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Application of Ferromagnetic Fluid in Mineral Dressing

Technology of separation of mixture of various particles in density is played the important role in the process of ore dressing. Science development and creating new modern technologies are the basis for developing technology of separation with the help of magnetic field by hydrostatic and hydrodynamic of magnetic fluids. Technology of magnetic separation is offered to use for this purpose.

Flotation of the hard magnetic bodies sunk into magnetic fluid under the influence of inhomogeneous magnetic field is one of the phenomena which became the basis for creating new technology. Such field leads to quasistable weighting of magnetic fluid in consequence of which nonmagnetic bodies of the high density (copper, lead, gold) are emerged.

As inhomogeneity of magnetic field is easy to modify in the wide ranges, it can be possible to guarantee the flotation of the particles of the definite density. It will lead to separation of the mixture of various particles in density.

The mixture of the particles of various density falls down to the layer of magnetic fluid hanging between the poles of electromagnet. The current in electromagnet can be chosen in such a way that light particles of the mixture would return to a magnetic fluid..

If to install the poles of electromagnet inclining and guarantee the movement of the light particles along the surface of the layer, continuous process of mixture separation can be reached.

One of the main characteristics of the separator, that is precision of the particle separation in density, is determined by various factors. The main thing is the regularity buoyant force affecting the particle in the whole liquid volume. To correct magnetic field and increase the field in which gradient is constant, hyperbolic poles can be limited by the magnetic screen at the top. Such screen smoothes down magnetic field. In this case precision of particles separation in density increases.

Installation of the screen made of magnetic material over the layer of magnetic fluid can guarantee regularity of magnetic field gradient in vertical direction. However, gradient in real construction is also changed in the level. It worsens separation characteristics. It can be avoided by limitation of the active volume of separator by the area nearby plane of symmetry. Additional containers also should be filled by magnetic liquid.

One of the most important reasons limited applications of magnetic separators is carrying away magnetic fluid stuck on the surface of the separated particles. Losses of magnetic fluid can be sufficient. It leads to the process prime cost.

The tests of magnetostatics separators show that it is the most sufficient to use them while separating particles of the size of 1-6 mm in density.