tesla (5.17 MA/m)</td>
<td>4.5 Tesla (3.5MA/m)</td>
<td>3.0 Tesla (2.39 MA/m)</td>
<td>5.0 Tesla (3.98MA/m)</td>
</tr>
<tr>
<td><strong>Sample parameters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum sample diameter/width</td>
<td>30 mm</td>
<td>40 mm</td>
<td>15mm</td>
<td>5mm</td>
</tr>
<tr>
<td>Maximum sample height</td>
<td>30 mm Manual</td>
<td>30 mm Manual</td>
<td>15mm Manual</td>
<td>5mm Manual</td>
</tr>
</tbody>
</table>

Due to a process of continual improvement, Hirst Magnetic Instruments Ltd. reserve the right to change any specifications without notice.

Hirst Magnetic Instruments Ltd. also manufactures wide ranges of magnetic instruments, magnetisers, demagnetisers, precision demagnetisers and special magnetic systems.