

Fluxmeter Test: Magnetic Flux Test

The total flux output of a magnet can be obtained by using a Fluxmeter (*figure 1*) connected to a Helmholtz coil (*figure 2*). The coil is actually a pair of coils with a known number of copper wire turns at a certain distance from each other. The resulting data in mVs, Weber, or Maxwells, can be interpolated to obtain an approximate value for Br or Bdi. When designing or purchasing a Helmholtz coil it is important to know the approximate size of the magnet being tested. The coil diameter should be at least three times the largest dimension of the magnet and the spacing between the two coils should be equal to their radius. *Figure 3* shows



Figure 1

a few examples of the coil size compared to a typical magnet to be measured in each coil. Another important factor to know is the coil constant. This, along with knowledge of the magnet volume, can be used to determine Br and other magnetic values. Fluxmeter measuring is a quick, repeatable, and reliable test. Unlike the Gaussmeter test, it is not overly sensitive to magnet placement.



Figure 2



Figure 3

The test procedure is simple:

A magnet is placed mid-space inside the coils and is pulled out so that the lines of flux from the magnet perpendicularly cross through the plane of one coil. The connected Fluxmeter (*figure 1*) will measure the induced voltage and provide data in mVs, Webers, or Maxwells. Newer Fluxmeters allow users to input the magnet volume and thus provide results in Tesla. Although the procedure is simple and results are highly repeatable, the operator must undertake certain steps.

1. Fluxmeters must be de-drifted. Although this is done by simply activating the unit's de-drift feature, the process can take from 5 to 15 minutes.
2. The magnet must be pulled out of the coil along the Z axis so that it's magnetic orientation is perpendicular to the plane of the coil (*figure 4*).

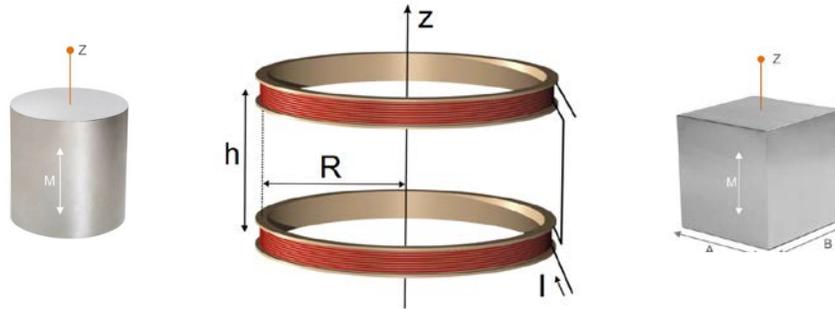


Figure 4

3. The Helmholtz Coil must be located for minimal outside magnetic interference. It is advisable to keep magnets at a proper distance from the coil and to avoid placing it on or near a metal surface. Even wearing a metal watch when testing can influence the measurement.

Fluxmeters can be connected to other measuring devices called Search Coils (*figure 5*). These are custom made fixtures utilizing sets of coils shaped in a way to provide output when a set of magnets are pulled out of the plane of the coil. This is helpful when the set of magnets form a closed circuit, as in a motor housing (*figure 6*). In that instance, the motor housing containing magnets is pulled vertically away from the fixture.



Figure 5



Figure 6

If you have any questions regarding the equipment, Helmholtz Coils, or testing procedure, please feel free to call or customer support team at 219-548-3799 or engineering@allianceorg.com