**Aussie Magnets**

**Types of Magnets**

There are three main types of iron-based, but artificially made, permanent magnets.

They are manufactured from various combinations of raw material elements, which are combined through a powder metallurgical process to produce different magnet types that are shaped by various moulding, casting and bonding processes.

Iron becomes magnetic when an external magnetic force is applied and one or two electrons in the iron atoms are reorientated. No other element has electrons that can be affected by an external magnetic force as easily as iron. But, even the few electrons in iron that exhibit this flexibility will not retain it for long. Heat or impact can cause the electrons to revert to their random orientation and magnetisation is lost. Because of this, manufacturers usually add another element that not only makes the magnet 'permanent' but also adds other special qualities, depending on the element added. Elements most commonly used are nickel, boron, cobalt, samarium, strontium and neodymium.

The most widely used permanent magnets are: Rare Earth, Ferrite and Alnico.

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| Rare Earth | Ferrite | Al Nico | Flexible Rubber |

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| Chemical composition: Nd2Fe14B. Produced by powder metallurgical process. Readily available in various forms and shapes, nickel-plated. Very hard and brittle, cannot be drilled or machined. Extremely stable and highly resistant to demagnetisation. Precise calibration is achievable for critical applications. Excellent strength/cost value. Relatively low resistance to corrosion. Not suitable for high temperatures application (80¼C plus). Uses include: Security systems Magnetic separators Magnetic resonance imaging Health bandages and plasters Specialty door catches Filters & strainers Sensors High performance motors | Chemical composition Ba/Sr0.6Fe2O3. Produced by powder metallurgical process. Can be cast into any desired shape or size, then magnetised. Readily available in various forms. Comparatively hard and brittle, cannot be drilled or machined. Extremely stable and resistant to demagnetisation. Very cost effective price/output ratio. Outstanding resistance to corrosion. Very good temperature stability. Uses include: Electric motors Audio speakers Electronic equipment Industrial automation Conveyor belts Magnetic separators Magnetic resonance imaging Automotive sensors | Chemical composition AlNiFeCo. Produced by powder metallurgical process or casting. Readily available in very large range of sizes. Very hard and brittle but can be cut, drilled and machined with simple cutting tools. Comparatively poor resistance to demagnetisation. High magnetic flux density. Good resistance to corrosion. Superior temperature stability over wide range. Uses include: Automotive and electronic sensors Magnetron TWT amplifiers Actuators Motors Reed switches Hall effect sensors Communication | Produced by combining plastic or rubber polymers with magnetic powders. Processed by calendering or extrusion method to form sheets and rolls. Sheets can be stamped, cut and punched. May be laminated onto other materials. Can be supplied with a self-adhesive backing, plain brown, white gloss or colour. Stable and corrosion resistant. Good resistance to demagnetisation. Resistance to chemicals is moderate. Readily available at low cost. Uses include: Signage. Labelling. Self-adhesive patches for calendars, promotional flyers, business cards and so on. Removable signage for motor vehicles. Door seals. Fridge magnets. |

Which type of magnet is best for your design? See our Which Magnet? page for advice or get in touch.

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