

Mag-03 used in MRI Controlled Area Safety

Objectives

To increase worker safety within MRI suites and similar facilities by mapping magnetic field values and establishing proximity limits for ferromagnetic materials.

Instrumentation

- Mag-03MS1000 precision three axis fluxgate magnetic field sensor
- Spectramag-6 Data Acquisition Unit

Applications

Determination of safety parameters for equipment use and exposure risk within the MR environment.

Background

The strong magnetic field produced by MRI scanners raises safety issues with the proximity of ferromagnetic materials. Accordingly, medical devices and related equipment are marked with one of three definitions, depending on their suitability to be used within the 0.5mT (5 Gauss) field produced by the MRI diagnostic equipment. The limits of this field are marked on the floor around the equipment as a contour line.

The definitions are:

- MR Safe (there is no risk in taking the equipment within the 0.5mT line)

- MR Conditional (the equipment is safe within specific conditions, or has not been tested at all frequencies or gradients [the conditions for individual pieces of equipment are marked])
- MR Unsafe (the equipment poses a risk in all MR environments).

Method

Guidelines for MR controlled areas recommend that the MRI equipment be totally enclosed within an access controlled area that is of a size sufficient to contain the 0.5mT contour. Prior to the installation, manufacturers will be able to provide dimensions to ensure that the room is of sufficient size for this. The limit of the 0.5mT field is measured when the scanner is installed.

Field measurements are undertaken using a Mag-03MS1000 connected to a Spectramag-6 and mounted on a tripod (please note: the Spectramag-6 should be kept outside the MRI suite). The Mag-03 sensor is mounted at the same height as the bore of the magnet. The field contours are measured at multiple points around the room, keeping the sensor in the same orientation at each measurement point, taking care not to over-expose the sensor. Once measured, the location of the 0.5mT limit is marked on the floor as a visual indication to staff.

In the event that the 0.5mT line falls outside the boundaries of the room (this can occur if an older scanner is replaced by a newer, more powerful one), the line is marked on the floor outside of the room and precautions continue to be taken to ensure that no MR Unsafe materials are allowed to cross it.

