



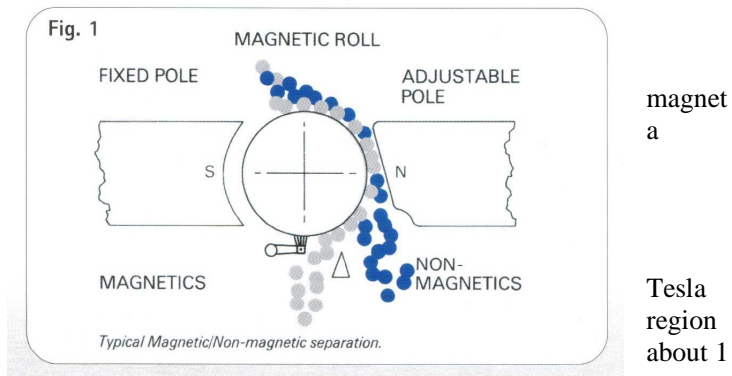
Magnets for Iranian nepheline syenite

Master Magnets has recently supplied an induced roll high intensity magnetic separator to the Iran Industrial Design Co (IID) for use in the production of high quality nepheline syenite. This is the culmination of some ten years of discussions with the user and product testing in Master Magnets laboratory. Over that period Master Magnets provided other magnetic separators to customers in Iran, building, it says, “a reputation for quality products in a very specialised marketplace. The combination of good test results and the reputation built up during the period convinced IID to purchase the machine

Nepheline syenite is a feldspar-like mineral, and has similar uses in the ceramic industry, where it is used as a flux in the production of tiles, sanitary ware, porcelain etc. It has many properties which make it superior to feldspar in application, but its popularity is principally due to the whiteness achieved by its use. This gives a distinct advantage in marketing for example high quality sanitary ware. An important part of preparing it for industrial use is the removal of ferrous contaminants, these may be feebly magnetic or paramagnetic in nature, and require these use of high intensity magnets to achieve the purity required.

Deposits of nepheline syenite are found in various parts of the world, major ones being in North America and parts of Europe. Sample testing had shown that a deposit in Iran would be commercially exploitable, so an initial production plant was commissioned. This used permanent magnetic separators for purification purposes, but it was found that in practice too much contamination was left in the product. Further tests were carried out using Master Magnet’s induced roll machine which gave demonstrably better results.

The induced roll separator is an electromagnetic machine, the basic principle is that a powerful electro uses a massive iron circuit to induce magnetic field in a rotating separation roll set between fixed and adjustable magnetic poles, as shown.



Magnetic field strengths of over 2 can be obtained in the operating of the separator, compared with Tesla for the best permanent

magnetic separators. In operation, product for treatment is fed at a controlled rate on to the roll, feebly magnetic particles are attracted to the roll face and clean product is thrown off the face at a normal trajectory. Magnetic material is discharged from the roll face at a point of lower intensity with the aid of a brush. A splitter plate between the two flows keeps them separate. To achieve optimum separation efficiency magnetic intensity, roll gap, roll speed, and splitter position are all adjustable.

Various machine configurations are available, to meet the requirements of the IID a four roll machine was proposed, with each roll 1,000 mm long. The rolls were arranged in pairs, so that the total flow was split between two rolls in parallel, each of these having a secondary roll to re-treat the product. Using this layout a high degree of cleanliness was possible at a production rate of 8 t/h. Other configurations are available using one, two, or four rolls, with roll lengths from 500 to 1,000 mm.

Test work was carried out on a laboratory scale version of the induced roll, this is identical in all respects to production machines, but it has a roll only 125 mm long. Results obtained on this machine can therefore be directly scaled up. Test work of this nature is routinely carried out in the laboratory at Master Magnets to confirm equipment selection. The induced roll separator is now undergoing full operation

within the processing plant producing clean nephelin syenite free of magnetic impurities.
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