



NEWS RELEASE

For Immediate Release

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NEW THINKING ON WET MAGNETIC TREATMENT OF FELDSPAR

Abstract

Traditionally, magnetic separation has only been introduced into the processing flow sheet of a feldspar operation at the dry stage, late in the process. Flotation is used to remove most other contaminants. Now, as companies try to reduce their reliance on flotation, wet high intensity magnetic separation is proving to either partially or totally replace the need for flotation.

INTRODUCTION

The [High Intensity \(HI\) Magnetic Filter](#) is not a new concept. Indeed, various designs of the HI Filter can be found in ceramic plants across the world, purifying ceramic bodies and slips. They are even installed in chocolate plants, removing fine iron from the grinding process. What is new is how the technology is applied.



Typical iron pulled out by a HI Filter



HI Filter installed at a ceramic plant

The electromagnetic HI Magnetic Filter is designed to generate and project high magnetic fields into a central column containing a magnetically susceptible matrix. Strongly and weakly magnetic particles are then attracted to and held on the matrix. The original HI Magnetic Filters had background fields of 5000 gauss and these remain best suited to the ceramic industry and removing fine iron. Development work is ongoing in the ceramics field where higher field HI Magnetic Filters are able to increase the brightness of barbotines.

Already, Eriez has supplied a 1 Tesla (10,000 gauss) HI Magnetic Filter into Turkey. Models with 6500 gauss are commonly used in the mineral processing industry, with bore diameters of up to 1.2m.



A pair of HI Filters processing sand for the glass industry

[HI Magnetic Filters](#) are already well established for processing and purifying silica sand. However, one of the first industrial minerals HI Magnetic Filters was installed to process fine feldspar in Italy over ten years ago. Since then, there have been further developments with the HI Magnetic Filter technology and, similarly, there have been by changes in legislation and increasing in processing costs.

Fe₂O₃ REDUCTION IN FELDSPAR with the HI FILTER

Eriez has been evaluating how HI Magnetic Filter technology can be successfully applied to processing and upgrading feldspar. Companies are keen to see if flotation can be either eliminated or reduced from a flow sheet, mainly due to environmental pressures and the increasing cost of managing waste forcing companies to evaluate methods of reducing chemical usage.

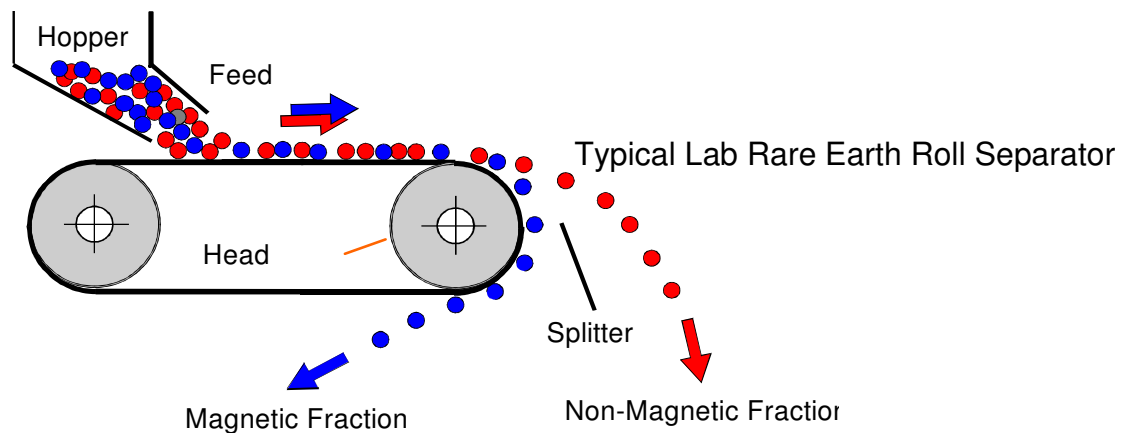
Many feldspar producers are now faced with lower grade deposits, requiring additional processing. The laboratory results from a series of tests conducted on Turkish feldspars confirmed that magnetic technology can change the existing and future process methodology.

Sample 1 – Potassium Feldspar

Laboratory work conducted on a potassium feldspar (typically <150μ) produced some excellent results. The feldspar had an iron content of 2.5 % and the target was to reduce this to <0.1%. The first tests, conducted on a HI Filter with a background field of 0.65 Tesla, reduced the Fe₂O₃ level to 0.165%. However, processing for a second time reduced this from 0.165 % to <0.14%.

There were two options available to further improve the productivity and separation. The feldspar could be milled to <100μ to liberate more of the magnetic particles and allow a finer matrix type to be used. Also, the material (0.5-1.2mm) could be pre-treated in a dry state with a [Rare Earth Roll Separator](#) to remove coarse free magnetic minerals prior to milling.





The [Rare Earth Roll Separator](#) is a dual pulley system where high intensity, permanent rare earth magnets are mounted on the head pulley. Material is fed, via a Vibratory Feeder, onto the thin Kevlar belt and conveyed into the magnetic field. Magnetically susceptible minerals are attracted to the magnetic poles, allowing segregation of non magnetic particles with a strategically positioned splitter. Recently, most Rare Earth Roll Separators supplied have been with a 300mm diameter magnetic head pulley (a model RE300), although other diameters are available including 76mm, 100mm and 125mm. The RE300 is usually selected on the basis of capacity per meter width. To achieve the required level of product purity a number of stages may be required most commonly two or three.

Preliminary wet high intensity magnetic separation tests were also conducted on a fine feldspar (<25 μ) from the same deposit and the Fe₂O₃ levels were reduced to <0.15%.

Sample 2 – Sodium Feldspar

Turkish sodium feldspar also proved that magnetic treatment is a real option. Tests on two different size fractions from the same deposit have produced good results. On a <300 μ material with a 0.49% Fe₂O₃ content, magnetically treatment on a HI Filter with a background field of 0.65 Tesla reduced the Fe₂O₃ to <0.25%. Tests on a slightly coarser feldspar (<500 μ) reduced the Fe₂O₃ from 0.49% to <0.20%.

The results on a different sodium feldspar were even more encouraging. Two types of feldspar were tested, one being glass grade (100-500 μ) and the second being fine grade (>250 μ). Both feldspars had Fe₂O₃ contents of 0.21% and the target capacity was 10tph. The tests were made to compare the relative performance of the HI Filter (0.65 Tesla) against flotation. The Fe₂O₃ levels were reduced to 0.027% and 0.026% respectively, confirming that magnetic technology is a viable option to flotation. For 10tph, one pair of model HI400-65 Magnetic Filters is required.

Further work is being undertaken on processing feldspar, but there are clear environmental and commercial advantages for magnetic treatment.

CONCLUSION

The mineralogy of feldspar deposits can vary significantly and the benefits of magnetic separation can only be determined with controlled laboratory tests. Such tests are conducted at the Eriez Europe laboratory in the UK. The development work conducted by Eriez and their

customers has proven that HI Magnetic Filter technology can be applied to either fully or partially replace flotation.

For more information contact Eriez on: Tel: +44 (0)29 2086 8501; Fax: +44 (0)29 2085 1314 or e-mail info@eriezeurope.co.uk.

Eriez is recognized as world authority in advanced technology for magnetic, vibratory and inspection applications. The company's magnetic lift and separation, metal detection, materials feeding, screening, conveying and controlling equipment have application in the process, metalworking, packaging, recycling, mining, aggregate and textile industries. Eriez manufactures and markets these products through eleven international facilities located on five continents. For more information or to request an Eriez brochure, visit www.eriez.com or send e-mail to eriez@eriez.com.