

# Rare-Earth Magnets

**⚠ WARNING: CHOKING HAZARD.**

Contains small magnets. Not for children under 8 years.  
Magnets should not be left in the hands of young children.  
Swallowing any magnet can be dangerous. Seek immediate medical attention if a magnet is swallowed or inhaled.

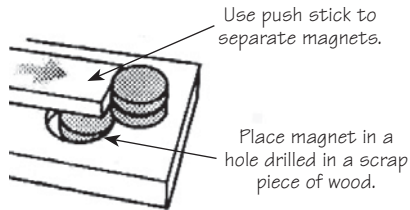
**⚠ Caution:** Strong magnetic field. Keep magnets away from all electronic equipment or other items that have information stored magnetically. Magnets can corrupt stored data if placed too near.

## Handling Rare-Earth Magnets

All of our rare-earth magnets are strong and should be treated with respect.

Their attractive forces can cause loose magnets to unite with such impact that their edges can chip. To avoid damaging the edges, **do not** let them collide. The 1" magnets can actually pinch your hand hard enough to raise a blood blister if you don't control them well. The ring magnets are fragile and, if they snap together, they may crack or break apart. Exercise care while handling ring magnets.

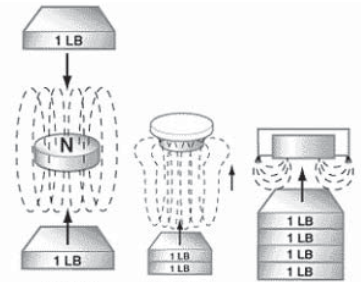
The best way to separate rare-earth magnets is to slide them apart. With large ones (1/2" diameter and up), it may be necessary to drill a hole in a scrap piece of wood just under 1/8" deep and at least as large in diameter as the magnets you want to separate. Then you can use a scrap of wood to push all except one magnet away from the hole.



**Figure 1: Separating magnets with a piece of wood.**

## Making Magnets Work Harder

Magnets do their best work when focused. The natural field of a magnet is polar radiating loops. Disc magnets have equal fields (**Figure 2**). The trick is to get both fields working for you.



**Figure 2 Figure 3 Figure 4**

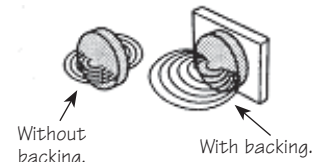
A ferromagnetic backing plate placed against one side of the magnet

(**Figure 3**) creates a more efficient path for the flux lines to follow. It also creates a radiating pattern favoring one pole, which effectively points the majority of the magnetic energy in one direction.

When a magnet is placed in a ferromagnetic cup (**Figure 4**), the cup further magnifies the effect by eliminating the air gap (air is a poor conductor of magnetic fields) and brings both poles of the magnet to grip on the same surface. This is similar in principle to a horseshoe magnet. A rare-earth magnet in a steel cup provides four times the strength of a bare magnet. A cup provides the optimal magnetic flux focus into the smallest gap area.

## Maximum Attraction

To increase the attractive power of a magnet, put a piece of iron (or steel) behind it. Any piece of steel the same size or larger than the magnet will do. For maximum effectiveness, be sure the steel is at least as thick as the magnet. Several layers can be used if necessary.



**Figure 5: Increasing the attractive power of a magnet.**

Magnets can be glued in place with almost any glue (epoxy is the most secure). For mechanical mounting, try our magnet cups.

Our rare-earth magnets can withstand temperatures up to 121°C (250°F). At higher temperatures, magnets will begin to lose their magnetism over time.