MAGNETIC
SYSTEMS

MAGNETIC SEPARATOR

ITOMAK

unrivalled fine-grained and fine-dispersed gold
extraction performance

MAGNETIC SEPARATION

Magnetic separation is a method of materials separation based of difference in their magnetic properties (magnetic susceptibility) and different behaviour in magnetic field action area changing particles' gravitational trajectory. In motion of separated product through separator's magnetic field, under effect of magnetic attracting force, particles with different magnetic properties move along different trajectories, what allows to separate magnetic and nonmagnetic particles of product.

Magnetic separation is applied in upgrading operations for gravity concentrates purification, particularly primary gold concentrate of concentration table purification from magnetic minerals. Dry magnetic separation can be used at magnetic field intensity 0.7–1.0 T. Gold extraction to non-magnetic fraction is up to 99.98%. At high content of strong magnetic minerals wet magnetic separation is applied with magnetic field intensity 1.0 T.

Widely used in lines of industry as glass, metal mining, reworking, food, chemical, metallurgy, geological samples handling and many others.

Magnetic separators (wet and dry) are irreplaceable for upgrading of gold and diamond concentrates. Magnetic separation is a key part for preparation for magnetic fluid separation.

WET MAGNETIC SEPARATORS

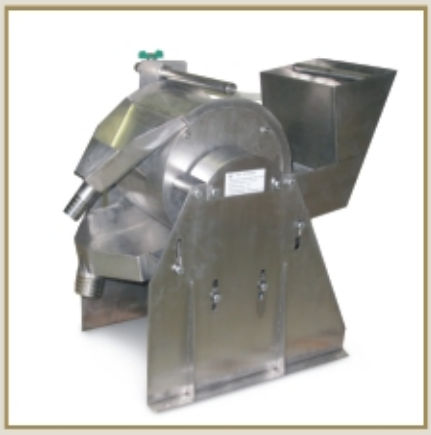
Designation

Intended for separation of ferromagnetic minerals (ferro-ferrite, pyrrhotite) from steel scrap from ores and sands getting to separation as fine pulp.

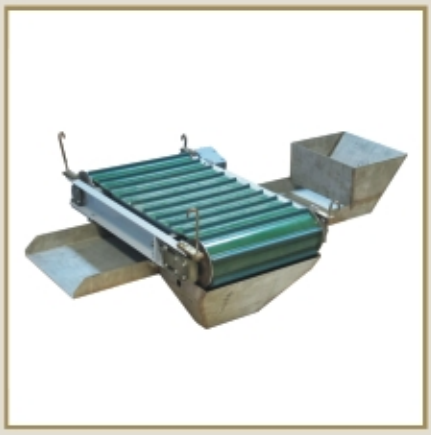
Separator is a device for purification of source material from particles having magnetic properties. Separator operation is based on process of separation mixture of mineral grains moving in magnetic field depending on their magnetic properties.

Advantages

- Modern powerful Nd-Fe-B magnets are used.
- Separators parts are made of special steel.
- Ecological cleanliness.
- Reliability and durability of main parts.
- Small size at high performance, compactness.
- Rotor, drum and belt separators based on permanent magnets.
- Engineering is performed based on special program, which allows to optimise work and increase magnetic system efficiency.



MMS-0.1PM



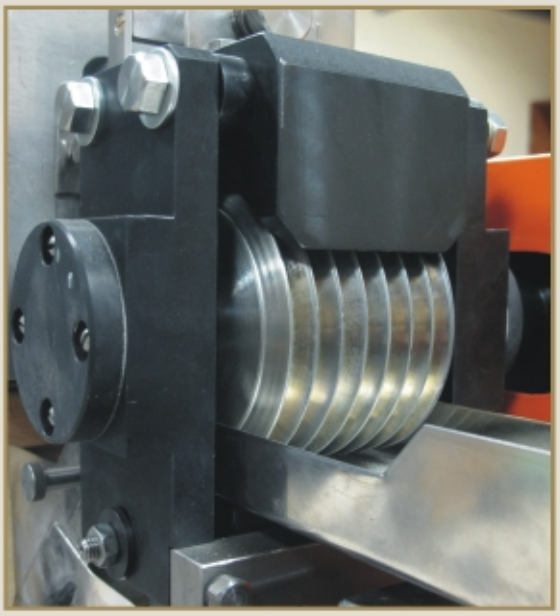
PLMMS-4PM

MMS-2PM

SPECIFICATION

Table 1.

NAME	ROTOR			DRUM	SUSPENDED
	MMS-0,1PM	MMS-2PM	MMS-4PM	MMSB-15PM	PLMMS-PM
Maximum source material capacity, t/hr	0,1	2	4	15	2
Separated materials grain size, mm	-10+0,2	-10+0,5	-10+0,5	-10+0,5	-10+0,5
Magnetic system rotation frequency, rpm	0...100	0...100	0...100	0...100	-
Belt velocity, m/s	-	-	-	-	0,32
Minimum gap width between drum and tray bottom, mm	5	5	5	30	-
Minimum gap width between belt and tray bottom, mm	-	-	-	-	55
Maximum magnetic field intensity value on drum surface, mT/G, minimum	330/3300	330/3300	330/3300	330/3300	-
Maximum magnetic field intensity value on belt scoop, mT/G, minimum	-	-	-	-	150/1500
Consumption of power from three-phase alternate current of 380 V with frequency of 50±0.5 Hz, kW	0,2	0,75	0,75	1,5	0,25
Device operation mode	continuous, sustained				
Device weight, kg, maximum	50	120	200	450	110
Overall device dimensions, mm, maximum:					
length	780	1050	1050	1010	1500
width	580	560	800	1420	880
height	570	1140	1140	1000	375



DRY MAGNETIC SEPARATORS

Designation

Dry magnetic separators are designed for washings purification from ferro- and paramagnetic impurities, as well as for separation of magnetic minerals at conduction of mineralogical analysis and moderate-size geological samples handling. Used for concentrates upgrading and in laboratory research. Irreplaceable at finishing stage of gold and diamond concentrates.

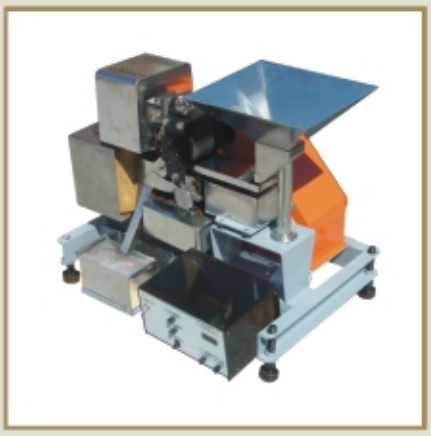
Dry magnetic separator is a device for dry two-stage purification of source material from particles having magnetic properties. At the first purification stage separation of strong magnetic impurities from source material sample is performed as a result of use of rotating magnetic system on permanent magnets. At the second purification stage weakly magnetic minerals separation is performed with use of direct current electromagnet.

In the model range of dry separators there are also one stage separators, which execute either strong magnetic impurities or weakly magnetic minerals separation from source material sample.

Advantages

- Magnetic field intensity created by device in the separation area reaches 2 Tesla. Separator provides maximum magnetic field gradient.
- Use of specialised programs in magnetic systems engineering helps to optimise their operation.
- High extraction of paramagnetic minerals is provided (titano-ferrite, pyrite).
- Modern, compact current source.
- Convenient vibration feeder trays with adjustable amplitude and frequency of oscillation.
- Two stages of concentration At the first stage strong magnetic fraction is separated, electromagnetic fraction is separated at the second stage.

SMS-20M



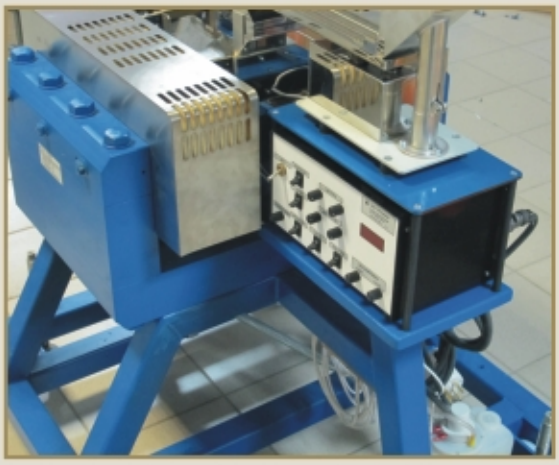
SEMS1-20

SEMS-ИКЛ

SPECIFICATION

Table 2.

NAME	WITH ADJUSTABLE FIELD		
	SMS-20M	SEMS1-20	SEMS-IKL
Maximum performance with material grain size -4+1 mm, kg/hr, minimum.	20	20	-
Magnetic field intensity on roll's ledge at 4 mm gap width between roll and magnetic conductor and 16 A current in coil, T, minimum	1,9	1,9	-
Magnetic field intensity at wedge's pin-point at 10 A current in coils, T, minimum	-	-	1,8
Separated materials grain size, mm	-4+0,1	-4+0,1	-5+1
First purification stage magnetic system rotation frequency, rpm	45	-	-
Maximum gap width between a roll and butt-end of magnetic conduit of second purification stage magnetic system, mm	10	15	-
Gap width between wedge's pin-point and butt-end of magnetic conduit, mm	-	-	20
Vibration trays oscillation amplitude, mm	0 to 2	0 to 2	-
Consumption of power from one-phase alternate current of 220 ± 22 V with frequency of 50±0.5 Hz, W, maximum	-	-	1100
Consumption of power from three-phase alternate current of 380 V with frequency of 50±0.5 Hz, W, maximum	1400	1300	-
Electrical resistance of second purification stage magnetic system, Ohm, maximum	4,8	4,8	4,2
Device operation mode at maximum 10 A current strength in second purification stage magnetic system coils	continuous, sustained		
Device operation mode at minimum 10 A current strength in second purification stage magnetic system coils	continuous, with periodic shutdown		
Device weight, kg, maximum	230	150	200
Overall device dimensions, mm, maximum:			
length	1150	850	500
width	620	480	400
height	800	680	820



MAGNETIC FLUID SEPARATORS

Designation

Separators are designed for non-magnetic materials separation by specific weight (particularly, for precious metals, heavy minerals separation from washings), and also at upgrading of diamond-bearing concentrates in dry concentration mode. It is recommended to use separators in conditions of gold-concentrating plants and sites at finishing operations of concentration process, upgrading stages.

Separator's principle of operation lies in impact on separation medium (ferromagnetic fluid) by magnetic field and creation of additional buoyant force of magnetic origin.

Magnetic fluid separation has widespread application by virtue of high separation accuracy, prompt adjustment of separation medium density. Magnetic field is created in devices by permanent magnets or electromagnets

Advantages

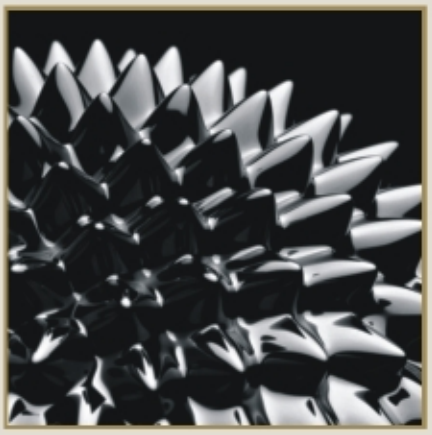
- Ability to promptly adjust separation medium density
- Motion of particles with different density can be controlled by adjusting magnetic buoyant force changing ferromagnetic fluid concentration or magnetic field intensity.
- Allows to upgrade washing to pure gold without any intermediate operations.
- Ability of any non-magnetic materials separation.
- High accuracy of stratification by density.
- Maintenance simplicity.
- All magnetic and weakly magnetic minerals shall be removed from material during preparation for magnetic fluid separation.

FERROMAGNETIC FLUID

Ferromagnetic fluid has a complicated structure and includes carrying fluid, nanoparticles of ferromagnetic material, and a surface acting agent. Kerosene, water, toluene, as well as benzene, acetone, paraffin and silicone oils, etc. can be used as carrying fluid.

Such a property of ferromagnetic-fluid as change of its effective density under effect of magnetic field is used in the process of magnetic separation.

SMZh-PM-3



Ferromagnetic fluid

SMZh-EM20

SPECIFICATION

Table 3.

NAME	On permanent magnets	With adjustable field
	SMZh-PM-3	SMZh-EM-20
Maximum source material capacity, kg/hr	3,0	20,0
Separated materials density, g/cm^3	2,8...15	2,8...15
Separated materials grain size, mm	-3,0...+1,0	-3,0...+1,0
Separated materials accuracy in density, g/cm^3:		
for materials with density from 2.8 g/cm^3 to 8 g/cm^3	±0,2	±0,2
for materials with density from 8 g/cm3 to 15 g/cm^3	±0,5	±0,5
Separation medium volume, ml	200...250	700...1000
Vibration trays oscillation amplitude, mm	0 to 1,5	0 to 1,5
Consumption of power from one-phase alternate current of 220 ± 22 V with frequency of 50±0.5 Hz, kW, maximum	0,2	2,0
Device operation mode	continuous, sustained	
Device weight, kg, maximum	20	950
Overall device dimensions, mm, maximum:		
length	530	1420
width	210	860
height	380	1300

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