ИТОМАК

PRODUCT CATALOG ZAO ITOMAK

2018

Since 1993, ITOMAK has been developing and implementing concentration technology for the mining industry. Today, it is a modern growing business known both in Russia and abroad. ITOMAK equipment is operated by gold mines in 45 countries globally — from Chukotka in Russia to South Africa and Latin America.

Based on in-house research and development, ITOMAK offers the industry state-of-the-art world-class concentration technology.

Thanks to a close partnership with the research community, ITOMAK products are continuously improved, guided by the needs of the mining industry

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By now, ITOMAK has won a leading position in the centrifugal concentrator market, both in Russia and globally.

The company conducts research on the gravity and magnetic concentration methods of mineral feeds and experimental design work for the development of new machines and plants for the concentration of ores and mineral sands.

Today, 14 types of centrifugal concentrators are available with a throughput of 0.1 to 300 t/hour and a cutting-edge automatic control system.

ZAO ITOMAK develops and produces unique magnetic separators and magnetic liquid separators.

ITOMAK MEANS QUALITY, RELIABILITY, INNOVATION

Equipment: - for the recovery of fine and ultra-fine gold and other heavy metals by gravity separation.

- for dry and wet magnetic, as well as ferrohydrostatic separation of minerals.

- for breakage, crushing, milling, classification, and sample preparation.

Process lines based on environmentally friendly (gravity and magnetic) concentration methods allowing to recover finely-dispersed particles of gold and other heavy minerals.

Mobile modular prospecting concentration plants with a feed, deep breakage, and concentration system for the gold and diamond mining industry.

Comprehensive study of samples and development of recommendations on gravity and magnetic concentration of feeds containing finely-dispersed mineral particles.

Research on gravity and magnetic concentration processes.

Delivery and commissioning of refinery plants for gold concentrates.

Lab-scale and prospecting concentration plants.

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RESEARCH, PRE-TREATMENT, TESTING, AND SAMPLING

PLANTS AND MODULES

Introduction

THE OPERATING PRINCIPLE OF A TROMMEL SCRUBBER.

A trommel scrubber operates by breaking up mineral sands and ores and separating the mineral grains from the clay gouge by washing. Breakage is achieved by loosening the feed material in water with rotating fingers or plates forming a special pattern on the inner surface of the trommel screen's closed chamber. Pebble in the feed enhances the effect of breakage due to the impact and abrasive action of falling and sliding stones.

Via an intermediate receiving hopper, the feed is sent into the feed opening of the rotating trommel scrubber. Simultaneously, water is supplied to the scrubber, either with the feed or separately via the irrigation pipe inside the scrubber.

In the scrubber's closed chamber, the feed is broken and washed. Then, the washed material is fed to screening in the drum screen (the trommel's screening compartment). Particles finer than the size of the openings are sieved under the influence of the centrifugal force through the perforated wall into the hopper, while coarser particles are sent to the discharge.

THE OPERATING PRINCIPLE OF A HIGH PRESSURE TROMMEL.

A scrubber operates by washing with a high pressure water jet mineral sands and ores and separating the mineral grains from the clay gouge. The water jets are sent through the openings of the rotational nozzles. In addition, the scrubber has two flushing slit jets for flushing the openings of the perforated drum. The drum rotates continuously.

A portion of the treated material is fed into the scrubber's perforated drum through the feed opening, then the opening is closed with a lid. Then, the scrubber is put into the running position and water is supplied through the main nozzle at a pressure of up to 200 bar.

In the scrubber's drum, the feed is broken up and washed. Washed particles finer than the size of the openings in the drum shell are drained and discharged through the drainage pipe. After the breakup process, particles coarser than the size of the openings are unloaded from the drum by tilting it.

High-pressure trommel scrubbers integrated into a prospecting concentrator module (GROM)

Trommel scrubbers, series SB

Trommel scrubber SB-3

PURPOSE

Trommel scrubbers are intended for washing, mechanical breakage, and classification in water of alluvial sands or ores for subsequent concentration.

SPECIFICATIONS

Parameter	SB-3	SB-5	SB-5-2
Maximum throughput, m³/hour of feed, max	3.0	5,0	
Trommel scrubber rotational speed, rpm	24,5		
Trommel scrubber angle, max	3°		
Closed chamber length, mm	850	1200	
Closed chamber diameter, mm	800		
Length of the screening section, mm	465	770	
Diameter of the screening section, mm	600		
Number of screening drums	1		2
Diameter of the openings in the screening section, mm	8,0 .. 16,0		8,0 .. 16,0 / 2 .. 5
Maximum size of the feed, mm	100,0		
Input power, kW, max	3,0		
Mains voltage / frequency, V / Hz	380±10% / 50±1%		
Unit weight, kg, max	950	1100	1200
External dimensions, mm, max:			
Length (L), mm	2200	2820	2980
Width/width incl. manifold, mm	950/1010		
Height, mm	1800		

High pressure scrubber DVD

PURPOSE

The scrubber is intended for washing, mechanical breakage, and classification in water of alluvial sands or ores for subsequent concentration.

Ensures accelerated breakage of difficult-to-wash clayey feeds.

SPECIFICATIONS

Parameter	DVD-0,1	DVD-0,15
Maximum throughput, l/hour of feed, max	100	150
Scrubber drum rotational speed, rpm	32	
Operating angle of the scrubber drum, deg.	22	
Diameter of the scrubber screening section, mm	500	600
Diameter of the openings in the scrubber screening section, mm	2	
Feed size, mm, max	100	
Water pressure in the system, bar, max	200	
Input power, kW		
Scrubber drive	0.37	
Tipper drive	0,25	
High pressure pump	5.5	
Mains voltage / frequency, V / Hz	380±10% / 50±1%	
Unit weight, kg, max	180	210
External dimensions, mm, L x W x H, max:	910 x 720 x 1150	1150 x 1050 x 1380

Scrubber D-40

PURPOSE

The scrubber is intended for breaking up (comminution) and desliming of core samples with a high content of clay minerals in geological prospecting for primary and placer deposits of diamonds, precious metals, and other solid minerals.

OPERATION

The principle of operation is based on the use of an impeller (screw) rotating at a high speed causing intensive mechanical action on the feed.

SPECIFICATIONS

Parameter	Value
Operational feed throughput	4 samples/hour or not less than 100 kg
Chamber capacity, l, min	40
Feed weight, kg, max	25
Feed size, mm, max	50
Impeller rotational speed, min^{-1}, from…to	50…1800
Water feed rate at desliming, l/min, min	60
Input power, kW, max	5,5
Mains voltage / frequency, V / Hz	380±10% / 50±1%
Unit weight, kg, max	440
External dimensions, mm, L x W x H, max:	880 x 1172 x 2350

Introduction

THE OPERATING PRINCIPLE OF CENTRIFUGAL SEPARATION

The operating principle of the concentrator is to separate the feed into two fractions — sink and float — in a centrifugal force field. The separation of the feed into fractions is a result of the interaction of the flow of washing water, centrifugal forces, and the gravity field acting on the particle in a rotor rotating horizontally or at an angle. The intensity of the density separation process is enhanced by the vibrations of the mineral layer caused by the inclined or horizontal position of the rotor.

The process of density segregation is intensified by the horizontal or oblique (non-vertical) position of the rotation axis of the rotor; due to gravity, the rotation results in weak oscillations of the mineral layer in the radial and axial directions. As a result, feed particles with a specific weight greater than a threshold value (the so-called sink fraction) migrate under the action of the centrifugal force to the bottom of the cone's grooves, towards the washing water flow, and are deposited there. Feed particles with a lower specific weight (the so-called float fraction) are forced onto the inner surface of the cone and carried by the water flow over the rotor lip to the discharge. Gradually, due to the substitution of lighter particles with heavy ones, a change occurs in the structure of the deposits as the sink fraction accumulates. The efficiency of the process depends on the angular velocity, the pressure of the washing water, the size class, and the liquid/solid ratio of the feed.

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ADVANTAGES

1. High specific throughput and performance. Environmental performance. Only electric power and water are required to run the plant.
2. Low power consumption, light weight, dimensions, and footprint.
3. High recovery of heavy minerals into high-grade concentrates, unsurpassed recovery of ultra-fine, fine, platy, and floating gold
4. High reduction rate, up to 10^4, or low concentrate yield.
5. Auto-washing of the concentrate takes no more than 1 minute.
6. Horizontal and inclined axis of rotation of the rotor improves reliability, prevents water or sand from entering the bearing assembly. High quality at an affordable price, reasonable lead time, reliability, wear resistance, spare parts included in the scope of delivery. Russian-made spare parts. Warranty maintenance.
7. Simplicity of operation, maintenance and repair, resilience in abnormal conditions, water can be recycled.

Centrifugal concentrator ITOMAK-KN-0,1

PURPOSE

Gravity centrifugal concentration of small-volume mineral samples (ground ores or sands) containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- In geological prospecting, in the processing of pre-treated core samples.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Processing of sluice concentrates at placer gold concentrating sites.
- Performance assessments of concentration equipment and process sampling.
- Upgrading of concentrates.
- Training and research.

SCOPE OF DELIVERY

The concentrator is supplied complete with a control cabinet and a water pump. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.

OPERATION

The accumulated concentrate is extracted manually, by removing the working cone from the rotor and washing it in the washer.

SPECIFICATIONS

Parameter	Value
Throughput, kg/hour of solid residue	100
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	0,25
Maximum washing water feed rate at 0.3 bar, m^3/hour	2,0
Feed size (alluvium), mm, max	2,0
Feed size (ore), mm, max	0.5
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, ml, max	150
Electric motor power, W	250
3-phase mains voltage*, V AC	380±38
Unit weight, kg, max	55
External dimensions, mm, L x W x H, max:	550 x 340 x 780
(*) — Optionally: support for connection to a single-phase 50 Hz 220 V AC mains.	

Centrifugal concentrator ITOMAK-KG-0,3

PURPOSE

Gravity centrifugal concentration of small-volume mineral samples (ground ores or sands) containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- In geological prospecting, in the processing of pre-treated core samples.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Processing of sluice concentrates at placer gold concentrating sites.
- Performance assessments of concentration equipment and process sampling.
- Upgrading of concentrates.
- Training and research.

SCOPE OF DELIVERY

The concentrator is supplied complete with a control cabinet and a water pump. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.

OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	Value
Throughput, kg/hour of solid residue	300
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	0,75
Concentrate washing time, min, not more than	1,0
Maximum washing water feed rate at 0.3 bar, m^3/hour	2.7
Feed size (alluvium), mm, max	2
Feed size (ore), mm, max	0.5
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, ml, max	300
Electric motor power, W	370
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Unit weight incl. spare parts, kg, max	65
External dimensions, mm, L x W x H, max:	655 x 440 x 785
(*) — Optionally: support for connection to a single-phase 50 Hz 220 V AC mains.	

Centrifugal concentrator ITOMAK-KN-1,0

PURPOSE

Gravity centrifugal concentration of bulk mineral samples (ground ores or sands) containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Bulk sampling in geological prospecting.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Upgrading of shallow sluice concentrates and recovery of gold from the tailings of heavy concentrate upgrading.
- Performance assessments of concentration equipment and process sampling.
- Reduction of concentrates from the more efficient centrifugal concentrators.
- Research.

SCOPE OF DELIVERY

The concentrator is supplied complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.

OPERATION

The accumulated concentrate is extracted manually, by removing the working cone from the rotor and washing it in the washer.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour of solid residue	1,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	2.5
Maximum washing water feed rate at 0.3 bar, m^3/hour	7,2
Feed size (alluvium), mm, max	3,0
Feed size (ore), mm, max	1,0
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, l, max	1,0
Electric motor power, kW	1,1
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Unit weight, kg, max	100
External dimensions, mm, L x W x H, max:	805 x 455 x 900
(*) — Optionally: support for connection to a single-phase 50 Hz 220 V AC mains.	

Centrifugal concentrator ITOMAK-KG-1,0

PURPOSE

Gravity centrifugal concentration of bulk mineral samples (ground ores or sands) containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Bulk sampling in geological prospecting.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Upgrading of shallow sluice concentrates and recovery of gold from the tailings of heavy concentrate upgrading.
- Performance assessments of concentration equipment and process sampling.
- Reduction of concentrates from the more efficient centrifugal concentrators.
- Research.

SCOPE OF DELIVERY

The concentrator is supplied complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.

OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour of solid residue	1,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	2.5
Maximum washing water feed rate at 0.3 bar, m^3/hour	7,2
Feed size (alluvium), mm, max	3,0
Feed size (ore), mm, max	1,0
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, l, max	1,0
Electric motor power, kW	1,1
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Unit weight, kg, max	90
External dimensions, mm, L x W x H, max:	930 x 590 x 780
(*) — Optionally: support for connection to a single-phase 50 Hz 220 V AC mains.	

Centrifugal concentrator ITOMAK-KG-2,0

PURPOSE

Gravity centrifugal concentration of ground ores or sands containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Upgrading of concentrates at concentrator plants.
- Installed as part of process trains at concentration operations.
- In geological prospecting, as part of concentration plants and in bulk sampling.
- Reduction of concentrates from the more efficient centrifugal concentrators.

SCOPE OF DELIVERY

The concentrator is available in two versions:

1. Complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.
2. Complete with an automatic control system.

OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour of solid residue	2,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	5,0
Maximum washing water feed rate at 0.3 bar, m^3/hour	7,6
Feed size (alluvium), mm, max	3,0
Feed size (ore), mm, max	1,0
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, l, max	1,7
Concentrate washing time, min, not more than	1,0
Electric motor power, kW	1,1
Electric drive power, drain unit, kW	0,09
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Unit weight, kg, max	150
External dimensions, mm, L (hatch open) x W x H, max:	990 (1200) x 865 x 880

Centrifugal concentrator ITOMAK-KG-5,0

PURPOSE

Gravity centrifugal concentration of ground ores or sands containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Upgrading of concentrates at concentrator plants.
- Installed as part of process trains at concentration operations.
- In geological prospecting, as part of concentration plants and in bulk sampling.
- Reduction of concentrates from the more efficient centrifugal concentrators.

SCOPE OF DELIVERY

The concentrator is available in two versions:

1. Complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.
2. Complete with an automatic control system.

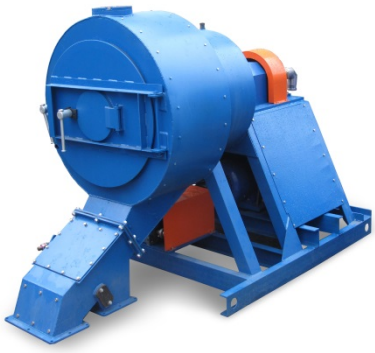
OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour of solid residue	5,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	12,0
Maximum washing water feed rate at 0.4 bar, m^3/hour	12,5
Feed size (alluvium), mm, max	3,0
Feed size (ore), mm, max	1,0
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, l, max	3,0
Concentrate washing time, min, not more than	1,0
Electric motor power, kW	3,0
Electric drive power, drain unit, kW	0,25
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Unit weight, kg, max	500
External dimensions, mm, L x W x H, max:	1370 x 900 x 1250

Centrifugal concentrators ITOMAK KG-10,0 / KG-20,0



Centrifugal concentrator KG-10

Manifold

PURPOSE

Gravity centrifugal concentration of ground ores or sands containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Installed as part of process trains at concentration operations.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- As part of concentration plants at technogenic deposits.

SCOPE OF DELIVERY

The concentrator is available in two versions:

1. Complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.
2. Complete with an automatic control system.

OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	ITOMAK-KG-10,0	ITOMAK-KG-20,0
Throughput, ton/hour of solid residue	10,0	20,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	25,0	50,0
Maximum washing water feed rate at 0.4 bar, m^3/hour	20,7	26,8
Feed size (alluvium), mm, max	3,0	
Feed size (ore), mm, max	1,0	
Content of the solids in the slurry, %	up to 75	
Volume of the concentrate, l, max	6,1	13,0
Concentrate washing time, min, not more than	1,0	1,0
Electric motor power, kW	5,5	
Electric drive power, drain unit, kW	0,37	
3-phase mains voltage*, V AC	380±38	
Mains frequency, Hz	50±1	
Unit weight, kg, max	700	900
External dimensions, mm, L (hatch open) x W x H, max:	2100(2250) x 1200 x 1400	2100 (2460) x 1585 x 1625

Centrifugal concentrators ITOMAK KG-30,0 / KG-40,0

Centrifugal concentrator KG-40

Manifold

PURPOSE

Gravity centrifugal concentration of ground ores or sands containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Installed as part of process trains at concentration operations.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- As part of concentration plants at technogenic deposits.

SCOPE OF DELIVERY

The concentrator is available in two versions:

1. Complete with a control cabinet. On request, the control cabinet can be fitted with a frequency converter for separation factor adjustment.
2. Complete with an automatic control system.

OPERATION

The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.

SPECIFICATIONS

Parameter	ITOMAK-KG-30,0	ITOMAK-KG-40,0
Throughput, ton/hour of solid residue	30,0	40,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	75,0	100,0
Maximum washing water feed rate at 0.4 bar, m^3/hour	29,7	48,6
Feed size (alluvium), mm, max	3,0	
Feed size (ore), mm, max	1,0	
Content of the solids in the slurry, %	up to 75	
Volume of the concentrate, l, max	15,0	40,0
Concentrate washing time, min, not more than	1,0	1,0
Electric motor power, kW	7,5	11,0
Electric drive power, drain unit, kW	0,37	
3-phase mains voltage*, V AC	380±38	
Mains frequency, Hz	50±1	
Unit weight, kg, max	1280	1600
External dimensions, mm, L x W x H, (without feed nozzles), max:	2170 x 1540 x 1740	2325 x 1500 x 1780

Multi-rotor system ITOMAK MK-100,0

PURPOSE

Gravity centrifugal concentration of ground ores or sands containing ultra-fine and fine liberated particles of precious metals or other minerals with a high specific weight.

APPLICATIONS

- Installed as part of process trains at concentration operations.
- As part of concentration plants at technogenic deposits.

SCOPE OF DELIVERY

Available solely complete with an automatic control system.

OPERATION

The feed is supplied to the concentrator continuously, while the concentrate is discharged periodically. The accumulated concentrate is discharged from the cones alternately. When discharging, the supply of feed to one of the cones being discharged is suspended, while the other two rotors continue to operate in the concentration cycle.
The accumulated concentrate is flushed into the concentrate receiver from the working cone with washing water coming from the cone openings when it stops or slowly rotates.
This plant is an illustration of an installation composed of several concentrators. It is controlled automatically. Allows flexible control of the throughput. The prefab design of the modules allows convenient transportation and maintenance.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour of solid residue	100,0
Throughput, m^3/hour of pulp, at a L:S ratio of 3:1	250,0
Maximum washing water feed rate at 0.4 bar, m^3/hour	146,0
Feed size (alluvium), mm, max	3,0
Feed size (ore), mm, max	1,0
Content of the solids in the slurry, %	up to 75
Volume of the concentrate, l, max	120,0
Concentrate washing time, min, not more than	1,0
Electric motor power, kW	3x11,0
Electric drive power, drain unit, kW	3x0,37
3-phase mains voltage, V AC	380±38
Mains frequency, Hz	50±1
Unit weight, kg, max	5000
External dimensions, mm, L x W x H (with hopper), max:	2300 x 3435 x 1760 (3072)

Introduction

THE OPERATING PRINCIPLE OF A JIGGER.

Jigging means separation of a mixture of mineral particles by density based on the difference in their velocities in a vertical pulsating flow of water or air.

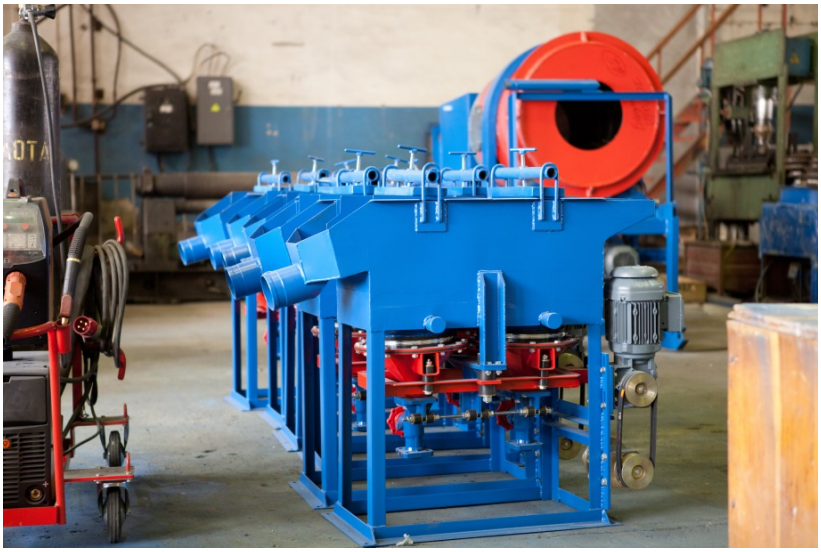
The motion patterns of mineral particles are very complex and lack an unambiguous theoretical explanation. Under the action of the ascending flow of water, the feed becomes suspended and is rearranged into density layers in accordance with the fall velocity of the various particles. Under the action of the descending flow, a similar process takes place, but the feed is deposited and compacted. As a result, particles with higher density become concentrated in the bottom layer.

The equipment used for jigging is known as jigs.

A jig is composed of two interconnected concentration and pulsation compartments. In the concentration compartment, there is a sieve for separating the mineral feed. In the pulsation compartment, there is a piston or other device performing reciprocating motion that is transmitted to the water filling the jigger's chamber. The mineral feed to be concentrated is fed to the sieve with water, which transports it along the jigger, distributing it in a uniform layer (bed).

Through the openings in the sieve, the drive sends ascending and descending flows of water with variable velocity and direction. When there is ascending flow, the bed loosens, and the lightest grains whose fall velocity is less than the velocity of ascending flow travel upward with the water, while the heavier grains become suspended. Under the action of a descending flow, the bed becomes compacted, with the heavier grains being entrained downward by the water flow with a higher velocity than the lighter grains. As a result of the alternating action of ascending and descending flows, the bed is stratified: light minerals are carried by ascending flows into the top layers, and heavy minerals under the action of gravity overcome the resistance of the environment and concentrate in the bottom layers of the bed. Due to the longitudinal flows of water, the bed moves along the plant to the discharge side of the sieve where the concentration product is discharged in layers.

In diaphragm jiggers (MOD), pulsations of the medium are induced by the moving conical bottoms or a diaphragm. Jiggers are used to concentrate ferrous and rare metals and gold-bearing placers with feed particle sizes from 0.5 to 10 (15) mm.



Jig MOD-02SK installed in a shop

Diaphragm jigs, series MOD-SK

Jigr MOD-0,2SK

Jig MOD-0,5SK

PURPOSE

Jigs of the series MOD-SK are intended for mineral processing by jigging in an aqueous medium in a lab or full-scale setting.

APPLICATIONS

- Installed as part of process trains at concentration operations.
- In geological prospecting, as part of concentration plants and in bulk sampling.
- Lab studies.
- Widely used in the processing of concentrates and preparation of geological samples, in particular, as part of the upgrade modules ITOMAK DM-1, DM-2 and PMGOU plants.

SPECIFICATIONS

Parameter	MOD-0,2SK	MOD-0,5SK
Maximum throughput, kg/hour	900	2000
Chamber area, m^2	0,1	0,25
Number of chambers	2	2
Chamber size, mm	336 x 336	500x500
Maximum stroke of the diaphragm, mm	20,0	30
Maximum pulsation frequency, per minute	341	225
Feed size, mm, max	8,0	10,0
Diameter of the outlet valve, DN, mm	25	25
Diameter of the underscreen water supply nozzle, mm	32	40
Diameter of the tailings discharge nozzle, mm	100	150
Installed power, kW, max	0,75	2.2
3-phase mains voltage / frequency, V AC / Hz	380±10% / 50±1%	380±10% / 50±1%
Unit weight incl. spare parts, kg, max	150	330
External dimensions, mm, L x W x H (with the undersize concentrate receiver hopper installed), max:	1170 x 570 x 1100	1875 x 790 x 1280

Diaphragm jig MOD-0.02SKL

PURPOSE

Concentration of minerals by jigging in an aquatic medium in a lab setting.

APPLICATIONS

Lab examination of samples.

Training and research.

SCOPE OF DELIVERY

Each jigger is supplier complete with a power supply and control unit.

SPECIFICATIONS

Parameter	Value
Maximum throughput, kg/hour, up to	100
Chamber area, m^2	0,01
Number of chambers	2
Diameter of the chamber, mm	120
Maximum stroke of the diaphragm, mm	18
Maximum pulsation frequency per minute	440
Feed size, mm, max	5,0
Diameter of the water supply nozzle, mm	27
Diameter of the output nozzle, mm	27
Diameter of the tailings discharge nozzle, mm	48
Input power, W	300
Single-phase mains voltage, V AC	220±22
Mains frequency, Hz	50±1
Unit weight incl. spare parts, kg, max	60
External dimensions, mm, L x W x H (incl. the support), max:	645 x 440 x 1050

Field jig, series MOP

Jigger MOP-0,03

PURPOSE

Field jigs with a moving sieve are intended for concentrating geological samples by jigging minerals, sands, and ores in an aqueous medium.

APPLICATIONS

Examination of samples in a field or stationary setting, geological prospecting.

SCOPE OF DELIVERY

Each jig is supplied complete with:
1. Manual drive.
2. Power supply and control unit.

SPECIFICATIONS

Parameter	MOP-0,03	MOP-0,07
Maximum weight of the feed, kg	3	5
Feed size, mm, max	10,0	10,0
Sieve dimensions, mm, D x H	200 x 50 x 100	200/300 x 38..100
Maximum amplitude of sieve oscillation, mm	34	34
Maximum pulsation frequency per minute	240	440
Input power, W	100	290
Single-phase mains voltage, V AC	220±22	220±22
Unit weight incl. spare parts, kg, max	12	15
Weight, including spare parts and power supply, kg, max	19	22
External dimensions, mm, L x W x H, max:	370 x 320 x 525	515 x 460 x 610
The equipment can be operated without a power supply unit by connecting 12 V and 24 V batteries (pulsation frequency cannot be adjusted).		

Lab-scale shaking table SKL-0,2

PURPOSE

The shaking table is intended for separating granular feeds by density in water by making use of the asymmetric oscillatory motion of the table deck in the direction coinciding with the direction of the grooves (slowly forward and quickly backward). The reciprocating motion of the table transports heavy particles along the grooves to the concentrate discharge side.

APPLICATIONS

- Concentrate upgrading circuits, in order to recover heavy minerals from the washings.
- Lab examination of samples.
- Training and research

SPECIFICATIONS

Parameter	Value
Throughput, kg/hour, max	15
Size of the feed to be separated, mm, max	1
Synchronous engine speed, rpm	1000
Deck area, m^2	0,2
Frequency of oscillation of the deck, Hz (cycles/min), from…to	2,5…8,3 (150…500)
Amplitude of oscillation of the deck, mm	2…13
Deck adjustment	variable
Electric motor power, kW	0,25
Single-phase mains voltage, V AC	380±38
Mains frequency, Hz	50±1
Weight (without the control cabinet), kg, max	36
External dimensions, mm, L x W x H, max:	986 x 397 x 725

INTRODUCTION

THE OPERATING PRINCIPLE OF MAGNETIC LIQUID SEPARATION

The separation criterion in magnetic liquid separation is density. Feed particles with a density higher than the density of the magnetic fluid fall to the bottom of the separator chamber, while particles with a lower density rise to the surface of the liquid.

Another feature of magnetic liquid separation is that the required pseudo-density of the magnetic fluid (up to 12,000 kg/m^3) is achieved under the action of an external magnetic field with a gradient, which imposes certain limitations on the process, in particular, on the active volume of the separation zone, which determines the separator's capacity.

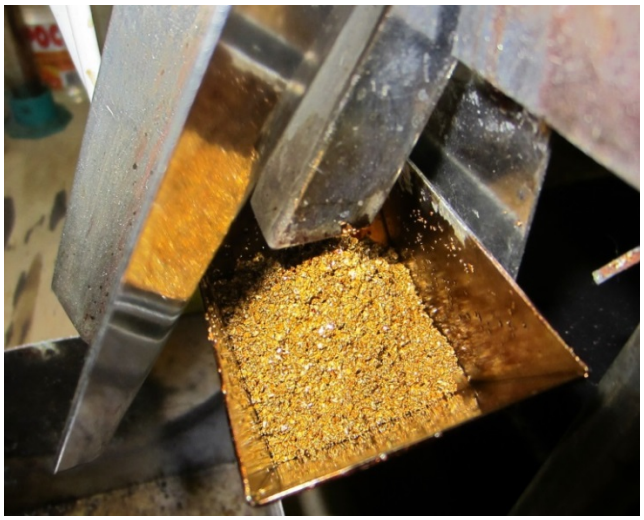
Before magnetic liquid separation, the magnetic and weakly magnetic fractions must be removed from the feed as the separator is not designed to handle these. This is efficiently accomplished with the help of the high-gradient electromagnetic separator SMS-20M3, whose magnetic field intensity in the active gap is up to 2T.

MAGNETIC (FERROMAGNETIC) LIQUID

The key component of a magnetic liquid separator is the magnetic (ferromagnetic) liquid allowing the separation by specific weight of nonmagnetic materials, thanks to the magnetic fluid's ability to change its effective density under the action of the magnetic field.

Magnetic liquid is a colloidal solution of a complex structure and is composed of a carrier fluid, nano-sized particles of a ferromagnet, and surfactants. The carrier fluid is kerosene.

For the recovery of gold, the recommended density of the magnetic fluid is 0.95-1.06 g cm^3.



Gold after magnetic liquid separation

Magnetic liquid separator in action

Magnetic liquid separator SMZ-PM-3

PURPOSE

Separation of nonmagnetic particles by density in a magnetic fluid held in a constant non-homogeneous magnetic field.

APPLICATIONS

- Concentrate finishing and upgrading in gold mining, for the recovery of precious metals, diamonds, and other valuable minerals from the washings.
- In geological prospecting, for the processing of non-magnetic stream sediment samples.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the magnetic fluid.

OPERATION

The material is fed to separation dry.
The separation density threshold is set by selecting the initial density of the magnetic fluid at a constant intensity of the magnetic field.
During the separation process, the feed is divided by density into two components — the light and the heavy fractions, which are continuously removed from the separation zone. In the separation of gold concentrates, the recovery into the heavy fraction is not less than 98.8%.
For pre-treatment of the feed (removal of magnetic particles) before separation in a magnetic liquid separator, a dry magnetic separator of the series SMS.

SPECIFICATIONS

Parameter	Value
Maximum throughput, kg/hour of feed, max	3,0
Density of the feed to be separated, g/cm^3, from…to	1,0 .. 19
Size of the feed to be separated, mm	-4,0 … +0,1
Separation accuracy by density, g/cm^3	
Feeds with a density of 1.0 g/cm^3 to 8 g/cm^3	±0.2
Feeds with a density of 8 g/cm^3 to 15 g/cm^3	±0.5
Separation medium	Magnetic liquid based on a colloidal system of magnetite in kerosene
Volume of the separation medium, ml	200 … 300
Oscillation amplitude of the shaking chute, mm	0 to 1
Input power, W, max	200
Single-phase mains voltage, V AC	220±22
Mains frequency, Hz	50±1
Mode of operation	continuous, long-term
Unit weight, kg, max	45
External dimensions, mm, L x W x H, max:	540 x 190 x 370

Magnetic liquid separator SMZ-EM-20

PURPOSE

Separation of nonmagnetic particles by density in a magnetic fluid held in a constant non-homogeneous magnetic field.

APPLICATIONS

- Concentrate finishing and upgrading in small- and large-scale gold mining, for the recovery of precious metals, diamonds, and other valuable minerals from the washings.
- In geological prospecting, for the processing of non-magnetic bulk stream sediment samples.
- Development of processes for the recovery of precious metals and heavy minerals from ores, placers, and technogenic deposits.
- Separation of electronic scrap and recyclables from non-ferrous metals.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the magnetic fluid.

OPERATION

The material is fed to separation dry.
The separation density threshold is set by selecting the intensity of the magnetic field applied to the separation medium or the initial density of the magnetic fluid.
During the separation process, the feed is divided by density into two components — the light and the heavy fractions, which are continuously removed from the separation zone. In the separation of gold concentrates, the recovery into the heavy fraction is not less than 98.8%
For pre-treatment of the feed (removal of magnetic particles) before separation in a magnetic liquid separator, use a dry magnetic separator of the series SMS.

SPECIFICATIONS

Parameter	Value
Maximum throughput, kg/hour of feed, max	20,0
Density of the feed to be separated, g/cm^3	1,0 .. 19
Size of the feed to be separated, mm	-4,0 ..+0,1
Accuracy of separation by density	
Feeds with a density of 1.0 g/cm^3 to 8 g/cm^3	±0,2
Feeds with a density of 8.0 g/cm^3 to 15 g/cm^3	±0,5
Separation medium	Magnetic liquid based on a colloidal system of magnetite in kerosene
Volume of the separation medium, ml	700 ... 1000
Oscillation amplitude of the vibrating chutes, mm	0 to 2
Input power, kW, max	2,0
Single-phase mains voltage, V AC	220±22
Mains frequency, Hz	50±1
Mode of operation	continuous, long-term
Unit weight, kg, max	750
External dimensions, mm, L x W x H, max	1180 x 715 x 1270

INTRODUCTION

MAGNETIC PROPERTIES OF MATERIALS

By their magnetic properties or by the ability to interact with a magnetic field, materials are classified into three groups:

- Ferromagnetic, or strongly magnetic;
- Paramagnetic, or weakly magnetic
- Diamagnetic

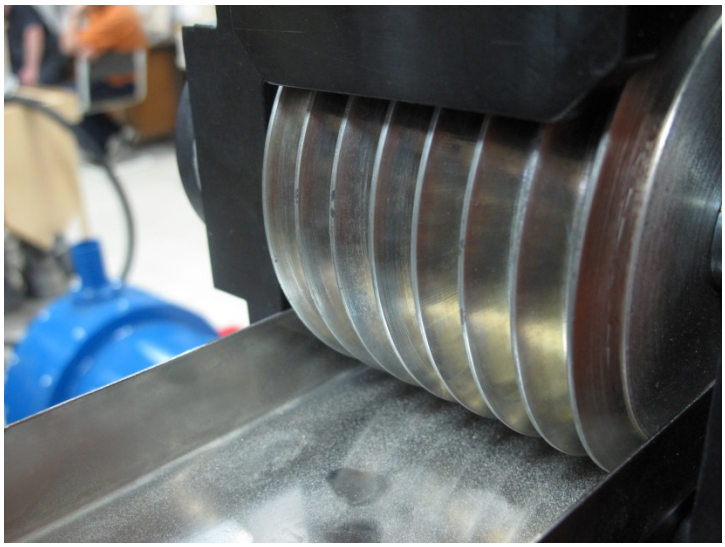
DRY MAGNETIC SEPARATION

The process of concentration by magnetic separation in air is known as dry magnetic separation.

THE OPERATING PRINCIPLE OF THE ELECTROMAGNETIC SEPARATOR SMS-20M3

Separation using SMS-20M3 is carried out in two successive stages. In the first one, permanent magnets are used to remove the strongly magnetic fraction (such as iron, magnetite). In the second stage, with the help of electromagnets with an adjustable magnetic field, the weakly magnetic fraction is removed. All units are mounted on a single frame, and the removal of the strongly magnetic and weakly magnetic fractions occurs simultaneously in the same process.

Control unit for the separator SMS-20M



A roller in the second (electromagnetic) stage of separation.

Dry magnetic separator SMS-20M3

This model is an upgrade to SMS-20M offering a number of advantages.

PURPOSE

Two-stage dry magnetic roller separator for the separation of particles by magnetic properties.

APPLICATIONS

- Finishing and upgrading of concentrates to remove ferro- and paramagnetic particles from washings.
- Process studies of mineral samples.
- Preparation of process samples for the mineralogical analysis.
- In geological prospecting, for the processing of stream sediment samples.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the control unit.

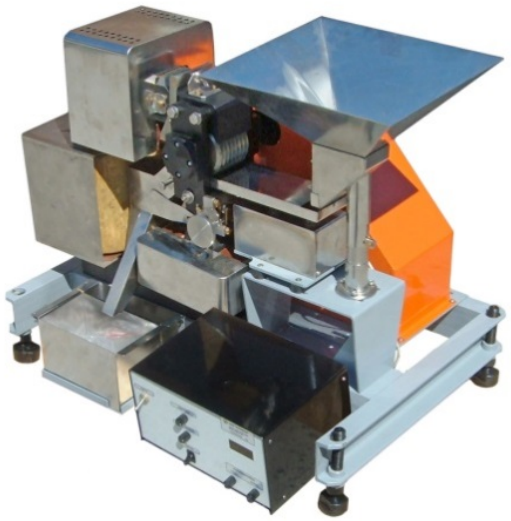
OPERATION

In a single separation cycle, the feed is separated into three products — ferromagnetic, paramagnetic, and nonmagnetic.
The gap in the magnetic core of the magnetic system in the second separation stage is adjustable.
Separation zone in the second separation stage is accessible and the separator is easy to clean.

SPECIFICATIONS

Parameter	Value
Maximum throughput, feed size -4.0 +1.0 mm, kg/hour, not less than	20,0
Maximum magnetic field strength on the roller protrusions, 6 mm gap between the roller and the magnetic core, coil current 16 A, T, not less than	2,1
Size of the feed to be separated, mm	-4,0 +0,1
Rotational speed of the magnetic system in the first stage of separation, rpm	45
Maximum adjustable gap between the roller and the end of the magnetic core of the magnetic system in the second stage of separation, mm	10
Oscillation amplitude of the shaking chutes, mm	0 .. 2,0
Mode of operation at a current of not more than 10.0 A in the coils of the magnetic system in the second stage of separation	Continuous, long-term
Mode of operation at a current of more than 10.0 A in the coils of the magnetic system in the second stage of separation	Intermittent
Maximum input power from a three-phase mains with a voltage of 380±30 VAC and a frequency of 50±0,5 Hz, W, max	1300
AC supply voltage, V	380±30
Mains frequency, Hz	50±1
Unit weight, kg, max	230
External dimensions, mm, L x W x H, max:	1030 x 620 x 835

Dry magnetic separator SEMS1-20



PURPOSE

Single-stage dry magnetic roller separator for the separation of particles by magnetic properties.

APPLICATIONS

- Finishing and upgrading of concentrates to remove ferro- and paramagnetic particles from washings.
- Process studies of mineral samples.
- Preparation of process samples for the mineralogical analysis.
- In geological prospecting, for the processing of stream sediment samples.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the control unit.

OPERATION

In a single separation cycle, the feed is separated into two products — magnetic and nonmagnetic.
The gap in the magnetic core of the magnetic system is adjustable.

SPECIFICATIONS

Parameter	Value
Maximum throughput, feed size -4.0 +1.0 mm, kg/hour, not less than	20,0
Maximum magnetic field strength on the roller protrusions, 6 mm gap between the roller and the magnetic core, coil current 16 A, T, not less than	1,9
Size of the feed to be separated, mm	-4,0 +0,1
Maximum adjustable gap between the roller and the end of the magnetic core of the magnetic system, mm	10
Oscillation amplitude of the shaking chutes, mm	0 .. 2,0
Mode of operation at a current of not more than 10.0 A in the coils of the magnetic system	Continuous, long-term
Mode of operation at a current of not more than 10.0 A in the coils of the magnetic system	Intermittent
Maximum input power from a three-phase mains with a voltage of 380±30 VAC and a frequency of 50±0,5 Hz, W, max	1500
AC supply voltage, V	380±30
Mains frequency, Hz	50±1
Unit weight, kg, max	150
External dimensions, mm, L x W x H, max:	850 x 580 x 680

Dry magnetic separator SMS-20-PM1

PURPOSE

Dry magnetic disc separator for the separation of particles by magnetic properties.

APPLICATIONS

- Finishing and upgrading of concentrates to remove ferromagnetic particles from washings.
- Process studies of mineral samples.
- Preparation of process samples for the mineralogical analysis.
- In geological prospecting, for the processing of stream sediment samples.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the control unit.

OPERATION

In a single separation cycle, the feed is separated into two products — ferromagnetic and nonmagnetic.
The gap between the magnetic system and the vibrating chute is adjustable, in order to adjust the intensity of the magnetic field.

SPECIFICATIONS

Parameter	Value
Maximum throughput, feed size -4.0 +1.0 mm, kg/hour, not less than	20
Size of the feed to be separated, mm	-4 +0,1
Displacement (vertical) of the magnetic system, mm	10
Oscillation amplitude of the shaking chute, mm	0 to 2
Mode of operation	Continuous, long-term
Maximum power intake, VA, not more than	100
AC supply voltage, V	220±22
Mains frequency, Hz	50±1
Unit weight, kg, max	15
External dimensions, mm, L x W x H, max:	560 x 270 x 340

Dry magnetic separator SEMS-IKL

PURPOSE

Dry magnetic separator for the separation of particles by magnetic properties.

APPLICATIONS

- Finishing and upgrading of concentrates to remove ferro- and paramagnetic particles from washings.
- Process studies of mineral samples.
- Preparation of process samples for the mineralogical analysis.
- In geological prospecting, for the processing of stream sediment samples.
- Training and research.

SCOPE OF DELIVERY

The separator is supplied complete with the control unit.

OPERATION

The feed is separated manually by placing a tray of diamagnetic material with the sample into the separator gap.
In a single separation cycle, the feed is separated into two products — magnetic and nonmagnetic. Discharge of the separation products is periodic.
Separation zone is accessible and the separator is easy to clean.

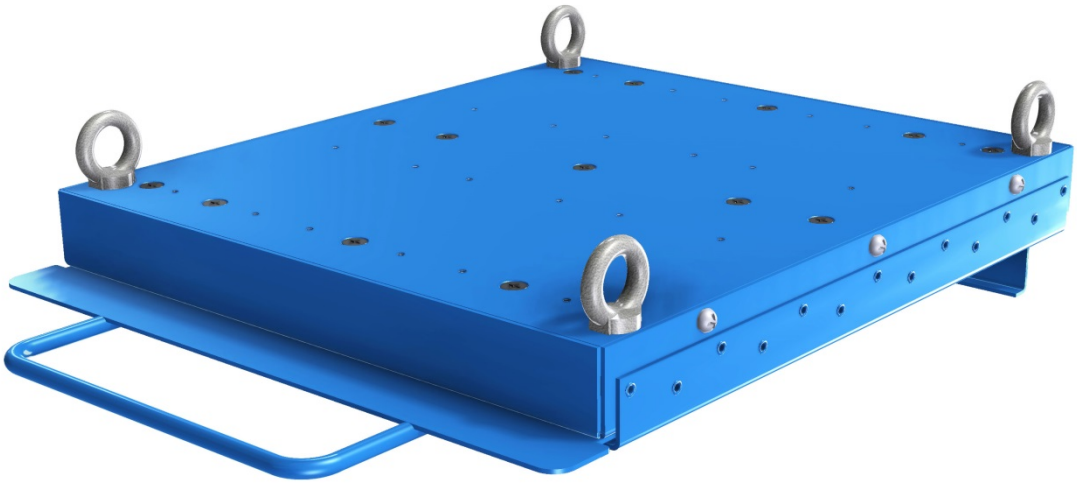
SPECIFICATIONS

Parameter	Value
Magnetic field intensity at the tip of the wedge at a current in the coils of 10 A, T, min	1,83
Size of the feed to be separated, mm	-5,0 +0,1
Gap between the tip of the wedge and the end of the magnetic core, mm	20
Mode of operation at a current of not more than 10.0 A in the coils of the magnetic system	Continuous, long-term
Mode of operation at a current of not more than 10.0 A in the coils of the magnetic system	Intermittent
Maximum power intake, VA, not more than	1100
AC supply voltage, V	220±22
Mains frequency, Hz	50±1
Unit weight, kg, max	200
External dimensions, mm, L x W x H, max:	500 x 400 x 825

Suspended iron separator

PURPOSE

Suspended iron separator is intended for extraction of ferromagnetic objects from coal and other non-magnetic bulk materials transported by belt conveyors and produced for the needs of the economy and export, including climatic conditions U3 or T3 to GOST 15150 (U3 at an ambient air temperature from -35 C to 40 °C and a relative humidity of 80%)



SPECIFICATIONS

Parameter	Value
Product	Gold sand
Product size, max, mm	10
Product moisture content, max, %	40
Product temperature, max, (C)	80
Conveyor belt width (LK), max, mm	400
Feed width on the belt, max, mm	300
Belt speed, max, m/sec	1,0
Iron separator installation location	Above the conveyor belt or above the head of the belt conveyor above the material transfer zone
Depth of extraction zone, max, mm	150
Extracted objects	Wire, bolts, fittings, nails, etc.
Material of the magnetic system	Constant Nd-Fe-B magnets
Cleaning of the iron separator	Mechanical (manual)
Weight, kg, max	30
Dimensions (L x W x H)	467 x 345 x 116

INTRODUCTION

WET MAGNETIC SEPARATION

Wet magnetic separation is the separation of minerals by their magnetic properties in a liquid medium. In finer feeds, wet magnetic separation performs better due to the fact that water prevents the coalescence of magnetic and non-magnetic particles

.

Wet magnetic separator MMS-2PM as part of the upgrading module DM-2

Wet magnetic separator MMS-0,1PM

PURPOSE

It is intended for the extraction of ferromagnetic impurities from ores and sands fed to magnetic separation as pulp and for the separation of magnetic minerals during mineralogical analysis and processing of small geological samples.

APPLICATIONS

Training and laboratory tests.

SPECIFICATIONS

Parameter	Value
Maximum throughput, ton/hour of feed, max	0,1
Size of the feed to be separated	-10 .. +0,2
Rotational speed of the magnetic system, rpm	62
Minimum gap between the rotor casing and the tray bottom, mm	5,0
Maximum magnetic field strength on the drum surface, mT/Gs, not less than	190 / 1900
Diameter of the water supply nozzle, mm	21
Diameter of the ferromagnetic fraction discharge nozzle, mm	32
Diameter of the non-magnetic fraction discharge nozzle, mm	51
Operation mode	Continuous, long-term
Input power, W	250
Mains voltage / frequency, V / Hz	380±10% / 50±1%
Unit weight, kg, max	52
External dimensions, mm, L x W x H, max:	710 x 460 x 575

Wet magnetic separator MMS-[2/4]PM

PURPOSE

It is intended for the extraction of ferromagnetic impurities from ores and sands fed to magnetic separation as pulp and for the separation of magnetic minerals during mineralogical analysis and processing of bulk geological samples.

APPLICATIONS

Widely used for the removal of ferromagnetic impurities from gravity concentration feeds, in the processing of washings, in particular, as part of the upgrading modules ITOMAK DM-1 and DM-2.

SPECIFICATIONS

Parameter	MMS-2PM	MMS-4PM
Maximum throughput, ton/hour of feed, max	1,0 – 2,0	1,0 – 4,0
Maximum magnetic field strength on the rotor casing surface, mT/Gs, not less than	300 / 3000	
Size of the feed to be separated	-10 .. +0,5	
Rotational speed of the magnetic system, rpm	86	
Minimum gap between the rotor casing and the tray bottom, mm	5,0	
Operation mode	Continuous, long-term	
Input power, W	750	
Mains voltage / frequency, V / Hz	380±10% / 50±1%	
Unit weight, kg, max	150	200
External dimensions, mm, L x W x H, max:	1250 x 635 x 780	1290 x 715 x 780

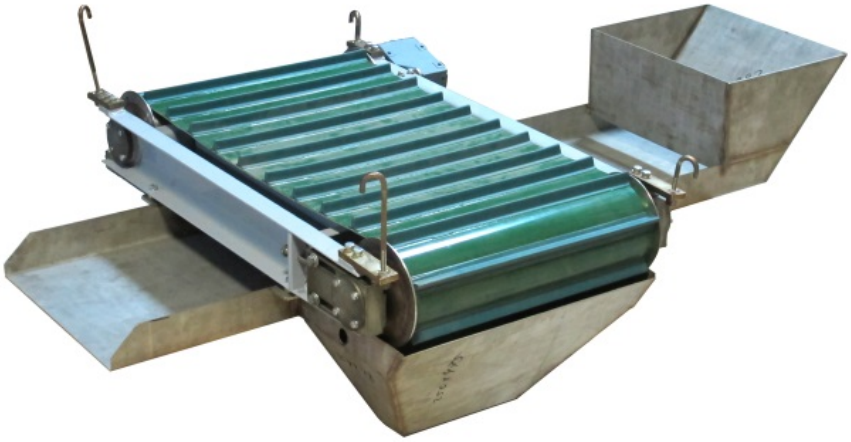
Wet magnetic separator PLMMS-2PM / PLMMS-4PM

PURPOSE

The separator is intended for the extraction of ferromagnetic minerals and steel scrap from ores and sands fed to magnetic separation, either as pulp or as bulk material transported by a conveyor.

APPLICATIONS

Used to remove ferromagnetic impurities from gravity concentration feeds in the processing of washings and bulk geological samples.



SPECIFICATIONS

Parameter	PLMMS-2PM	PLMMS-4PM
Maximum throughput, ton/hour of feed, max	2,0	4.0
Size of the feed to be separated	-10 .. +0,5	
Belt speed, m/sec	0,32	
Maximum magnetic field strength on the belt tooth surface, mT/Gs, not less than	150 / 1500	
Operation mode	Continuous, long-term	
Input power, W	250	
Mains voltage / frequency, V / Hz	380±10% / 50±1%	
Unit weight, kg, max	85	110
External dimensions, mm, L x W x H, max:	1500 x 880 x 375	1500 x 1000 x 375

Introduction

THE OPERATING PRINCIPLE OF AN INERTIAL SCREEN

Inertial screens are intended for screening crushed stone, sand, gravel, and other bulk materials. The screen is a set of sieves for sorting of bulk materials by size (fractions).

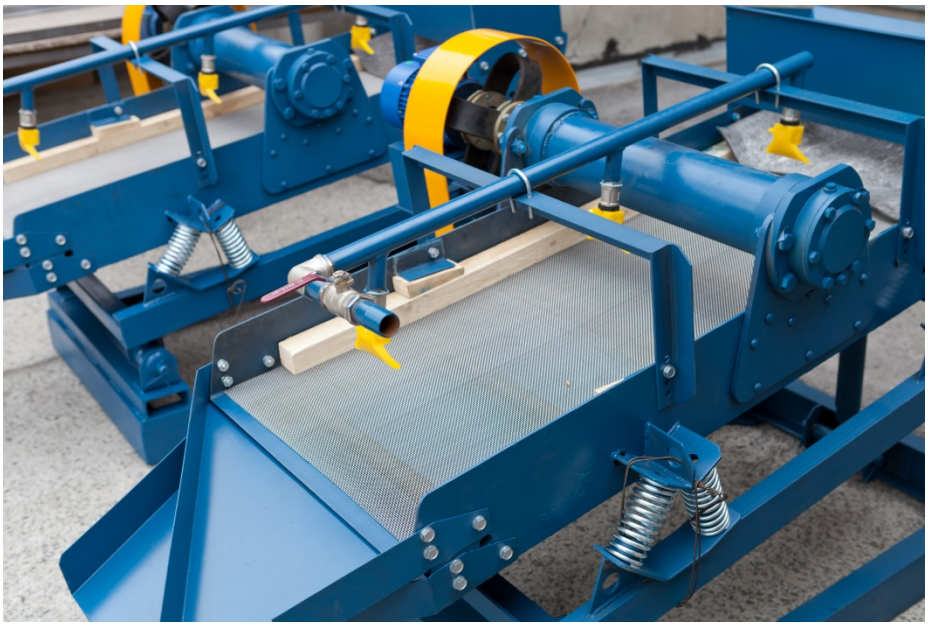
The most simple and reliable are inertial inclined screens.

The operating principle of an inertial screen is based on the use of vibrational processes that arise as a result of the rotation of unbalanced masses. The feed is thrown up on the sieves, the fine fractions pass through the sieve, and the coarse ones roll down along the inclined surface.

Most often, inertial screens are used for medium and fine screening. Screens provide high sorting efficiency of bulk materials.

Key advantages of inertial screens

- low energy intensity and maintenance costs
- simple construction
- long service life of the screen's components
- serviceability



Screens GI1-06D ready for shipment

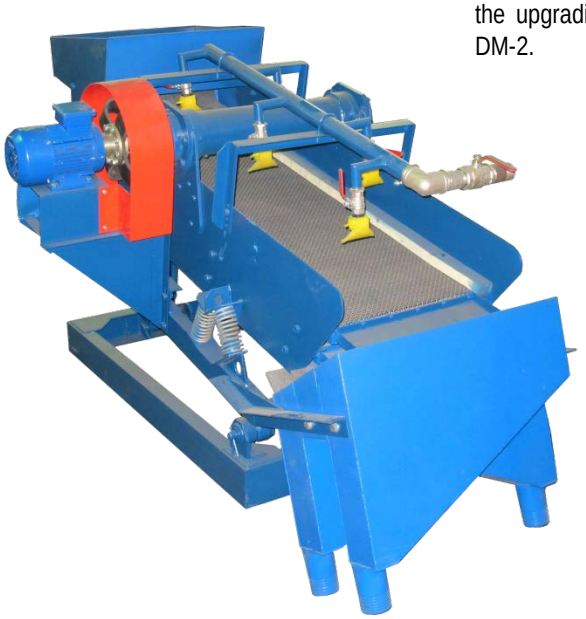
Inertial screen GI-0,6

PURPOSE

Screens of the series GI-0.6 are intended for dividing the feed into size classes prior to concentration.

APPLICATIONS

Widely used in wet and dry sorting at mining and mineral processing operations as part of the upgrading modules ITOMAK DM-1 and DM-2.



Inertial screen GI2-0,6

SPECIFICATIONS

Parameter	Value		
	GI1-0,6	GI2-0,6	GI3-0,6
Number of the screening surfaces	1	2	3
Effective area of each sieve, m^2	0,6		
Oscillation frequency of the screen box, 1/sec.	25,0		
Oscillation amplitude of the screen box, mm	6…10		
Angle of the screening surfaces	10°…20°		
Opening size of the screening surfaces	On request		
Diameter of the sprinkler nozzle, mm	48		
Diameter of the divider nozzles, mm	76		
Input power, kW, max	1,5		
Mains voltage / frequency, V / Hz	380±10% / 50±1%		
Unit weight, kg, max	380	430	450
External dimensions, mm, L x W x H, max:	1885 x 1190 x 1100	1995 x 1190 x 1100	2015 x 1190 x 1100

Inertial screen GI-0,3

PURPOSE

Screens of the series GI-0,3 are intended for dividing the feed into size classes prior to concentration.

APPLICATIONS

In geological prospecting and at concentrators, upgrading modules and laboratories

SPECIFICATIONS

Parameter	Value
Number of the screening surfaces	1
Effective area of the sieve, m^2	0,3
Oscillation frequency of the screen box, 1/sec.	10 .. 50,0
Oscillation amplitude of the screen box, mm	1…6
Angle of the screening surfaces, deg	10° .. 20°
Maximum size of sieved particles, mm	16,0
Opening size of the screening surfaces	On request
Diameter of the oversize divider nozzle, mm	76
Diameter of the undersize divider nozzle, mm	50
Input power, kW, max	0,55
Mains voltage / frequency, V / Hz	380±10% / 50±1%
Unit weight, kg, max	155
External dimensions, mm, L x W x H, max:	1400 x 640 x 750

Inertial screen GIL-0,15

Inertial screen GIL3-0,15

PURPOSE

Screens of the series GIL-0,15 are intended for dividing the feed into size classes prior to concentration.

APPLICATIONS

In geological prospecting and at concentrators, upgrading modules and laboratories

SPECIFICATIONS

Parameter	Value		
	GIL1-0,15	GIL2-0,15	GIL3-0,15
Number of the screening surfaces	1	2	3
Effective area of each sieve, m^2	0,15		
Oscillation frequency of the screen box, 1/sec.	10 .. 50,0		
Oscillation amplitude of the screen box, mm	1...4		
Angle of the screening surfaces, deg	20°		
Maximum size of sieved particles, mm	10,0		
Opening size of the screening surfaces	On request		
Diameter of the sprinkler nozzle, mm	32		
Diameter of the divider nozzles, mm	76		
Input power, kW, max	0,18		
Mains voltage / frequency, V / Hz	380±10% / 50±1%		
Unit weight, kg, max	35	40	45
External dimensions, mm, L x W x H, max:	1000 x 500 x 700	1050 x 500 x 722	1110 x 500 x 770

Motorized shaker

PURPOSE

The shaker is intended for sieving and fractionating by size small-volume stream sediment samples.

APPLICATIONS

Geological prospecting

SPECIFICATIONS

Parameter	Value
Maximum weight of the feed, kg	30
Sieve dimensions, mm, L x W x H	560 x 560 x 160
Sieve opening size, mm	8;4;2;0,5
Maximum amplitude of sieve oscillation, deg	±13°…±8.5°
Effective area of each sieve, m^2	0.2
Unit weight incl. spare parts, kg, max	100
External dimensions, mm, L x W x H, max:	845 x 830 x 1000

Suspended inertial screen GIP4-0,15P

PURPOSE

Screens of the series GIL-0,15 are intended for dividing the feed into size classes prior to concentration.

APPLICATIONS

Demountable, portable. Geological prospecting.

Classification of the feed in both dry and wet form is supported

SPECIFICATIONS

Parameter	Value
Number of the screening surfaces	4
Effective area of each sieve, m^2	0,15
Oscillation frequency of the screen box, 1/sec.	10 .. 50,0
Oscillation amplitude of the screen box, mm	1…5
Angle of the screening surfaces, deg	8° .. 14°
Maximum size of sieved particles, mm	10,0
Opening size of the screening surfaces	On request
Diameter of the divider nozzles, mm	40
Diameter of the product receiver nozzle, mm	40
Input power, kW, max	0,05
Input voltage (from a generator), V	220/380
Mains voltage / frequency, V / Hz	220±10%/ 50±1% (from a generator)
Unit weight, kg, max	50
Frame	10
Screen incl. suspended equipment	30
Control cabinet	10
External dimensions, mm, L x W x H, max:	1490 x 600 x 990

Suspended inertial screen GIP3-0,3

PURPOSE

Screens of the series GIP-0,3 are intended for dividing the feed into size classes prior to concentration.

APPLICATIONS

In geological prospecting and at concentrators, upgrading modules and laboratories

SPECIFICATIONS

Number of the screening surfaces	3
Effective area of each sieve, m^2	0.3
Oscillation frequency of the screen box, 1/sec.	10…50
Oscillation amplitude of the screen box, mm	1…6
Angle of the screening surfaces	10°…20°
Maximum size of sieved particles, mm	16,0
Sieve opening size, mm	On request
Input power, kW, max	0.45
Mains voltage / frequency, V / Hz	380±10% / 50±1%
External dimensions, mm, L x W x H, max:	1350 x 520 x 585

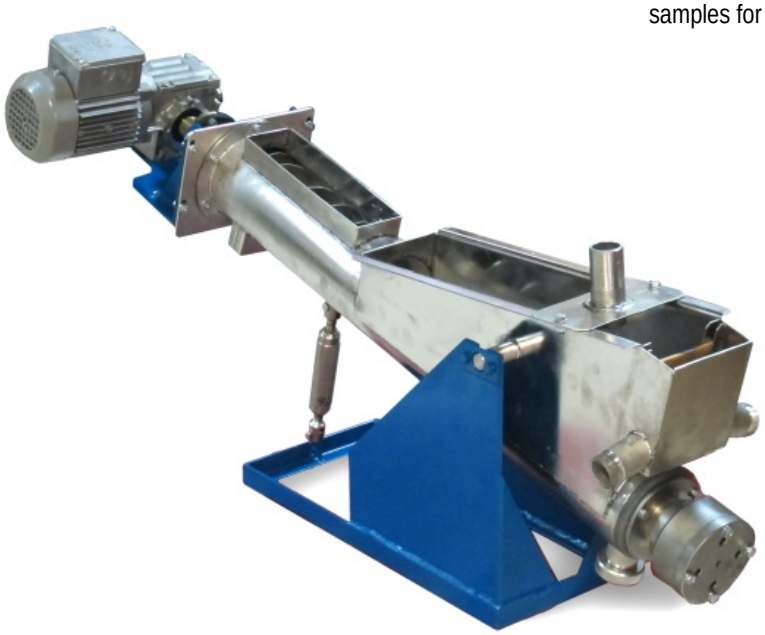
Spiral classifier KSL-96

PURPOSE

The classifier is intended for feed desliming, separation into two size fractions in a water medium prior to gravitational concentration, and dehydration of the granular product.

APPLICATIONS

Grinding circuits when testing mineral samples for washability.



SPECIFICATIONS

Parameter	Value
Throughput at a separation fineness of 0.15 mm, kg/hour	
by overflow	150
by underflow	250
Spiral diameter, mm	96
Trough length, mm	720
Number of helixes	1
Spiral pitch, mm	50
Rotational speed of the spiral, 1/min	45-50
Trough angle	12…22
Installed power, kW, max	0,09
Power supply voltage, V	380
External dimensions, mm, L x W x H, max:	1050 x 360 x 410

Slurry analyzer ADAP

PURPOSE

The slurry analyzer ADAP is used for separating small mineral samples with a particle size of less than 0.1 mm into five size classes as part of washability tests of mineral feeds.

SPECIFICATIONS

Parameter	Value
Equipment type	Lab-scale, ADAP type
Number of sections	2
Number of chambers per section	4
Sectional area of the chambers, mm	25x25 50x50 100x100 200x200
Duration of a single test, hours	5…12
Weight of a single sample, g	50
Pressure tank capacity, l	3
Size of the feed to be separated, micron, max	100
Water feed, cm^3/min.	45…340
Weight of the equipment, kg, max	20
External dimensions, mm, L x W x H, max:	726 x 420 x 936

Gravity test bench UGT-100

PURPOSE

The plant is intended for testing of mineral samples by the gravity centrifugal method.

The plant includes:

1. Vibratory feeder with a hopper for uniform supply of dry feed to the agitator.
2. Agitator for pulp preparation.
3. Centrifugal concentrator ITOMAK-KN-0,1.
4. Automatic sampler at the discharge of the centrifugal concentrator.
5. Control cabinet.

Used in a lab setting at concentrator operations and research institutions.

SPECIFICATIONS

Parameter	Value
Hopper capacity, l	27
Agitator tank capacity, l	6,5
Feed rate, kg/hour	0…180
Oscillation frequency of the shaking chute, Hz	0…50
Feed size, mm, max	3
Installed power, kW, max	0,8
AC power supply voltage, V	380±38
AC power supply frequency, Hz	50±1
Weight, kg, max	150
External dimensions, mm, L x W x H, max:	1610 x 940 x 1850

Sampler PO-0,1I

PURPOSE

The sampler is intended for the automatic sampling of a pulp stream (for example, mineral processing products)

APPLICATIONS

Used in a lab setting at concentrator operations both as a standalone piece of equipment and together with the centrifugal concentrator ITOMAK-KN-0,1.

SPECIFICATIONS

Parameter	Value
Throughput, kg/hour of solid residue, min	100
Throughput, m^3/hour of pulp	2.5
Capacity of the sampler's removable tank, l	12
Time periods in the "sampling" and "tails" modes	1 sec... 99 min
Time of transition between the modes, sec	1
Diameter of the feed nozzle, mm	50
Diameter of the discharge nozzle, mm	50
Input power, kW, max	0,3
Mains voltage / frequency, V / Hz	380±10% / 50±1%
Weight (incl. the control cabinet), kg, max	46
External dimensions (excl. the control cabinet), mm, L x W x H, max	510 x 380 x 580

Sampler PSH-A

PURPOSE

The sampler is intended for the automatic sampling of a pulp stream (for example, mineral processing products)

APPLICATIONS

The sampler can be used at concentrator operations, both as a standalone piece of equipment and together with a centrifugal concentrator.

SPECIFICATIONS

Parameter	Value
Throughput, kg/hour of solid residue, min	2000
Throughput, m^3/hour of pulp	6,0
Time periods in the "tails" mode	1 sec... 99 min
Sampling time, sec	7…10
Diameter of the feed nozzle, mm	76
Diameter of the discharge nozzle, mm	76
Diameter of the sample discharge nozzle, mm	48
Input power, kW, max	0,1
Mains voltage / frequency, V / Hz	220±10% / 50±1%
Weight (incl. the control cabinet), kg, max	35
External dimensions, mm, L x W x H, max:	310 x 290 x 650

Sampler PSH-400

PURPOSE

The sampler is intended for the automatic sampling of a pulp stream (for example, mineral processing products)

APPLICATIONS

The sampler is used at concentrator operations.

SPECIFICATIONS

Parameter	Value
Throughput, m^3/hour of pulp	2000
Time periods in the "tails" mode	1 sec... 99 min
Sampling time, sec	2…7
Diameter of the feed nozzle, mm	400
Diameter of the discharge nozzle, mm	600
Diameter of the sample discharge nozzle, mm	110
Input power, kW, max	1,1
Mains voltage / frequency, V / Hz	380±10% / 50±1%
Weight (incl. the control cabinet), kg, max	1000
External dimensions, mm, L x W x H, max:	1000 x 1420 x 1113

Sample splitter DP-4/5/8

PURPOSE

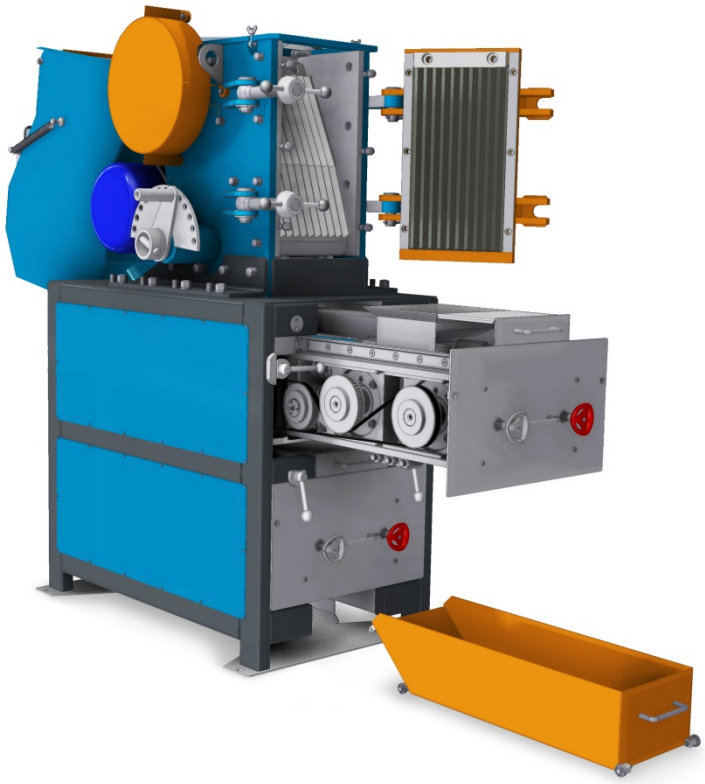
The splitter is intended for splitting samples of bulk materials into parts that are equal in mass and equivalent in content. A single charge allows the sample to be split into two parts.

Used to reduce samples of bulk materials.

SPECIFICATIONS

Parameter	Value		
	DP-4	DP-5	DP-8
Width of the grooves, mm	4	5	8
Total sampler capacity, l	2x1.35		
Number of grooves	55	46	28
Maximum size of the sample material, mm	1,5	2	3
Unit weight, kg, max	9	8,5	7
External dimensions, mm, L x W x H, max:	300x245x240		

Combined jaw and roll crusher DKVSH



PURPOSE

The combined jaw and roller crusher DKVSH is intended for crushing core samples in geological prospecting and other rock materials with a compressive strength of up to 180 MPa.

APPLICATIONS

Crushing of samples where stringent purity specifications apply.

The design of the crusher enables direct visual monitoring of the crusher's operating elements and prompt cleaning.

The crusher implements a three-stage crushing scheme per a single feed charge, significantly reducing the preparation time before further tests.

SPECIFICATIONS

Parameter	Value
Throughput, ton/hour, min	0,95
Size of the charge opening of the jaw crusher, mm	180 x 250
Size of the discharge opening of the jaw crusher, mm	5÷25
Feed size, mm, max	170
Processing time of a 25 kg sample (crushing and cleaning of the chambers), min, not more than	7
Number of rollers in the roll crusher 2	2
Roller design	smooth
Roller diameter, mm, max	250
Roller width, mm, max	125
Width of the gap between the rollers, mm, max	20
Size of the feed (at the smallest gap size between the rollers), mm, max	12
Input power, kW, max	10,5
Number of crushing stages in the roller crusher	2
External dimensions (length x width x height), mm	1100…1600x755x2350
Weight, kg, max	1200

Lab-scale jaw crusher DSHL-180x250

PURPOSE

The lab-scale jaw crusher DSHL 180x250 is intended for crushing rocks with a compressive strength of up to 240 MPa

OPERATION

The design of the crusher enables direct visual monitoring of the crusher's operating elements and prompt cleaning.

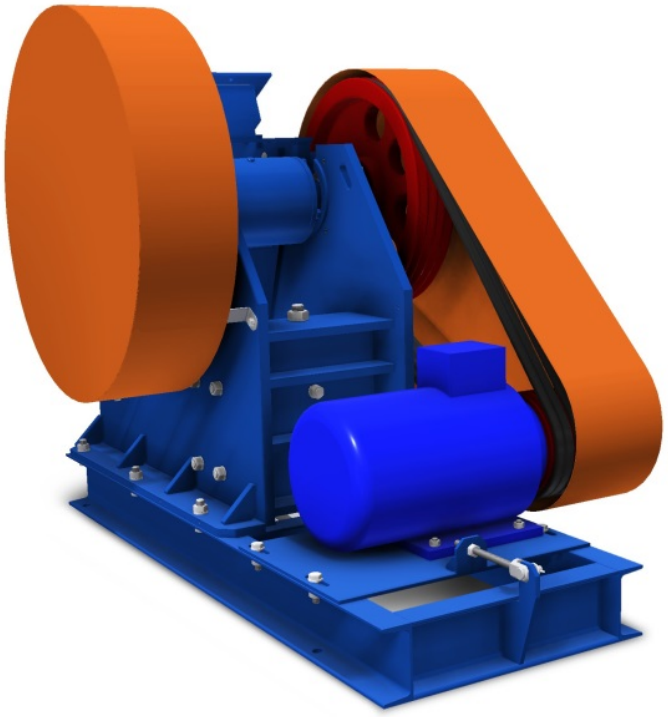
SPECIFICATIONS

Parameter	Value
Throughput, ton/hour, from…to	0,95÷5
Feed opening size, mm	180 x 250
Discharge opening size, mm	5÷25
Discharge opening adjustment	discrete with a step of 1 mm
Feed size, mm, max	170
Drive power, kW, max	7,5
Unit weight, kg, max	750
External dimensions (length x width x height), mm, max	1200x755x1850

Jaw crusher DSH-180x250

PURPOSE

The lab-scale jaw crusher DSH 180x250 is intended for crushing rocks with a compressive strength of up to 240 MPa



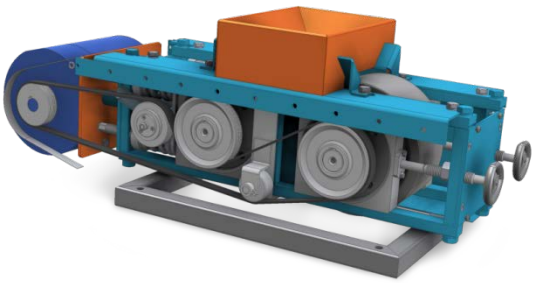
SPECIFICATIONS

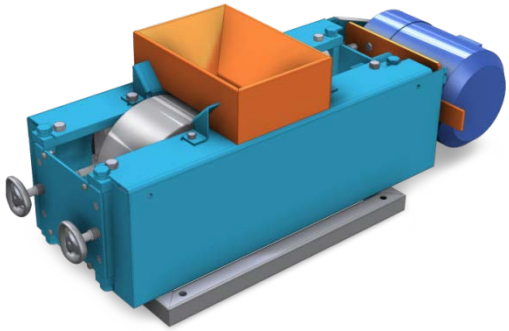
Parameter	Value
Throughput, ton/hour, max	0,95÷5
Feed opening size, mm	180 x 250
Discharge opening size, mm	8÷25
Discharge opening adjustment	Continuous
Feed size, mm, max	60
Drive power, kW, max	7,5
Unit weight, kg, max	1100
External dimensions (length x width x height), mm	1400x840x1295

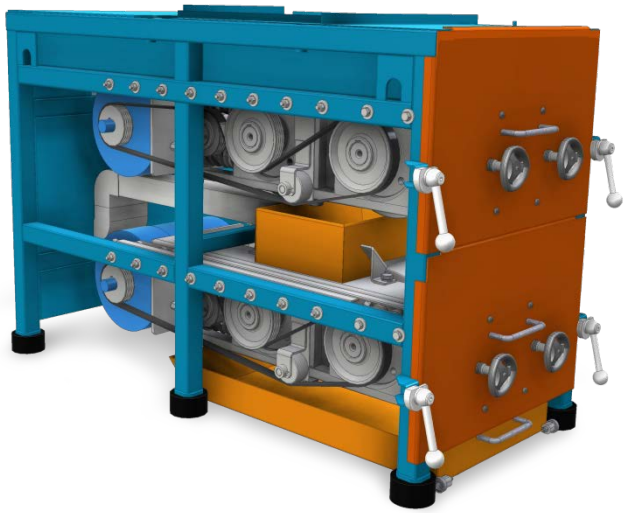
Roll crusher DVG-250x125 / DVG2 250x125

PURPOSE

The roll crusher DVG-250x125 is intended for crushing rocks with a compressive strength of up to 180 MPa







SPECIFICATIONS

Parameter	DVG-250x125	DVG2-250x125
Throughput, ton/hour, min	0,95	
Size of the feed (at the smallest gap size), mm, max	12	
Number of crushing stages	1	2
Number of rollers per crusher	2	
Roller design	smooth	
Roller diameter, mm, max	250	
Roller width, mm, max	125	
Width of the gap between the rollers, mm, max	15	
Feed size, mm, max	60	
Input power, kW, max	1,5	3.0
Mains voltage / frequency, V / Hz	380±10% / 50±1%	
Unit weight, kg, max	250	600
External dimensions (length x width x height), mm	1106x400x383	1269x611x787

Lab-scale ball mill MSHL-50 / MSHL-75

PURPOSE

Ball mills MSHL 50 / MSHL 75 are intended for wet or dry grinding of samples of ores and non-metallic minerals in a batch mode.

Used in scientific and process studies of mineral samples.

SPECIFICATIONS

Parameter	MSHL-50	MSHL-75
Grinding chamber capacity, l	50	75
Max lump size, mm	3-8	
Grinding medium, % of the grinding chamber capacity	35-50	
Charge, % of the grinding chamber capacity	10-30	
Grinding method	Wet / dry	
Ball size, mm	10-40	
Operation mode	Batch, continuous	
Combined engine power, kW, max	1,75 (1,5/0,25)	
Power supply voltage, V	380	
Unit weight, kg, max	250	300
External dimensions, mm, L x W x H, max:	890 x 850 x 1040	881 x 845 x 1130

Lab-scale mixer ML-20

PURPOSE

The mixer is intended for the preparation of pulp (a mixture of mineral feed and water for further processing).

Used in a lab setting at concentrator operations in conjunction with other technology (concentrators, separators, etc.).

SPECIFICATIONS

Parameter	Value
Tank capacity, l	26
Maximum pulp volume, l	20
Rotor speed, 1/min	
Without frequency converter	330
With frequency converter	0…330
Diameter of the outlet valve, DN, mm	95
Clearance between the rotor and the bottom of the tank, mm	20…120
Installed power, kW, max	0,25
Power supply voltage, V	380
Weight, kg, max	45
External dimensions, mm, L x W x H, max:	615 x 400 x 1200

Lab-scale mixer MI-80

PURPOSE

The mixer is intended for the preparation of pulp (a mixture of mineral feed and water for further processing).

Used in a lab setting at concentrator operations in conjunction with other technology (concentrators, separators, etc.).

SPECIFICATIONS

Parameter	Value
Tank capacity, l	120
Maximum pulp volume, l	80
Rotor speed, 1/min	10…350
Diameter of the outlet valve, DN, mm	50
Clearance between the rotor and the bottom of the tank, mm	13
Installed power, kW, max	1,1
3-phase mains voltage*, V AC	380±38
Mains frequency, Hz	50±1
Weight, kg, max	110

Mobile concentrator plant MOK-5

PURPOSE

The plant is intended for geological prospecting and small–scale alluvial gold mining. The plant is mounted on a truck trailer and has an autonomous hydraulic drive powering all equipment.

SPECIFICATIONS

Parameter	Value
Throughput (with 5 mm slits in the trommel screen's sieve compartment in the basic configuration), m^3/hour of feed	5,0
Throughput (with 10 mm slits in the trommel screen's sieve compartment), m^3/hour of feed	15,0
Number of screening surfaces	1
Effective area of the drum sieve, m^2	3,4
Slit size of the slotted screen, mm	5
Slit size of the grate in the feed hopper, mm	50
Maximum size of the feed, mm	200
Power, hydraulic oil pump diesel engine, hp	18
Weight, kg, max	2100
External dimensions, mm, L x W x H (in transport position)	5250 x 3700(1900) x 2300

Mobile washer MGI-0.3

PURPOSE

The washer is intended for geological prospecting and development of placer gold deposits with small reserves. The mineral feed undergoes wet sieving in a single-sieve screen, and then the oversize and the undersize fractions are concentrated in separate sluices.

The screen's vibrator is driven by the pressure of water jets created by a motor pump or a water pump.

SPECIFICATIONS

Parameter	Value
Motor pump capacity, m^3/hour	60
Number of screening surfaces	1
Effective area of the sieve, m^2	0,3
Angle of the screening surface	0° - 13°
Oscillation frequency of the screen box, 1/sec.	10...20
Oscillation amplitude of the screen box, mm	1…4
Sieve opening size, mm	5
Maximum size of the feed, mm	30
Weight, kg, max	120
External dimensions, mm, L x W x H (in transport position)	1640 x 940 (780) x 1500 (1200)

Mobile washer MSB-2,0

PURPOSE

The washer is intended for mining operations, geological prospecting, development of washing processes, and training. Features a gasoline engine powering the trommel scrubber and a motor pump for water supply.

SPECIFICATIONS

Parameter	Value
Throughput (with 5 mm openings in the trommel screen's sieve compartment in the basic configuration), m^3/hour of feed	2,0
Trommel screen rotational speed, rpm, max	35
Trommel screen angle, max	5
Closed chamber length, mm	600
Length of the screening section, mm	600
Diameter of the openings* in the screening section, mm	5
Length of the sluice, mm	2155
Maximum size of the feed, mm	50-70
Drive power, hp	5,5
Unit weight, kg, max	330
External dimensions, mm, L x W x H (incl. the sluice):	2205 x 1100 (2535) x 1400

Mini-dredge 2"

PURPOSE

Mini-dredge is intended for geological prospecting for gold, diamonds, and other heavy metals and gems in riverbeds and water bodies, as well as for small-scale development of native placers in river channels.

SPECIFICATIONS

Parameter	Value
Motor pump capacity, l/min of water	378
Diameter of the motor pump's input/output nozzles, in.	1,5 / 1,25
Maximum suction depth, m	8
Width of the sluice, mm	250
Length of the sluice, mm	1000
Length of the ejector, mm	1500
Diameter of the ejector's intake nozzle, mm	50
Motor pump power, hp	2.5
Weight, kg, max	40
External dimensions, mm, L x W x H	1700 x 650 x 550

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