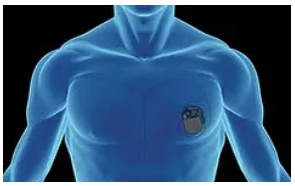
PEMF and Pacemakers



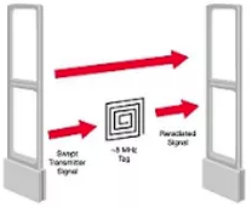
We are regularly asked if a PEMF device can be used when the person has a pacemaker, implantable cardioverter-defibrillator [ICD] or other electronic implant. The answer to this question is not straight forward and here follows some information about electromagnetic and static magnetic disturbance signals.

There are two different magnetic energy sources: passive (static magnets) and active (electromagnetism).

It is not possible to say that a specific level of static magnetic energy may affect an implanted active device like a pacemaker or defibrillator. The correct working of a pacemaker is tested at the hospital by placing a strong magnet directly over the device to force it to start working for test purposes (like measuring how long the battery will last). This does not lead to "disturbing" of the correct working of the device. To make the bold statement that a specific static magnetic level could cause a life threatening disturbance is simply not possible.

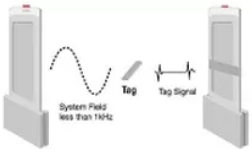
A complete other matter are electromagnetic disturbances, which are plentiful in our modern world. The actual working of the above mentioned active implanted electronic devices depend on their measurement functions, e.g. a pacemaker only starts firing pulses to the heart when it "detects" that the heart itself does not contract in the desired rhythm. Similarly an implanted defibrillator only fires a strong pulse to "restart" the heart when it "detects" that a life threatening electrical disturbance of the heart is taking place. What actually disturb the measuring functions of these devices are strong external electromagnetic pulses.

Anti theft systems or electronic article surveillance (EAS) systems in shops are used to identify articles as they pass through a gated area in a store. There are three types of EAS systems where a tag or label is attached to a product. If the tag is not removed or not deactivated, an alarm will sound when passed between the gates.



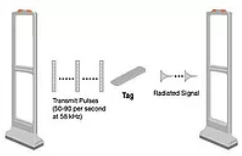
In Radio Frequency (RF) Systems a label (miniature disposable electronic circuit and antenna)attached to a product responds to a specific frequency emitted by a transmitter.

The response from the label is then picked up by a receiver and will trigger the alarm. RF systems transmit frequencies between 2 - 10 MHz.



In Electromagnetic (EM) systems a magnetic strip is attached to the goods.

This strip is deactivated upon payment by a high intensity magnetic field. The weak response of the strip requires use of high intensity fields between 70 - 1 kHz.



In Acousto-magnetic systems the transmitter sends a RF signal of ~ 58 kHz in pulses to energize the tag in the surveillance zone.

When the pulse ends the tag responds by emitting a single frequency signal. Then the tag signal is detected by a receiver and the tag's response signal is analyzed, which controls the alarm.

Although active implanted devices meet specific standards for electromagnetic interference, there is still a chance that strong external electromagnetic signals could corrupt the working of the implanted device, hence the warnings to avoid exposure to electromagnetic signals (cell phones, shoplifting/airport gates etc.).

Many different frequencies and intensities are used in such devices, thus these warnings are in place because the resulting inducted intensities and frequencies are simply unpredictable.

PEMF devices powered by batteries, like bone growth stimulators, generate electromagnetic pulses (PEMF) with very limited energy levels. The energy generated during the pulsing time depends on the pulse width (= pulse duration) and pulse amplitude (like the volume on your radio) which form the amount of energy emitted during the pulse duration time.

Both the pulse amplitude and the distance from the active PEMF coil to the implanted device or the connected catheter(s) are important. A minimum amount of energy will be required to disturb the correct measurement functions of a pacemaker or implanted defibrillator. It seems unreasonable to expect that PEMF home devices, which only transfer very little electromagnetic energy, have any chance of disturbing active implanted devices as long as the coil is not placed in very close vicinity of the pacemaker or ICD.

Manufacturers of PEMF devices write in their manuals that active implanted devices are contraindicated for use with pacemakers and the like. You will not find anybody who will tell you otherwise only because of possible legal implications. However the use the Curatron home model PEMF device should not cause for concerns for people with a pacemaker, similar to a person with a pacemaker or ICD not being able to enter a shop with anti-theft gates.
Notice the warning signs at the entrance only to avoid litigation, because we have never seen a person with a pacemaker having any problem passing through these detection systems.