

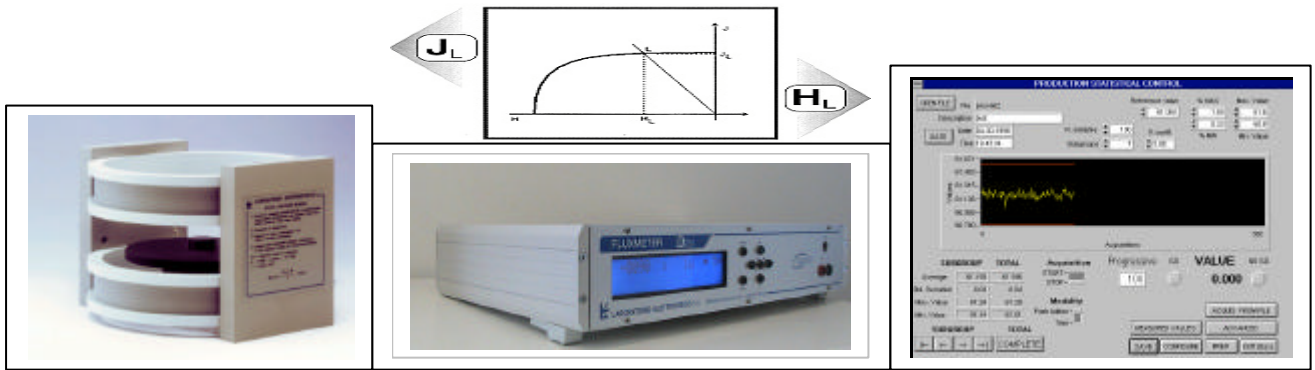


QC Magnets Test & Working Point

A very common use of the fluxmeter is for quality control. Using proper measuring system it's possible to determine the absolute properties of a given material using flux values. In many cases, however, it is sufficient to have comparative data. For example, to select a large number of magnets based on their residual induction, it is not necessary to measure and calculate each magnet B_r (for example using **Helmholtz coils**) but it is sufficient to know the flux value corresponding to acceptable minimum and maximum values and make a selection with these values.

The most common case is when the measuring system is directly introduced into the magnetisation coil. After magnetisation, removing the part from the coil a flux variation occurs and the fluxmeter reads it. The quality of a given magnet is therefore immediately checked. Various models of data collecting and data processing of data coming from the fluxmeter are available.

The software in use friendly and general is the **STATI-200**, produced by Laboratorio Elettrofisico, which allows on line and real time statistic control of magnetised parts (see figure below). The fluxmeter, connected with the coil, measures a magnetic flux. The values of flux are sent, automatically or manually, to the PC, where the acquisition program (see figure below) elaborates statistically the data.



MEASUREMENT OF J_L AND RESIDUAL INDUCTION: HELMHOLTZ COILS

The measure of working value J is performed with **Helmholtz coil** (see figure below). The measure is very simple:

1. Insert the connectors of the Helmholtz coils into the input jacks;
2. Place a magnet on the inside coil platform;
3. Reset the fluxmeter and remove the magnet.

The reading value of the fluxmeter is proportional to J_L of the material.

→ *Since ferrite and rare earth magnets have demagnetisation curve almost horizontal, this value is almost equal to residual induction value (B_r , or J_r).*

Laboratorio Elettrofisico produces different type of coils, standard and customized with different diameter, so that it is possible to measure magnets of all types and dimensions: **HMR32, HMR58, HMR100, HMR150**

B_L MEASURE

B_L value is related to H_L and J_L values. When these two magnitudes are determinate the B_L value is given by the formula:

$$B_L = J_L - \mu_0 \cdot |H_L| \quad \text{where } |H_L| \text{ is the } H_L \text{ absolute value.}$$

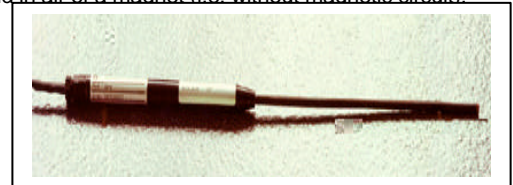
Magnet working point means either the value pair (H_L , B_L) or (H_L , J_L) of the demagnetisation curve, related to its magnetic condition (see figure nr. 4). The working point is due to the material and to the magnetic circuit where the magnet is located. Both measures of H_L and J_L can be performed with the fluxmeter and with one suitable coil.

H_L MEASUREMENT: POTENTIAL COILS

The measure of the demagnetising magnetic field is performed with potential coil.

Here below are some suggestions to perform the measure, please refer to the specific manual for additional details and for additional measures available with potential coils. Assuming to measure the demagnetising field in air of a magnet (i.e. without magnetic circuit):

1. Insert the connectors of the potential coils into the input jacks;
2. Place the end of the coil on one of the magnet surfaces;
3. Reset the fluxmeter and remove the coil from the magnet.



The reading of the fluxmeter is proportional, based on a given constant value of the coil, to the magnet H_L value and to its height. Laboratorio Elettrofisico produces three type of coils: **PM/S83, PM/S214, PM/S410**.