What makes a watch Anti-Magnetic.

You sometimes read that a watch is Anti-Magnetic (or, less common, 'non-magnetic'). But the questions are: what does this really mean, why would you need this (or not?) and how is it achieved? Time for some education!

What does it mean.

In simple words: Anti-Magnetic watches are able to run with minimal deviation when exposed to a certain level of magnetic field. There is also an international standard that describes this in more detail, the ISO 764 (DIN 8309). According to ISO 764 a watch must resist exposition to a direct current magnetic field of 4800 A/m (Ampere per meter). The watch must keep its accuracy to ± 30 sec/day as measured before the test in order to be acknowledged as a magnetic resistant watch. Annex A of ISO 764 deals with watches designated as magnetic resistant with an additional indication of intensity of a magnetic field exceeding 4800 A/m.
For this reason you will that see that the watch industry often reports the magnetic 'resistance' in A/m. Reference: 4800 A/m (SI unit) = approx. 60 G (Gauss)= approx. 6 mT (milliTesla).

About magnetic fields in general.

In everyday life magnetic fields are encountered as an invisible force created by permanent magnets which pulls on iron objects and attracts or repels other magnets.
Actually the Earth itself produces its own magnetic field, often measured in gauss (G) but generally reported in nanoTesla (nT) and it's all around us!
So you are actually in a permanent magnetic field already of somewhere between 25.000 and 65.000 nT (0.25 – 0.65 G). The intensity of the field is of a higher level near the poles and weaker near the Equator. By comparison, your refrigerator at home has a magnetic field of about 50 to 100 G = 0.005 to 0.010 T (Tesla). Magnetic fields are very widely used throughout modern technology, particularly in electrical engineering and electro-mechanics. Rotating magnetic fields are utilized in both electric motors and generators.

How.

Basically there are two ways of achieving 'anti-magnetic' watch properties.
The first way consists in using different alloys, capable of withstanding magnetic fields. These alloys include Invar (iron - nickel - carbon - chromium alloy), Glucydur (beryllium - bronze alloy), Nivarox (iron - nickel - chromium - titanium - beryllium alloy) and Elinvar - an alloy similar to Invar, though less resistant to magnetism and more resistant to thermal influence. The anchors, escape wheels and other watch movement parts are also made of non-magnetic metals or alloys.

Another way of making a watch non-magnetic is to put the entire movement into a case made of a highly conductive (permeable) material, usually soft iron.
If you want to block out magnetic "force" your best bet is to re-route magnetic field lines (lines of magnetic flux) around the object that is sensitive to those lines. Do this by shielding the object in a material with a much higher magnetic permeability of the surrounding materials. By doing so the movement itself is covered by an additional soft-iron clasp to prevent the forming of magnetic fields inside the movement itself (think of a Faraday cage).
These two ways can be combined but the last described option (soft iron Faraday cage) is most commonly used in the watch industry.

Facts.

- Magnetic fields, and the forces caused by them, cannot be blocked, that is to say, there is no such thing as a magnetic 'insulator'.
- Electromagnetism together with Gravity, Strong and Weak Nuclear Force is one of the 4 fundamental forces of nature in physics.
- Back to watches: Anti-Magnetic watches have been favoured by, and recommended for, people who deal with high/strong magnetic fields on a regular basis.
- Last but not least: anti-magnetic says nothing of the quality of the watch itself!

So now you know all about it!

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