



Testing Magnets

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A test or combination of test methods should be based upon the criticality of the requirement, and the cost and ease of performing tests. Ideally, the test results should be able to be directly translated into a functional performance of the magnet. A sampling plan should be specified which inspects the parameters that are critical to the application. Sampling plans can be found in the MMPA 01-100 guidelines.

Hysteresis, Parameter, BH Curve

B-H curves describe the magnetic properties at a specific temperature. B-H curves may be plotted with the use of a parameter. In order to plot a B-H curve, a sample of a specific size must be used and then cycled through a magnetization/demagnetization cycle. This test is expensive to perform due to the length of time required to complete. The test is destructive to the sample piece in many cases, and is not practical to perform on a large sample of finished magnets. However, when magnets are machined from a larger block, the supplier may be requested to provide B-H curves for the starting raw stock of magnet material. The B-H test will essentially provide you the demag properties.

Total Flux

Using a test set up consisting of a Helmholtz coil pair connected to a Fluxmeter, total flux measurements can be made to obtain total dipole moments, and interpolated to obtain close estimates of B_r , H_c , BH_{max} . The inside diameter of the coils should be at least three times the largest dimension of the magnet for accurate results. The angle of orientation of the magnet can also be determined using this method. This is a quick, repeatable and reliable test, and one that is not overly sensitive to magnet placement within the coil.

Flux Density

Flux density measurements are made using a Gaussmeter and an appropriate probe. The probe contains a Hall Effect device whose voltage output is proportional to the flux density. There are two types of probes: Axial, which measures the flux parallel to the probe holder and Transversal, which measures the flux perpendicular to the probe holder. The position of the probe related to the magnet must be exactly the same between each sample. This can be simplified by using a fixing device.