

# PERMANENT MAGNET

# Introduction

A permanent magnet is a magnet that does not lose its magnet field. However what makes a magnet permanent? In order to understand this we need to know how magnets work. Magnetism is an aspect of the phenomenon known as the electromagnetic force a fundamental force of the physical universe. Magnetism like its other aspect electricity manifests itself as a field. What makes a magnet is when certain substances and elements are induced with a strong magnetic field

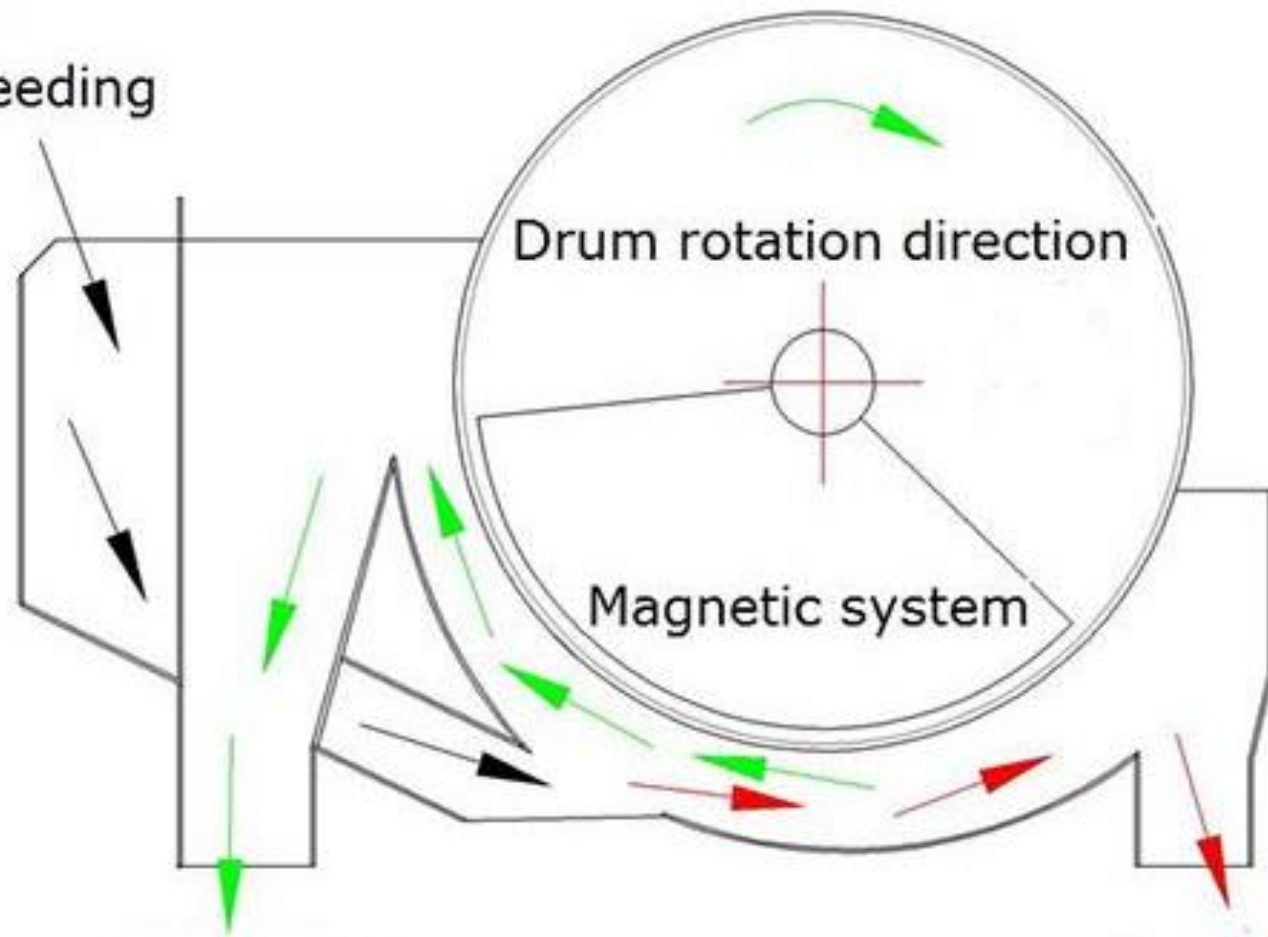
In the case of permanent magnets this field remains over time without weakening. Permanent magnets are important for their industrial uses especially when it comes to power generation and electric motors. The induction process for turbines and generators needs permanent magnets to turn mechanical motion into energy. They are also important for electric motors in many electronics using the reverse of the induction of electric current to make mechanical energy. As you can see without the permanent magnet we would not be able to take full advantage of the capabilities of electricity in modern devices.

# Working of Permanent Magnets

- A magnet is any material or substance that projects a magnetic field. A magnetic field is a type of vector field that aligns electric charges on a dipolar outlay. Magnets have both a north and south pole, which align to the earth's magnetic northern and southern poles (and which are not fixed points on the map, but rather varying areas generally located in the regions of the geographic north and south poles). Like poles repel from one another, while unlike poles attract.

- Ferromagnetic materials, meaning materials which contain some degree of iron, can usually be permanently magnetized, with a catch: if magnets are heated to excessive, known temperatures, they can lose their magnetism. This can be remedied by demagnetising through a process of slowly cooling the magnet.

Feeding



Drum rotation direction

Magnetic system

Concentrate

Tailings

# Why Permanent Magnets are used in Industries?

- Permanent magnets have many industrial uses and are a vital component of many electronic devices and motors.
- As part of the induction process for generators, permanent magnets are used to convert mechanical motion into energy.
- They are also essential for the proper function of many of the electronics that we use everyday, such as computer monitors, televisions, microphones, speakers and electric guitars.

- Magnets, in permanent and electromagnet combination, are used in electric motors for converting electric energy into mechanical energy. The same combination is used in generators to convert mechanical energy into the electrical.
- Permanent Magnets may be used in conveyors, plates, assemblies, separators, magnetized pulleys, tube grates, chutes and cranes. Magnets are required to separate ferrous impurities from non-ferrous matter. They separate metals from ore in the mining industry.



- Permanent magnets lift, hold, convey, stack and drop heavy loads.
- In the food and pharmaceutical industry, magnets pick out any iron particles that might have inadvertently mixed with the food or medications. Magnetic sweepers in airports, docks and construction sites pick up any waste iron scrap that would otherwise endanger traffic or puncture tires. By detecting the scrap before any harm is done, they prevent the expense of repairs.



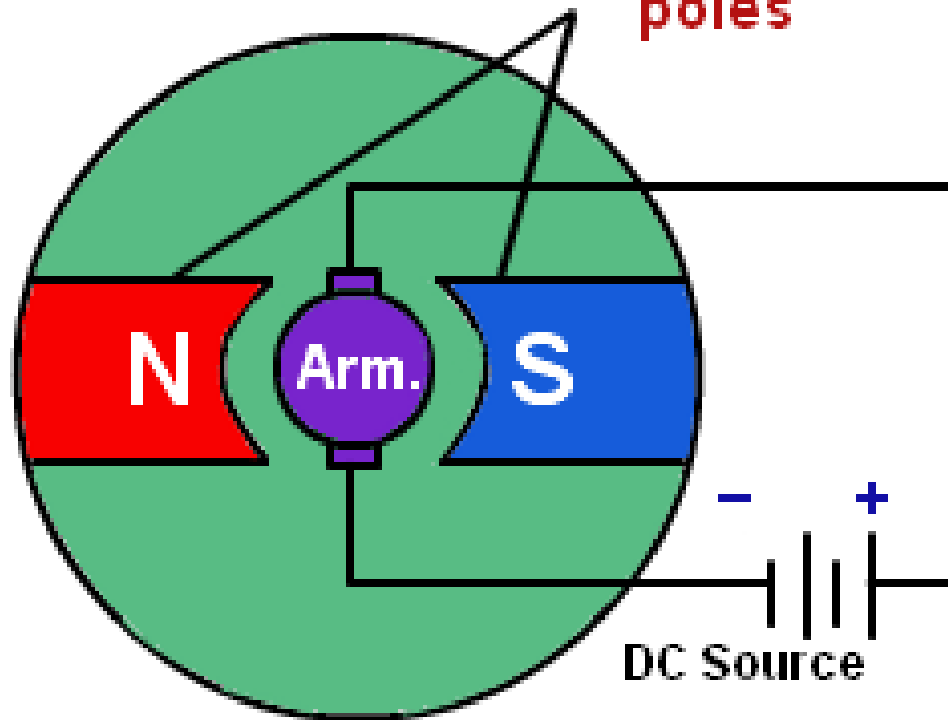
patented multistage permanent magnet generator

# Applications

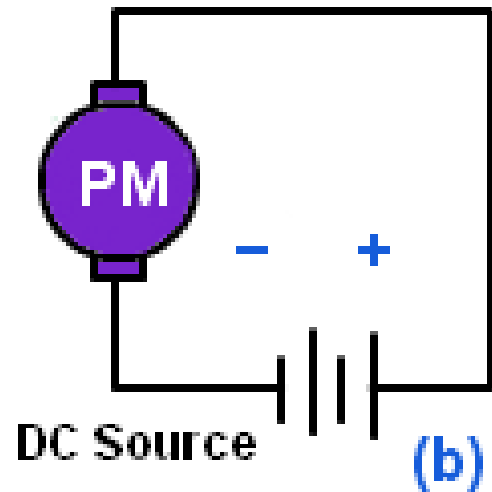
- Permanent magnets represent the majority of magnetic materials and are used in a variety of ways.
- Permanent magnets are often attached to gears or shafts to be used in conjunction with an electromagnet inside of a motor.
- Permanent magnets are often used on refrigerators to hold paper and other light objects to the metal surface.

- Permanent magnets are also used to keep cabinets and other doors closed that must be accessed frequently.
- Their repelling forces rotate a turbine, which then turns a piece of equipment known as an armature.
- This churning armature generates electricity, which can then be transferred to other purposes.
- The magnet's ability to affect ion beams.

Permanent magnet poles



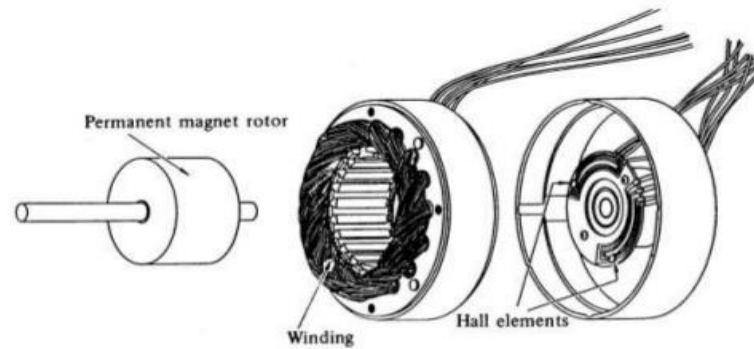
(a)



(b)

# Advantages

- No power supply needed
- Cling to vertical surfaces
- No electrical contact problems
- Inexpensive
- No damage to test piece
- Lightweight
- Produce a powerful magnetic field compared to their size.



#### **THE PERMANENT BRUSHLESS DC MOTOR'S ADVANTAGES,DISADVANTAGES AND APPLICATIONS**

Typical brushless DC motors use a rotating permanent magnet in the rotor, and stationary electrical current/coil magnets on the motor housing for the rotor, but the symmetrical opposite is also possible. A motor controller converts DC to AC. This design is simpler than that of brushed motors because it eliminates the complication of transferring power from outside the motor to the spinning rotor. Advantages of brushless motors include long life span, little or no maintenance, and high efficiency.



# CONTACT

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