A Continuous Flow Separation of Magnetite from Dry Mineral Sands

Advantages of the MAG-ZIP system:

- Removes “clean” magnetite, ~80% to ~96% in 1st & 2nd pass
- Does not trap non-magnetic material
- Continuous flow & self-cleaning
- Fast throughput: ~1 gal/2 min
- 12 V easy field operation
- Lightweight, <10 lb, easily moved
- Gravity fed with ~1 gal hopper
- Convenient collection: sits over two trays, or buckets
- Patent Pending*

*Dry Mining Equipment LLC retains rights to manufacture & market these magnetic separators to the mining/mineral industries under an exclusive license agreement from MSI.

How does the MAG-ZIP compare to existing separation methods?

1. **Hand Operated Batch Magnets:**
   - **PROS:** - Least costly investment of available methods
   - Thumb/slide release for cleaning
   - **CONS:** - Typically treats only small amounts in a pan
   - Commonly traps some non-magnetic grains; must repeat process several times to reach desired purity

2. **Drill Operated Batch Magnets:**
   - **PROS:** - Produces a cleaner magnetite at a reasonable cost compared to hand magnet
   - **CONS:** - Repeated hand work; each cycle retrieves a small batch before slide cleaning,
   - Centrifugal forces sling some trapped (valuable?) minerals out of the capture zone

3. **Magnetic Pulley Conveyor**
   - **PROS:** - Possible higher throughput; depends upon model
   - **CONS:** - Belt tracking and wear is problematic
   - ..Some non-magnetic particles are trapped unless an extremely thin layer is fed

**VITAL SOLUTION FOR BLACK SANDS:**
The MAG-ZIP works on DRY sand-sized mixtures by design. It is small, mobile, fast and cost effective for use even at the “prospector” level. It has a very low operating cost and it saves valuable time by
providing this necessary service to process “black sand” concentrates. If you have ever experienced panning gold out of a pan full of “black sands,” then you fully understand the value of removing most of the “black sand” burden first. It does not remove other heavy, dark colored non-magnetic minerals.

TECHNOLOGY:
The new MAG-ZIP technology provides a vital solution to the typical problems of magnetite separations from dry, gold bearing concentrates. This technology creates strong, pulsed magnetic fields that pull individual magnetic grains out of a vertically falling film of sand while the non-magnetic materials fall straight through. Furthermore, it continuously releases the magnetite: A self-cleaning solution! An inexpensive gravity feeding through a special double slot controls the rate of flow. Counteracting forces allow a very selective removal of magnetic particles without trapping any non-magnetic grains. Instead of removing all of the magnetite in one pass, the MAG-ZIP was designed to remove only a “clean” magnetite to prevent the loss of any non-magnetic material like gold!

FAST & EASY FEED RATE:
The 4.5” wide magnet gap will process 1 gal/2 min (1st pass) of -12 mesh sand or a 5 gal bucket of dry concentrates (80+ lb/10 min, or ~500 lb/h). It has been slowed down since its earlier introduction to assure even more efficiency. For larger mines, larger sized units are available upon request.

SIMPLE PREPARATION:
Detrital magnetite in most placer gold bearing sands has been ground by natural forces to fine sizes. Therefore, it is logical to optimize the feed size for MAG-ZIP separation by pre-screening to -12 mesh. The original model used -8 mesh but changing to the smaller size gained efficiency AND also removed all of the lead shot and removed the trash that caused some “bird nesting”.

EXAMPLE: GOLD BEARING CONCENTRATE FROM A DRY WASHER.
About 3 gal of -3/8” concentrate was collected with a Keene 151-S dry washer. It contained only “flood” gold which is smaller than 8M. So the concentrate was screened to give about 2 gal of -8M sand. NOTE: original model with coarse sand. This removed 25-30% of the material. Such screening is a simple, quick method that concentrates gold. Normally, the +8M portion would be entirely processed to recover gold.

However, this was treated by 3 passes through the MAG-ZIP to remove 0.5-0.75 gal of magnetite, and thus rapidly reduced the cons by another 25-30%! The remaining ~1.25-1.5 gal of concentrate represented less than 50% the original amount from the field. It was then processed by the slower hand-fed Gold Magic (water) in about half the time that would otherwise have been required. After panning the 3 sequential tablespoons of cons, collecting and weighing the gold, about 1.5 g was obtained. Not bad for several hours in the field, but especially after only about 1 h total clean up. Then there was time to play the guitar and enjoy some cold liquid refreshment! Yee Hah!

LOGICAL CONCENTRATION STEP NOW MADE EASY AND FAST
When gold can be concentrated by 25-30% with fast, simple screening, then it is clearly worth the time. Now that the MAG-ZIP can also quickly concentrate gold by another 25-30% by removing most of the “black sand” which makes the following steps faster and easier too, then it is definitely worth it to do so. It saves me precious time and anyone processing such dry concentrates should also consider that it’s worth their time too!