



Magnet Information

FIDLOCK Closure Systems – Effect of Magnetic Fields



Index

History of magnets	Page 3
Occurrence in nature and its effect on humans	Page 4
Effect on electronic devices	Page 5
Effect on magnetic strip cards	Page 6
Fidlock magnets	Page 7
Reference values of magnetic force fields	Page 8
Reference values in Fidlock products	Page 10
Effect on pacemakers and defibrillators	Page 14
Tips from Pacemaker manufacturers	Page 15
Difference between electromagnetic and permanent magnetic fields	Page 16

History of magnets

Aristotle attributes the first of what could be called a scientific discussion on magnetism to Thales, who lived from about 625 BC to about 545 BC. Around the same time in ancient India, the Indian surgeon, Sushruta, was the first to make use of the magnet for surgical purposes.

In ancient China, the earliest literary reference to magnetism lies in a 4th century BC book called Book of the Devil Valley. The earliest mention of the attraction of a needle appears in a work composed between AD 20 and 100 (Louen-heng): "A lodestone attracts a needle." The ancient Chinese scientist Shen Kuo (1031-1095) was the first person to write of the magnetic needle compass and that it improved the accuracy of navigation by employing the astronomical concept of true north, and by the 12th century the Chinese were known to use the lodestone compass for navigation.

Alexander Neckham, by 1187, was the first in Europe to describe the compass and its use for navigation. In 1269, Peter Peregrinus de Maricourt wrote the *Epistola de magnete*, the first extant treatise describing the properties of magnets. In 1282, the properties of magnets and the dry compass were discussed by Al-Ashraf, a Yemeni physicist, astronomer and geographer.



Occurrence of magnetism in nature & its effect on humans

Magnetism is a natural occurrence. Life on our planet has developed under the influence of the Earth's magnetic field since evolution began. Some animals use magnetism for their own orientation (eg Doves and Tuna). Even the human brain can produce magnetism.

Human beings are fascinated by magnets due to the fact that the magnetic power appears to come from nowhere and because it cannot be seen, felt, tasted or smelled.

There is no danger to health at all, in fact medical equipment often uses magnets, e.g. magnetic resonance tomography where extremely strong magnetic fields of up to 7.000 mTesla are used.



Are electronic devices affected by magnets?

All iPods, PC's, USB sticks, cameras and mobile phones are equipped with a flash memory which saves information by using electronic fields. All of these are immune against magnetic fields.

First generation iPods (2004 and older) or rather old professional cameras use a built in hard disk storage unit, which could possibly be influenced by magnets.

To counter any possible magnetic effect on older devices, some Fidlock closures use an evolved technology where the magnet is recessed or embedded within the mechanism, thus ensuring that the minimum security distance is maintained.



Effects on Magnetic Strip Cards

Magnetic strip cards may be erased by a magnetic force field starting at roundabout 30mTesla.

Many every day devices (small speakers, vibration engines of mobile phones, headsets, cameras, computers and jewellery catches) often show much higher magnetic force field strengths on the surface – in most cases, the consumer is unaware of these fields.

Magnetic forces weaken rapidly as distance from source is increased. Maintaining small distances avoids erasure problems. For headsets, a distance from the magnet of 0.1 – 0.3 cm should be sufficient.

For small speakers in cameras and mobile phones a distance of 0.2 – 0.5 cm is fine. Credit cards may be compromised within a 30mTesla magnetic field strength. Fidlock products absolutely maintain the security distances all products.

Fidlock is uniquely innovative by insulating the magnets within the mechanism. The inside of bags using MINI TURN is shielded completely which makes the keeping of a magnetic strip card in the bag 100% secure. The Slider with the Shield is 100% secure when closed.



Fidlock Magnets

A **neodymium magnet** is the most widely used type of rare-earth magnet, is a permanent magnet made from an alloy of neodymium, iron and boron to form the tetragonal crystalline structure. Neodymium magnets are the strongest and most lightweight type of permanent magnet commercially available. They have replaced other types of magnets in many applications in modern products that require strong permanent magnets, such as motors in cordless tools, hard disk drives and magnetic fasteners such as the Fidlock fasteners.

Reference values of magnetic force fields

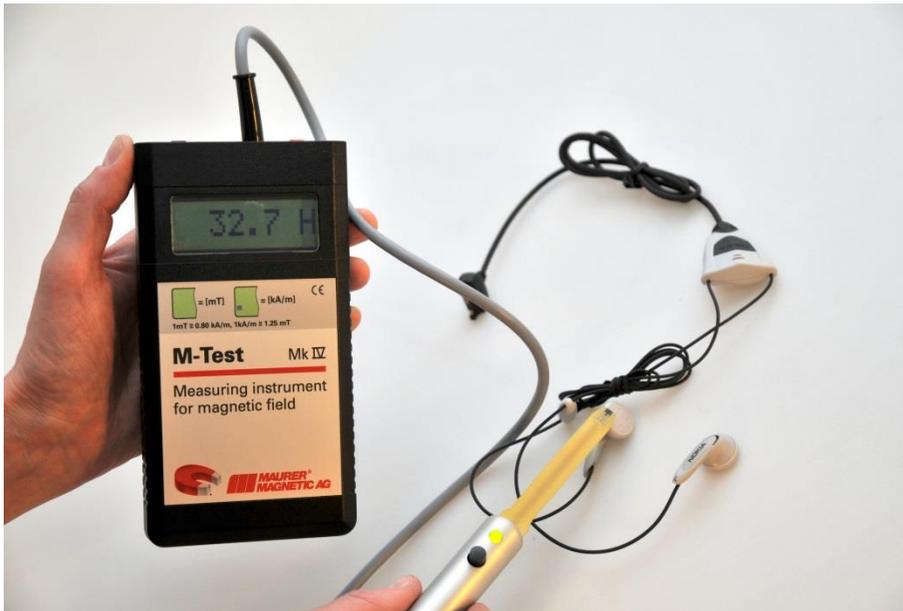


Magnetic plug on a Macbook 112 mTesla



Magnetic closing mechanism on a MacBook 237mTesla

Reference values of magnetic force fields



Headsets 32mTesla



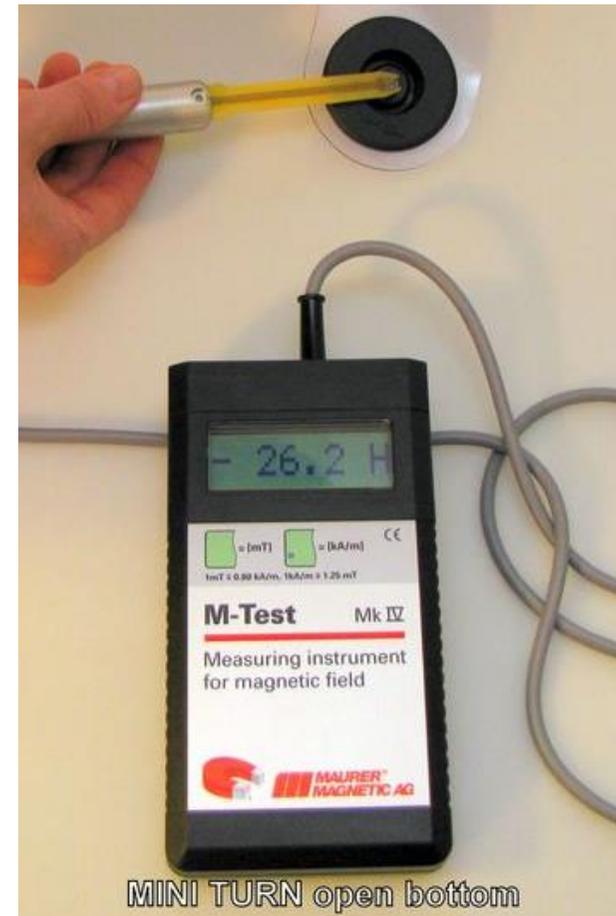
Speaker on a camera or mobile phone up to 58 mTesla

Reference values of magnetic force fields in Fidlock Products



Magnets in the top and bottom part of the Mini Turn are built in and recessed by 0.37cm.

A security distance of 0.3cm to credit cards is sufficient.



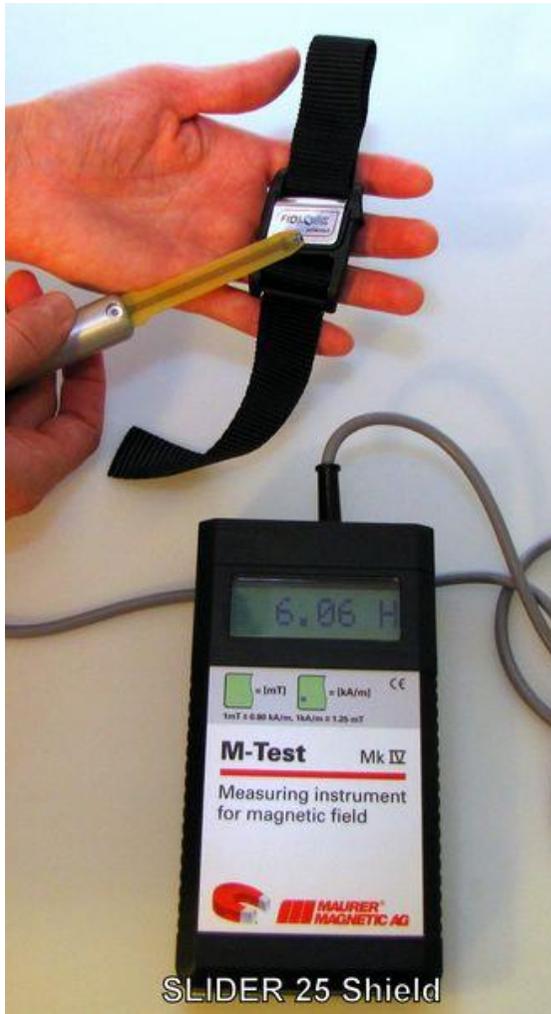
Reference values of magnetic force fields in Fidlock Products



For the Slider without shield a security distance of 0.2cm to credit cards is necessary.

Once open a security distance of 0.8cm to the front part of the slide in mechanism (the strongest field) is sufficient.

Reference values of magnetic force fields in Fidlock Products



Sliders with shields are totally credit card safe.

Once open, a security distance of 0,8cm to the front of the slide-in part (the strongest field), is sufficient.

Reference values of magnetic force fields in Fidlock Products



In the case of the SNAP and SNAP Buckle, measuring from below, a safety distance to the bottom part of 0.75cm is necessary.

Measuring from the top, the distance of 0.3cm to the mechanism is sufficient.

An additional shield can be easily achieved by using a foam pad 0.75cm thick, which can be sewed or glued in between the lining and the outer fabric.

Are pacemakers and defibrillators affected by magnets? Do I need a warning if I integrate a FIDLOCK closure into my product?

Most pacemakers and defibrillators have built-in magnetic switches (reed-switches) for switching the device into an emergency state (i.e. a stable 60bpm pulse). The influenceability of the device by a magnet is therefore not a failure but is a feature. The picture shows the large magnet used by doctors for such a purpose.



All people with pacemakers receive training by their doctor and /or pacemaker manufacturer about such functions and receive training about the safe use as well as recommendations for minimum distances to magnetic products such as earphones, magnetic toys etc. Often the patients receive a list of such objects, which can be used without risk, which can not be used directly over the implant and which are not useable. Not useable objects must have a warning label.

It is often advised to keep a distance of 20 – 30 cm between a magnet and a pacemaker. This applies only for unobstructed magnets and accordingly not for FIDLOCK products. The implanting clinic and/or the pacemaker manufacturer is the most reliable contact person for specific support and problems.

It is considered advisable, in case of questions or inconsistencies, to refer directly to the instructions for use of the pacemaker or to the pacemaker manufacturer or to the implanting clinic.



Tips from Pacemaker Manufacturers

The most important rule for pacemaker and/or defibrillators is distance. The general rule of thumb here is 30cm, e.g do not keep your mobile phone in your breast pocket directly above your pacemaker.

Here a list of objects and machines that can be used and operated without a problem:

- TV, Radio, Stereo equipment or similar AV devices
- Remotecontrols for TV, computers or consoles
- Hair dryers, electric razers and any other electric bathroom appliances
- E-books
- Electric scales
- Electric blankets and pillows
- Massage chairs
- Mobile phones, cordless home phones, walkie talkies
- Activity trackers (sport watches etc)

Here a list of devices that should not be used directly over the pacemaker

- Music playback devices (atleast 3cm distance between earphones and implant)
- Mobile massage equipment
- Small magnets e.g. for name tags etc



Difference between electromagnetic and permanent magnetic fields

There are two types and magnetic fields that surround us. There are electromagnetic fields and permanent magnetic fields. Devices such as mobile phones give out electromagnetic waves consistently. Fidlock magnets on the other hand have permanent magnetic fields.

The difference here is the devices with electromagnetic fields give out a constant stream of electromagnetic waves which are then absorbed by the body. An example here is your mobile phone. You can charge your phone until full and over night the charge will decrease due to the electromagnetic waves it gives off, which are then absorbed by the body, should you sleep next to your phone.

Permanent magnetic objects will continuously have the same strength, as permanent magnets do not give off magnetic waves, which actually make them safer than electromagnetic devices.

Fidlock products can thus be utilized without concern for ones health.