



RECYCLING SOLUTIONS

MAGNETIC ORE BENEFICIATION SOLUTIONS

HANDBOOK

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BAS[®] Beneficiation Application Separation

BAS is an engineering community focused on recycling and ore beneficiation processes. With its engineering team and laboratories, it offers ore beneficiation, high-tech separation, and field application solutions.

BAS achieves this by offering equipment manufacturing, engineering services, and turnkey plants.

The three letters of BAS, as a provider of ore beneficiation and separation technologies, represent our mission:

Beneficiation: Ore beneficiation systems

Application: Field application solutions

Separation: Separation technologies for materials within ores or processed raw materials

BAS incorporates all responsibilities from laboratory studies to manufacturing, including ore mineralogy and production engineering & design. Before field applications, all potential conditions are analyzed and optimized. Experimental & pilot-scale previews of the separation methods are conducted, followed by field applications.

BAS is headquartered in Ankara, Türkiye, and has numerous official sales offices and distributors worldwide.

As BAS that we are a fair team that works with passion and strive for excellence. And applies the right engineering solutions in the field.



EMBS-I-1200

BAS® Service

BAS employs professional service teams specialized in various fields, continuously trained and experienced, to provide the best possible service to its clients.

Service Processes:

Expert Teams:

Our service team comprises specialists in electrical, mechanical, and automation disciplines. Each team member is regularly trained according to current industry standards and supported by certified experts.

Commissioning and Technical Service:

Separate teams handle commissioning (installation, revision, and cold/hot testing) and technical service (troubleshooting, maintenance, and repair) to ensure high efficiency and quality in each process.

Quick Response Times:

Domestic Service: For emergencies across Turkey, same-day service planning is offered, and intervention is guaranteed within 48 hours.

International Service: Outside visa processing time, we guarantee intervention within 5 calendar days.

Additional Services and Value-Added Benefits:

Preventive Maintenance and Remote Support:

We ensure long-lasting and smooth operation of equipment with preventive maintenance and provide real-time support via a dedicated remote line.



Advanced Technology and Modern Equipment:

Equipped with state-of-the-art tools, we aim to resolve any technical issue in the shortest time, offering time and cost advantages.

Customer-Centric Approach:

Our service processes are planned flexibly based on client needs and expectations. We provide one-on-one communication and consultancy at every stage.

Sustainable and Reliable Business Model:

We integrate environmentally conscious and sustainable practices to ensure both quality and reliability. We believe earning customer trust is the foundation of long-term cooperation.

Emergency Service Line: 0090537 2649473

 service@bas.com.tr

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BAS[®] SOLUTION CENTER

Experience the BAS Laboratory Advantage – where innovation meets precision to drive your project's success. Our cutting-edge laboratory is designed to replicate industrial-scale operations through meticulously engineered pilot studies, offering you the confidence to invest wisely and streamline your process from the very first trial. With pilot capabilities ranging from a mere 500 grams to an impressive 10 tons, BAS Laboratory applications enable you to validate concepts, optimize performance, and preempt challenges before committing to full-scale operations. At BAS Laboratory, we simulate the complexities of industrial processes on a manageable scale, allowing you to identify and resolve potential obstacles early in the development cycle. Our detailed studies ensure that every aspect of your operation—from material handling to product recovery—is finely tuned to deliver maximum efficiency and cost-effectiveness. Our suite of advanced separation technologies is designed to meet the diverse needs of modern industry. In addition to separation techniques, we provide a full spectrum of analytical services that offer deep insight into your materials and processes:

Magnetic Beneficiation

Low-Intensity Magnetic Separators (0 - 7,500 Gauss) and High-Intensity Magnetic Separators (up to 20,000 Gauss) for dry, wet, or electromagnetic separation. Tailored solutions for optimizing magnetic mineral recovery.

Davis Tube Test

The Davis Tube (DT) test is a standard laboratory method for determining the optimum magnetic recovery of iron ore using wet low-intensity magnetic separators. This instrument separates small ore samples into strongly magnetic and weakly magnetic fractions, making it an essential tool in assessing the separability of magnetic ores.

Satmagan Analysis

The Satmagan (Saturation Magnetization) analyzer precisely determines the mass proportion of magnetic material in a sample, ensuring accurate quantification for process optimization.

Eddy Current Separation

Used widely in the recycling industry, Eddy Current Separation (ECS) efficiently sorts nonferrous metals from nonmetallic materials. This environmentally friendly process leverages time-varying magnetic fields to induce electrical currents in conductive particles, generating a repelling force that separates materials with high efficiency.

Electrostatic Separation

Electrostatic separators use charge differentials to separate dry, liberated particles based on conductivity. This technology is widely applied in mineral processing, plastics, and recycling industries to separate conductors from non-conductors.

Ore Mineralogy & Petrographic Imaging

Gain a comprehensive understanding of your ore's composition and structure through high-resolution imaging and detailed mineralogical analysis, enabling informed process decisions.

Liberation Studies

Optimize mineral recovery by determining the most effective methods to liberate valuable minerals from waste, ensuring peak process efficiency.

Process Engineering & Simulation

From detailed flow sheet design to rigorous mass balance calculations and flowchart simulations, our experts craft reports and recommendations that meet internationally recognized standards. This holistic approach ensures your process is designed for success and scalability.



WHY CHOOSE BAS LABORATORY?

Risk Reduction: Validate industrial processes on a pilot scale to minimize unforeseen challenges during full-scale application.

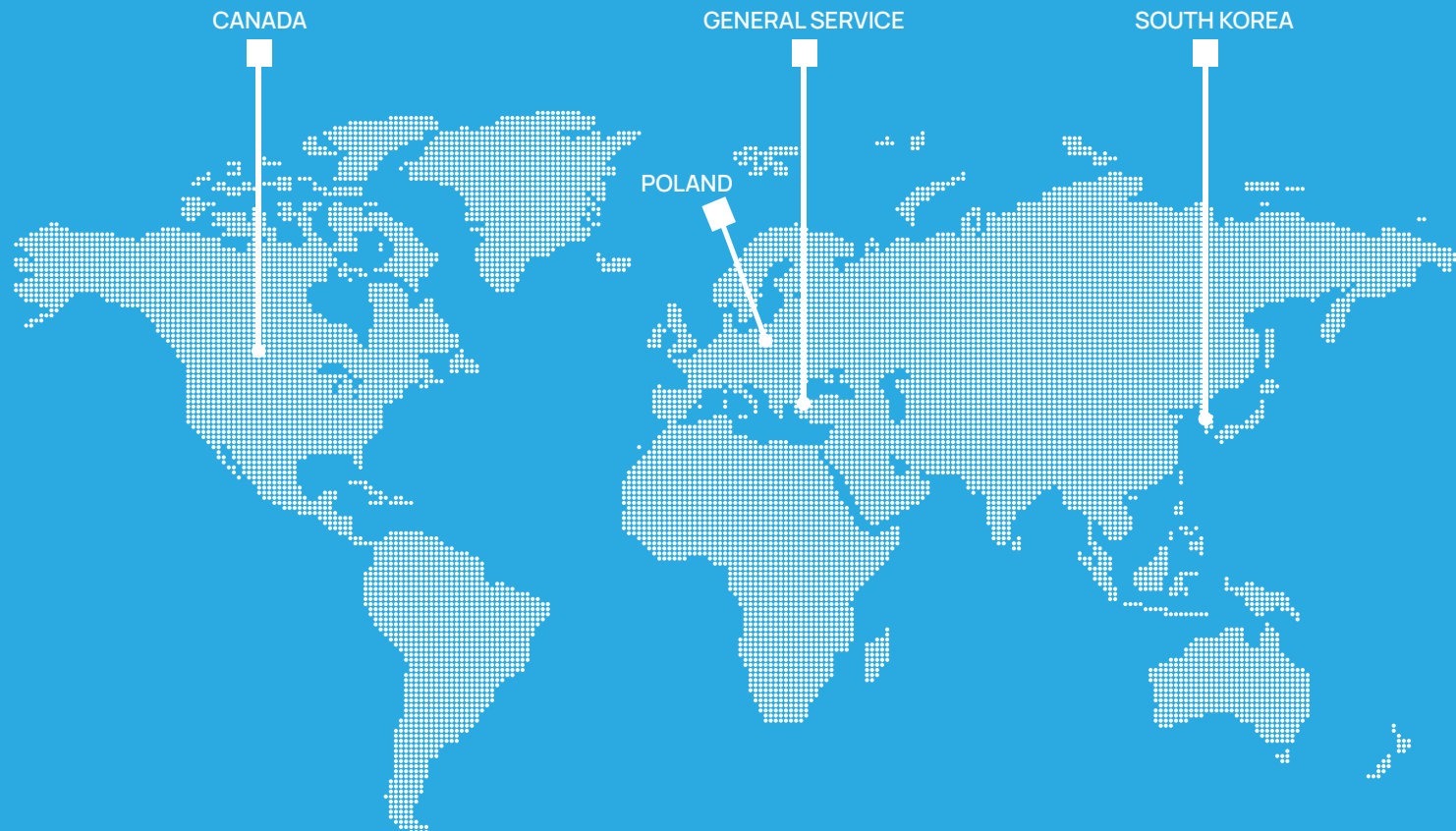
Precision & Quality: Benefit from analyses and reports prepared with internationally recognized standards.

Innovative Solutions: Leverage the latest separation and analytical technologies to enhance operational efficiency and material recovery.

Transform your pilot experiments into a resounding success with BAS Laboratory – your partner in pioneering industrial excellence. Contact us today to discover how our tailored laboratory applications can propel your project to new heights.

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EMBS-I-1000 MUNICIPAL WASTE RECYCLING APP

BAR SEPARATOR

Bar separators are used to remove unwanted metals in the material flow within a system. Magnetic bars are utilized to eliminate ferromagnetic materials ranging in size from 10 microns to 50 mm at distances up to 35 mm.

These separators can be configured in various magnetic field strengths, diameters, lengths, as single units or in bundles. With high-magnetism neodymium magnets, a surface magnetic field strength of up to 12,000 Gauss can be achieved.

They can be produced with perforated or closed ends using AISI316 stainless steel tubes depending on the application area. The maximum operating temperature for standard magnetic bars is 80–150 °C.

Application Area

Magnetic bars are mounted at points where metal is undesired in the manufacturing line. Due to their strong magnetic field, they are preferred in industries such as food, pharmaceuticals, chemicals, construction chemicals, and plastics.

Application Method

They can be mounted on material feed chutes based on project requirements. Upon request, they can also be equipped with pneumatic and self-driven mechanisms for automatic cleaning.



Pneumatic Bar Separator



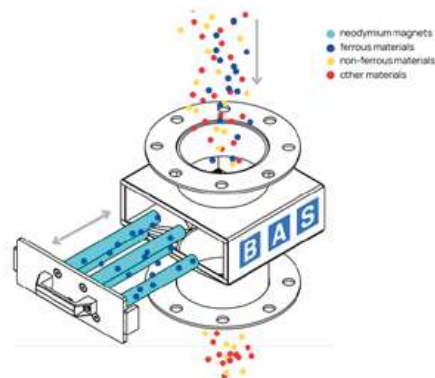
Magnetic Bar Separator



Simple Type Bar Separator



Liquid Bar Separator



MAGNETIC CONVEYOR DRIVE DRUM

Magnetic conveyor drive drums are used to capture ferrous materials on the belt before they are discharged, ensuring the ferrous components are released at the rear end of the conveyor.

They serve either as alternatives when magnetic overbelt separators cannot be used or as complementary units to capture any remaining ferrous materials. These units can also be installed as a safety mechanism after magnetic overbelt separators.

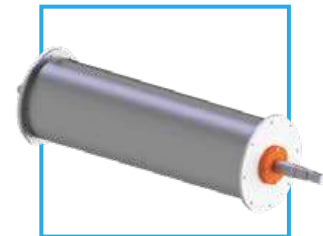
Application Area

They can be used in all conveyor systems involving ferrous metal materials.

Application Method

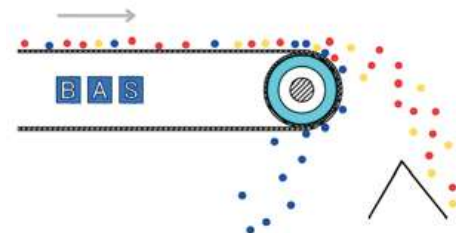
These are fully filled drums made of either ferrite or neodymium magnets. The magnetic drum captures ferrous materials as they align with its magnetic poles, transports them along its arc, and discharges them once outside the magnetic field at the conveyor's end.

Magnetic Conveyor Drive Drum



Magnetic Drum

- ferrite or neodymium magnets
- ferrous materials
- non-ferrous materials
- other materials



MAGNETIC DRUM SEPARATOR

Dry magnetic drum separators are used to separate ores with magnetic susceptibility from non-magnetic materials or to distinguish between two materials with different levels of magnetic sensitivity. They consist of a semi-filled drum, a material chute, a vibro feeder, and optionally a bunker.

Application Area

Plastics like PET, HDPE, PE, PP; MDF, chipboard; industrial minerals; construction chemicals; aluminum and other precious metal recycling applications; slag recycling.

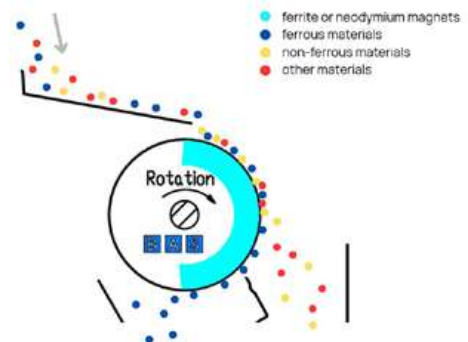
Application Method

The separation quality is optimized by adjusting the drum speed and the position of the separation flap. Ferrite magnetic drums can reach up to 2,000 Gauss on the surface, while neodymium magnetic drums can reach up to 6,000 Gauss.

BAS dry magnetic drums are manufactured in diameters of 300 mm and 500 mm, up to a length of 3,000 mm, and can separate materials up to 50 mm in size.



Magnetic Drum Separator



ELECTROMAGNETIC DRUM SEPARATOR

Electromagnetic drum separators are commonly used in scrap recycling applications. They provide efficient separation of large and sharp ferrous particles due to their high capacity and strong, deep-penetrating magnetic field.

Application Area

Ferrous scrap recycling and ferrous scrap preparation facilities.

Application Method

Designed for harsh environments, these separators are made with stainless steel or aluminum covers. Their magnetic core and coils are optimized for maximum saturation, enabling strong magnetic fields to capture and reverse-transport materials.

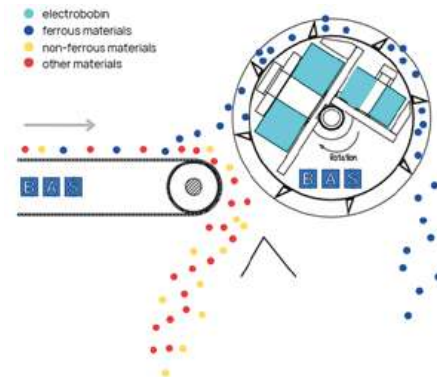
They are typically used at screen outputs and conveyor discharge chutes. BAS electromagnetic drums range from 1,000 mm to 1,800 mm in diameter and up to 3,000 mm in length.



Electromagnetic Drum Separator



Electromagnetic Drum Separator



MBS PERMANENT MAGNETIC OVERBELT METAL SEPARATORS

BAS® permanent magnetic overbelt metal separators are commonly used for removing unwanted metals from conveyor systems. These separators consist of a primary magnetic block, an endless separator belt, a motor, and a magnetically insulated steel frame. The steel chassis of the MBS series, which features permanent magnetism, is magnetically insulated so that unwanted metals do not stick around it. Only the bottom part of the separator attracts metals, which are then discharged via the endless belt.

Depending on the application capacity, the MBS series permanent magnetic overbelt metal separators are divided into several models: MBS-E, MBS-S, MBS-K, MBS-M, MBS-L, and MBS-H.

The MBS-MOB series magnetic separators are specially designed to be lightweight and suitable for mobile equipment.

Application Area

They can be used across all conveyor line applications.

They are especially preferred in scrap recycling plants, solid waste separation facilities, electronic waste recycling plants, and all types of plastic sorting facilities.

Working Principle

BAS® natural magnetic overbelt metal separators remove ferromagnetic metal particles from the material being transported on conveyor belts by magnetic attraction. The captured metal particles are discharged at a predetermined point on the conveyor line via the endless separator belt, maintaining material purity and protecting equipment from metal-induced damage. In metal recycling plants, they may also operate in reverse principle.

BAS MBS series permanent magnetic overbelt metal separators operate at suspension distances between 100 mm and 350 mm and are used in both inline and crossbelt applications.

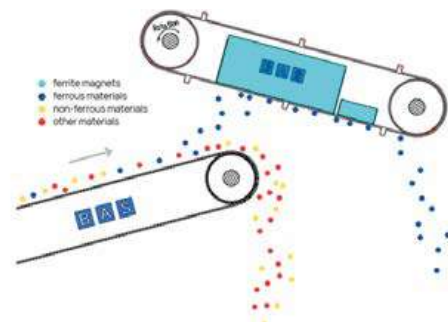
MBS Permanent Magnetic Overbelt Metal Separators



To watch the video here is QR code;



MBS



EMBS ELECTROMAGNETIC OVERBELT METAL SEPARATORS

BAS[®] Electromagnetic Overbelt Metal Separators are used for the separation of unwanted, challenging metal contaminants within conveyors and chutes. Unlike MBS permanent separators, EMBS separators generate an electromagnetic field. The coil, charged with a high electric current, activates the core inside and produces a strong magnetic field.

Overbelt metal separators consist of four main components: the primary magnetic block, the endless separator belt, the drive motor, and a magnetically insulated steel chassis. Compared to MBS series permanent magnetic overbelt separators, the EMBS series offers at least twice the magnetic field strength. In heavy-duty applications requiring high suspension distances, the system is capable of generating magnetic field intensities up to 2,000 Gauss at a distance of 600 mm.

Application Areas

These separators can be utilized in all conveyor-based processing lines.

They are especially suitable for use in scrap recycling facilities, slag recycling plants, solid waste separation plants, electronic waste recycling facilities, plastic sorting facilities, and similar operations.

Operating Principle

BAS[®] Electromagnetic Overbelt Metal Separators operate by attracting and separating ferromagnetic metal particles present in the conveyed material through magnetic force. The captured metal particles are discharged at a predetermined point along the conveyor line via the endless separator belt. This process ensures the purity of the material throughout production and prevents damage to machinery caused by metallic contamination. In metal recycling plants, they may also operate based on a reverse principle. The new generation standard EMBS electromagnetic overbelt separators are designed without a transformer group. This results in a more compact control panel, enhanced equipment efficiency, and a significantly lower risk of overheating compared to conventional electromagnetic separators.

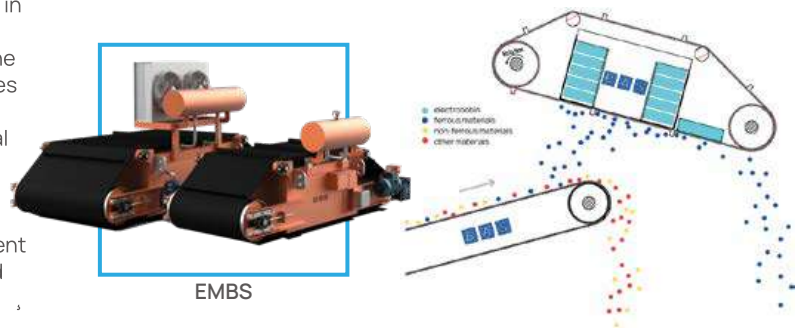
EMBS Electromagnetic Overbelt Metal Separators



Oil-cooled BAS EMBS separators also come standard without an expansion tank, which enables easier implementation in compact or confined installation areas.

The BAS EMBS series electromagnetic overbelt metal separators are available for use at suspension heights ranging from 350 mm to 1,000 mm and can be configured for both inline and crossbelt applications.

Standard BAS EMBS units are available with belt widths up to 2,000 mm, while customized units can be manufactured according to the specific length and width of the intended conveyor system.



EMBS

EDDY CURRENT NON-FERROUS METAL SEPARATORS

BAS[®] Eddy Current Non-Ferrous Metal Separators are used for the separation of non-ferrous metals. These separators operate by generating eddy currents through a high-speed rotating magnetic drum composed of magnets arranged in specific pole configurations. As non-ferrous materials enter this field at a certain velocity, eddy currents are induced within them, propelling the materials forward and away from the conveyor trajectory. This separation technique effectively isolates non-ferrous metals from other materials.

BAS BECS Eddy Current Non-Ferrous Metal Separators can be supplied with an optional vibratory feeder. Depending on customer preference, they can be delivered with either a vibratory feeder or a standard conveyor belt system.

Application Areas

Municipal solid waste treatment facilities, Refuse-derived fuel (RDF) plants, Aluminum recycling plants, Aluminum scrap processing and raw material preparation facilities, Aluminum slag recycling plants, PET separation facilities, Precious metal recycling facilities, Electronic waste recycling facilities.

Operating Principle

Eddy current non-ferrous metal separators consist of an eddy current drum, conveyor belt, feeding system, and drive components. Depending on the particle size of the non-ferrous metals being processed, the separators are manufactured with varying numbers of magnetic poles—the smaller the particle size, the higher the number of poles on the drum.

The belt speed is adjustable via a control panel in order to optimize separation quality. The discharge flap (separator gate) on BECS Eddy Current Separators can move along three axes, allowing precise adjustment of the material discharge path for optimal separation. A belt alignment kit is included as standard in the BAS BECS series, minimizing the risk of belt misalignment. Standard features also include monitoring of drum temperature, electric currents, drum rotation speed, and numerous other parameters. BAS provides eddy current separator solutions for belt widths ranging from 500 mm to 2,000 mm.

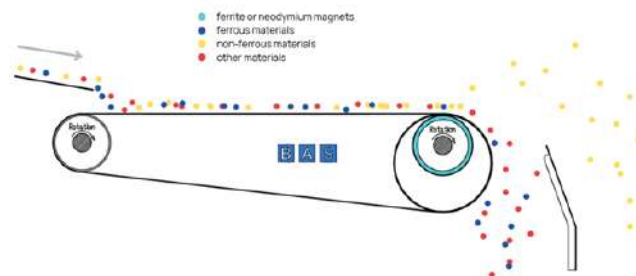
Eddy Current Non-ferrous Metal Separatörler



To watch the video here is QR code;



ECS



EDDY CURRENT FERROUS & NON-FERROUS COMBINED METAL SEPARATORS

Combined-type Eddy Current Non-Ferrous Metal Separators are used for the separate extraction of ferrous and non-ferrous metals. For detailed information regarding the working principles of the eddy current system, please refer to the section titled EDDY CURRENT NON-FERROUS METAL SEPARATORS. Combined separators first remove ferrous metals using the integrated magnetic drum. Subsequently, the remaining non-ferrous materials are transferred onto the eddy current separator conveyor, where the eddy current drum separates non-ferrous metals from other residual materials. These combined metal separators feature three distinct discharge points: Ferrous metals, Non-ferrous metals, Tailings (non-metallic residuals)

Application Areas

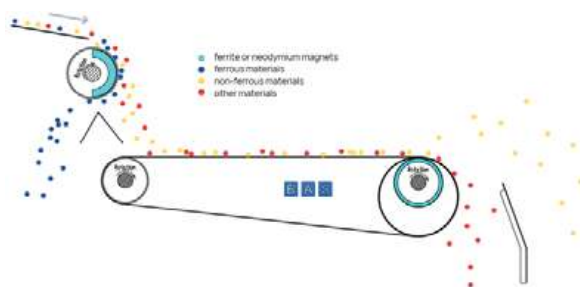
Municipal solid waste treatment facilities, Refuse-derived fuel (RDF) plants, Aluminum recycling plants, Aluminum scrap processing and raw material preparation facilities, Aluminum slag recycling plants, PET separation facilities, Precious metal recycling facilities, Electronic waste recycling facilities.

Operating Principle

Combined Eddy Current Ferrous & Non-Ferrous Metal Separators consist of a magnetic drum, an eddy current drum, a conveyor belt, a feeding unit, and drive components. Eddy current separators are produced with different magnetic pole configurations depending on the particle size of the metals to be separated. Both the belt speed and the drum speed are controlled via a variable-speed control panel to optimize separation efficiency. The discharge flap of the BECS eddy current separator moves along three axes, enabling precise adjustment for optimal separation of the materials. The BAS BECS series includes a belt alignment kit as a standard feature, minimizing the risk of belt misalignment. Monitoring of drum temperature, electric current, drum rotation speed, and various other parameters is provided as standard. The pre-separation drum can be selected in either 300 mm or 500 mm width depending on the particle size of the incoming material. Based on the type of ferrous material to be separated in the pre-separation stage, drums with an effective magnetic field strength of either 2,000 Gauss or 5,000 Gauss can be used. BAS offers eddy current separation systems with belt widths ranging from 500 mm to 2,000 mm.



ECS



STAINLESS STEEL SEPARATOR

BAS High-Intensity Stainless Steel Separators are designed for use in recycling facilities to separate low magnetic susceptibility alloy metals and stainless steel materials.

BAS BSS separators are suitable for the separation of high-grade stainless steels including AISI-316, micronized ferrous metals, and all paramagnetic and ferrous metal particles.

Application Areas

Metal recycling plants, Paper recycling facilities, Aluminum recycling facilities, Precious metal recycling plants, Electronic waste recycling facilities

Operating Principle

The system operates based on a main conveying mechanism that includes an endless belt rotating over two drums. The front drum (drive drum) is a high-intensity magnetic perm-roll. When material reaches this drum, magnetic materials adhere to its surface.

As the belt rotates, the adhered magnetic particles are carried to the rear side of the drum, while non-magnetic materials continue to fall off from the front of the drum.

Due to their low magnetic susceptibility, some particles are only weakly attracted to the drum and are thrown off the back side as the belt moves—effectively separating them from non-magnetic materials, which fall straight down.

This process enables the clean separation of magnetic from non-magnetic materials.

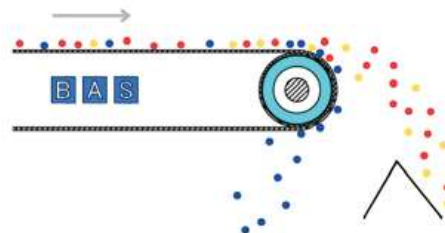
BAS manufactures stainless steel separators with belt widths up to 1,500 mm and drum diameters up to 250 mm, depending on the required processing capacity.

Stainless Steel Separator



Stainless Steel Separator

- ferrite or neodymium magnets
- ferrous materials
- non-ferrous materials
- other materials



ELECTROSTATIC SEPARATOR

BAS Electrostatic Separators are used to separate dry and liberated particles of different electrical conductivity using electrostatic charges.

This technology is primarily utilized in the plastics and recycling industries to separate conductive materials from non-conductive ones. The equipment performs separation by exploiting the differences in electrical conductivity between the various components of the feed material.

The success of the separation process depends on several fundamental material properties, such as conductivity, moisture content, and particle size range. As with other magnetic separation technologies, monolayer feeding is crucial for electrostatic separators. Therefore, electromagnetic feeders are employed to ensure that the material is delivered onto the drum in a single, uniform layer.

Application Areas

Granulated copper recycling, Cable recycling facilities, Electronic waste recycling plants, PVC recycling facilities, Precious metal recycling facilities

Operating Principle

The material is fed onto a rotating, grounded drum made of stainless steel and is exposed to a high-voltage discharge emitted from a fine tungsten wire electrode.

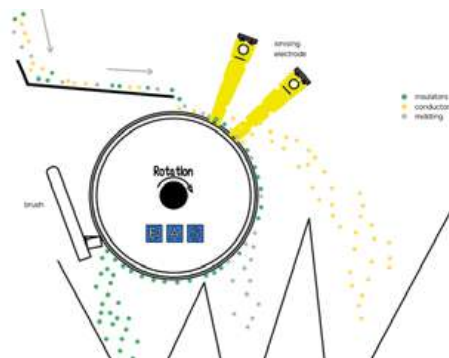
Non-conductive materials (insulators) retain their charge and adhere to the surface of the drum. These are then removed by a fixed brush mounted on the drum and discharged into a chute designated for insulators.

Conductive particles, on the other hand, rapidly lose their charge and are repelled from the drum along their natural trajectory, allowing effective separation. BAS Electrostatic Separators can be manufactured with drum diameters up to 300 mm and drum lengths up to 2,000 mm, depending on capacity requirements.

Electrostatic Separator



Electrostatic Separator



METAL DETECTORS

BAS[®] Conveyor Metal Detectors are used in systems where magnetic separation is not feasible, or to maintain operational safety after metal separators by detecting metal contaminants on conveyor belts.

Metal detectors are employed across nearly all raw material (non-metallic) processing lines. The application types vary depending on factors such as belt load height, particle size of the material, and the minimum detectable metal particle size.

Application Areas

Construction chemicals, Cement factories, Coal processing, Chemical industry, Wood processing, Plastics and PET recycling facilities.

Operating Principle

Single-sensor metal detectors detect from one side and are installed beneath the conveyor belt. They identify metal particles that may have mixed into the material passing above.

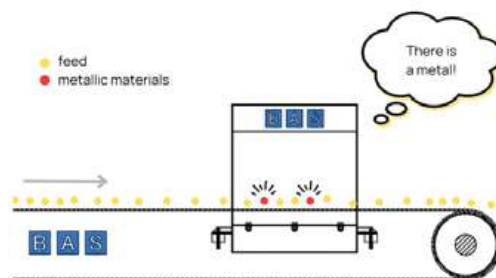
These detectors provide visual, audible, flag-based, and relay output signals upon detection. Tunnel-type metal sensors offer significantly higher sensitivity compared to single-sensor detectors. They are mainly preferred in high-capacity and high-sensitivity metal detection applications.

The sensitivity of BAS metal detectors can be adjusted. The control panel features a digital display, and all settings are made via numerical input. It includes a functional interference adjustment menu to eliminate false alarms caused by environmental factors such as grounding issues, radio signals, or electrical noise.

BAS detectors are also compatible with conveyor belts fitted with rivet sensors.



BMD-2 Seri Detector



BELT WEIGHERS

BAS NPI Belt Weigher systems are advanced weighing solutions designed to measure the instantaneous weight of materials conveyed on conveyor belts and to record capacity data. Thanks to their digital and analog outputs, these systems can be easily integrated into existing automation infrastructures, offering real-time monitoring, storage, and analysis of load data.

Equipped with a color display and user-friendly interface, they enhance process efficiency and reliability. Ideal for businesses seeking precise measurement of material flow on conveyor lines, these systems provide significant advantages for real-time production tracking and for monitoring total material flow on a daily, weekly, or monthly basis.

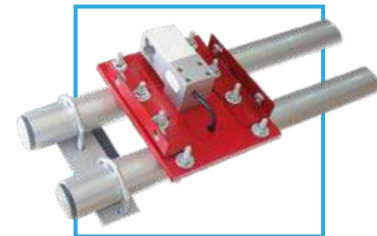
Application Areas

BAS® Belt Weighers are widely used in industries such as mining, quarries, cement production, food processing, and recycling.

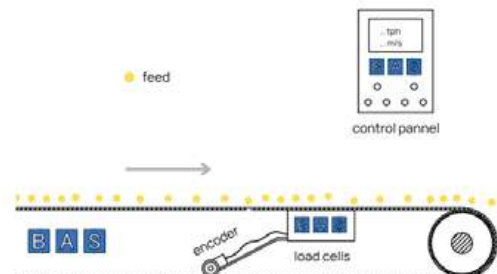
Operating Principle

The BAS Belt Weigher is integrated into conveyor systems to continuously measure and record material flow. The 4.3" TFT color display allows operators to easily monitor flow rate, weight, belt speed, and total material passed in real time.

With support for RS-232, RS-485, Ethernet, and Modbus communication protocols, and eight external relay outputs, the system ensures seamless integration with automation systems, providing uninterrupted data transmission to industrial operations.



Belt Weighers



ELECTROMAGNETIC LIFTERS

BAS[®] Electromagnetic Lifters are used for handling and transferring ferromagnetic metals of various forms, cast materials, and scrap metal. Depending on the application area, the strength of the magnetic field generated varies based on the size and surface area of the material being lifted.

They are manufactured with either welded steel bodies or high-alloy cast housings. The units are produced as a single cast piece or welded construction, minimizing magnetic field losses. For maximum durability and safety, a three-chain connection system is incorporated into the design.

Application Areas

Scrap yards, Foundries, Iron and steel plants, Ferroalloy plants, Slag handling facilities.

Operating Principle

The electromagnetic body, composed of an aluminum coil and a steel core, is operated via crane control panels. The lifter captures the desired metal materials in the field and transfers them to the relevant feeding unit.

BAS EMK series lifters are designed for a standard 75% duty cycle. Models capable of handling crucibles at high temperatures are also available.

Electromagnetic Lifters



Electromagnetic Lifters

NIRVIS RGB OPTICAL SEPARATOR

NIRVIS's high-tech color sorters, equipped with AI-supported optical separators, enable sorting based on color. With this single-camera hardware, both efficient solutions and effective color separation can be achieved. The RGB cameras sort materials solely based on color, and with NIRVIS's patented artificial intelligence, material identification is also performed. The other key component of the RGB optical separator, the blowing mechanism, allows for flawless on/off timings and ensures the precise separation of all detected materials.

With the addition of BAS vibro feeders and acceleration belts, monolayer material feeding is provided, completing the system for flawless separation.

Application Areas

Waste processing plants, PET recycling plants, other plastic recycling plants, forestry, food factories, paper recycling plants, biomass plants, ATY plants, composting lines, etc.

Operating Principle

The optical separator, based on high-resolution (RGB) camera technology, further maps detectable characteristics and sends data to the intelligent computer. The valve blocks at the end of the acceleration belt send signals for the separation of the relevant material, and the corresponding valve opens instantaneously, blowing air and then closing.

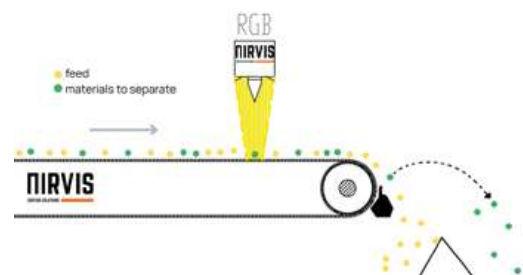
This process results in the separation of materials. The integrated NIRVIS artificial intelligence (AI) supports object recognition.



NIRVIS RGB Optical Separator



RGB Optical Separator



NIRVIS NIR OPTICAL SEPARATOR

NIRVIS & high-tech NIR optical separators, which combine infrared and color camera technologies, perform separation based on material density and color. The RGB camera identifies the color and shape of the material, while the NIR camera detects its density. Using NIRVIS's patented artificial intelligence, material identification is performed with the combination of these factors. The blowing mechanism, another component of the NIR optical separator, allows for flawless on/off timing and ensures the complete separation of all detected materials.

With the addition of BAS vibro feeders and acceleration belts, monolayer material feeding is provided, completing the system for flawless separation.

Application Areas

Waste processing plants, PET recycling plants, other plastic recycling plants, forestry, food factories, paper recycling plants, biomass plants, ATY plants, composting lines, etc.

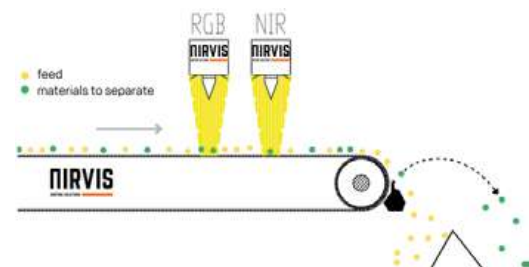
Operating Principle

Based on the latest near-infrared (NIR) camera technology and hyperspectral imaging (HSI) technology, the advantages lie in the highest local and spectral resolution combination.

The system is also available with a high-resolution color camera to further map optically detectable characteristics. NIRVIS's artificial intelligence (AI) supports object recognition.



NIR+RGB Optical Separator



MAGNETIC ORE BENEFICIATION SOLUTIONS

SIMPLE TYPE DRY MAGNETIC DRUM SEPARATOR

Conventional single-stage dry magnetic drum separators can be easily used in simple applications. A vibro feeder connected to a bunker ensures that the material is fed at the optimum distance to the drum. Adjustable drum speed allows for efficient separation, while the use of a splitter helps optimize the process. Non-magnetic materials are discharged from the front, while magnetic materials are collected from the back side. The magnetic field intensity of magnetic drum separators is determined in BAS laboratories. Drum surface magnetic field strengths of up to 2,000 Gauss can be achieved in ferrite-magnetized drums, and up to 7,500 Gauss in neodymium-magnetized drums.

Application Area

Magnetite ore and all other iron-bearing minerals containing magnetite. Beneficiation applications of quartz, feldspar, kaolin, silica sand, chrome, and manganese.

Working Principle

Magnetic minerals in the ore fed into the separator are subjected to a magnetic force. When this force overcomes opposing forces such as gravity and fluid resistance, the magnetic particles are attracted to and held on the drum surface, being separated as the magnetic product. In contrast, gangue minerals or particles with weak magnetic properties are not sufficiently affected by the magnetic force and are separated as non-magnetic products under the influence of opposing forces. In this way, magnetic and non-magnetic materials follow different paths and are effectively separated.

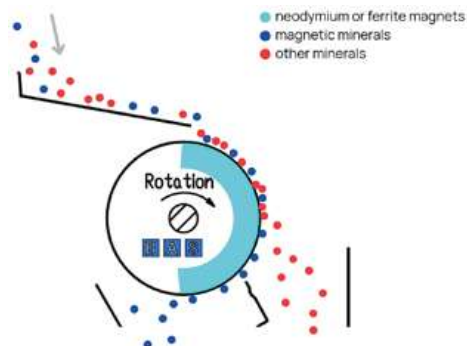
In recent years, interest in dry magnetic separation methods has increased in order to reduce costs and minimize environmental impact. Dry magnetic separation enables higher feed grades for subsequent enrichment stages, thereby reducing energy consumption in grinding and significantly lowering overall production costs.

The drum surface can be rubber-coated. Chutes, bunkers, and feeders can be lined with PU material or Hardox wear-resistant plates.

Simple Type Dry Magnetic Drum Separator



Simple Type Dry Magnetic Drum Separator



OREXORE TYPE DOUBLE-STAGE DRY MAGNETIC DRUM SEPARATOR

This type of separator is used in applications where higher final product quality is expected by re-processing the fed magnetic ore in two stages under different magnetic field intensities. In the first stage, the ore undergoes pre-concentration, and in the second stage, it is further beneficiated at a lower magnetic field intensity to obtain the final product.

Double-stage magnetic drum separators are equipped with access walkways and service doors on all four sides for easy maintenance access to both levels. The magnetic field strengths of the magnetic drum separators are determined in BAS laboratories. In ferrite-magnetized drums, a magnetic field intensity ranging from a minimum of 500 Gauss to a maximum of 2,000 Gauss can be achieved on the drum surface. Depending on the application type and if middling product recovery is desired, the separator can provide three different product outputs.

Application Area

Beneficiation of magnetite ore with a focus on obtaining high-quality final products.

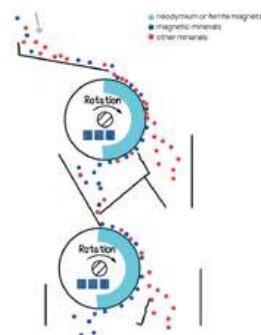
Working Principle

Magnetic minerals in the ore fed into the separator are subjected to a magnetic force. When this force exceeds opposing forces such as gravity and fluid resistance, the magnetic particles are attracted to and held on the drum surface, separated as the magnetic product. In contrast, gangue minerals or particles with weak magnetic properties, being less affected by the magnetic force, are separated as non-magnetic products due to the influence of opposing forces. In this way, magnetic minerals and gangue follow different trajectories and are effectively separated. The magnetic material obtained in the first stage is precisely transferred to the second drum via a specially designed transfer chute. The system is optimized using magnetic drums with adjustable speeds to achieve the desired highest iron content and recovery rate. With fully adjustable flaps under the drums, operators can precisely control the flow of the middling product toward either magnetic or non-magnetic separation paths. Feeding ore twice into separate dry magnetic drum separators would increase both the required plant area and the cost of additional material handling via conveyors. OrexOre Type Double-Stage Dry Magnetic Drum Separators are preferred because they reduce both initial investment and operational costs. The drum surface can be coated with rubber. Chutes, bunkers, and feeders can be lined with PU material or Hardox wear-resistant plates.

OrexOre Type Double-Stage Dry Magnetic Drum Separator



OrexOre Type Double-Stage
Dry Magnetic Drum Separator



OREXTAIL TYPE DOUBLE-STAGE DRY MAGNETIC DRUM SEPARATOR

This type of separator is preferred in applications where the tailings from the first stage still contain low-magnetic-susceptibility iron ore, and where both tailing and middling recovery is desired through a second separation at a higher magnetic field intensity. Double-stage magnetic drum separators are equipped with walkways and access doors on all four sides to allow easy maintenance access to both levels. The magnetic field strengths of the magnetic drum separators are determined in BAS laboratories. In ferrite-magnetized drums, a magnetic field intensity ranging from a minimum of 500 Gauss to a maximum of 2,000 Gauss can be achieved on the drum surface. Depending on the application type and if middling product recovery is required, the separator can provide three different product outputs.

Application Area

Beneficiation of magnetite and hematite ores, aiming at high product recovery rates.

Working Principle

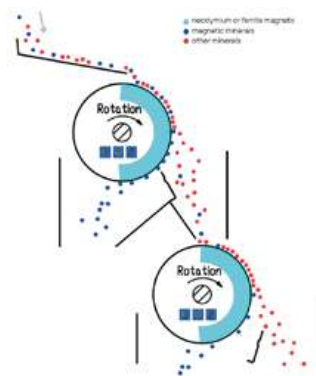
Magnetic minerals in the ore fed into the separator are subjected to a magnetic force. When this force overcomes opposing forces such as gravity and fluid resistance, magnetic particles are attracted to the drum surface and retained as magnetic product. In contrast, gangue minerals or weakly magnetic particles that are not sufficiently influenced by the magnetic field are separated as non-magnetic product under the effect of competing forces. This way, magnetic minerals and gangue follow different paths and are effectively separated. Material with lower magnetic susceptibility that could not be captured in the first stage is precisely transferred to the second drum via a specially designed transfer chute. The system is optimized using magnetic drums with adjustable speeds to achieve maximum possible recovery.

The adjustable flaps under the drums can sweep across all possible angles, enabling the operator to easily direct the middling product to either the magnetic or non-magnetic output as desired. Feeding the material twice into separate dry magnetic drum separators increases both the footprint of the plant layout and the cost of transferring material via conveyors. OrexTail Type Double-Stage Dry Magnetic Drum Separators are preferred as they reduce both initial investment and operational costs. The drum surface can be rubber-coated. Chutes, bunkers, and feeders can be lined with PU material or Hardox wear-resistant plates.

OrexTail Type Double-Stage Dry Magnetic Drum Separator



OrexTail Type Double-Stage Dry Magnetic Drum Separator



BCC TYPE CONCURRENT WET MAGNETIC DRUM SEPARATOR

This system is equipped with a special feed collector group parallel to the drum, ensuring even material distribution across the drum surface. A feed collector guarantees homogeneous distribution over the entire drum. Thanks to its short effective magnetic field range and straight-flow design, material does not accumulate at the bottom. A flow-adjustable valve in the tank beneath the drum allows the water level to be continuously controlled.

This separator is preferred for coarse particle materials and can process particles up to 5–7 mm in size. Compared to other separator types (BCTC and BCR), it can operate efficiently at higher solid-liquid ratios.

Wet magnetic drum separators are used to separate magnetic ores from non-magnetic materials or to separate materials with different magnetic susceptibilities in a slurry medium. These separators consist of a semi-filled magnetic drum, feed box, magnetic/non-magnetic discharge chutes, rotating drum shell, and drum drive unit.

Application Area

Beneficiation of quartz, silica, kaolin, and feldspar. Separation of gangue minerals.

Working Principle

Slurry with a defined solid-liquid ratio is fed into the inlet collector, where it is hydraulically agitated.

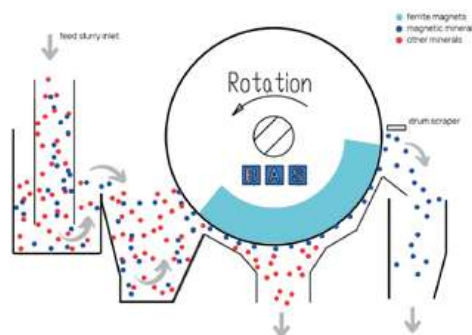
The material is then directed to the separation tank beneath the drum. The semi-filled magnetic drum rotates in the direction of material flow. Magnetic particles adhere to the drum surface and move along with the drum in the direction of flow. As they reach the non-magnetic (dry) zone, they are released from the drum, completing the separation process.

The drum surface, channels, and inlet/outlet boxes can be rubber-coated.

BCC Type Concurrent Wet Magnetic Drum Separator



BCC Type Concurrent Wet Magnetic Drum Separator



BCTC TYPE COUNTERCURRENT WET MAGNETIC DRUM SEPARATOR

Wet magnetic drum separators are used for separating magnetically susceptible ores from non-magnetic materials or for the wet separation of two materials with different magnetic susceptibilities. These separators consist of a semi-filled magnetic drum, feed box, magnetic/non-magnetic discharge chutes, rotating drum shell, and drum drive unit. BCTC-type wet separators are preferred for obtaining maximum-quality iron minerals. Equipped with a specially designed feed box that ensures uniform slurry distribution and a feed channel that spreads the material across the full width of the drum, the system provides enhanced feeding efficiency.

The medium-length separation zone is supported by an optimized separation angle and geometry that eliminates the need for pulp level control. The BCTC tank design is suitable for beneficiating fine and medium-sized materials and can process ore with a maximum particle size of -1 mm and slurry with 25–35% solids content by weight (w/w). A pulp agitation water line feeds the separation tank to support separation under challenging conditions and stabilize the process during fluctuations in solid-liquid ratio. Depending on the desired final product quality, up to four separation stages can be added in a horizontal layout. Since all drums are aligned horizontally, they are equally accessible, ensuring easy maintenance and service.

Application Area

Magnetite ore beneficiation applications. Designed for high-purity product recovery.

Working Principle

Slurry with a specific solid-liquid ratio is fed into the inlet collector and hydraulically agitated. The material is then transferred via a special channel beneath the drum to the center of the drum. The semi-filled magnetic drum rotates counter to the direction of material flow.

Magnetic particles adhere to the drum surface and move against the slurry flow direction until they reach the dry zone, where the magnetic field ends. There, the particles are released, completing the separation process. Based on the required product quality, additional stages can be incorporated, with clean water added at each stage for improved performance. The drum surface, channels, and inlet/outlet boxes can be rubber-coated.

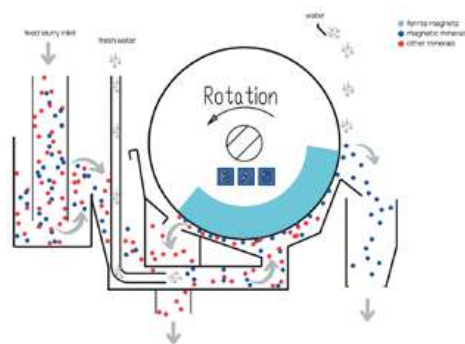
BCTC Type Countercurrent Wet Magnetic Drum Separator



To watch the video
here is QR code;



BCTC Type Countercurrent Wet
Magnetic Drum Separator



BCR TYPE COUNTER ROTATION WET MAGNETIC DRUM SEPARATOR

Wet magnetic drum separators are used for separating magnetically susceptible ores from non-magnetic materials or for wet separation of two magnetic materials with different magnetic susceptibilities. These separators consist of a semi-filled magnetic drum, feed box, magnetic/non-magnetic discharge chutes, rotating drum shell, and drum drive unit.

BCR-type wet separators are preferred when maximum iron mineral recovery is required.

Material is fed into the separation tank through pipes from beneath the unit. The short and efficient transport distance for magnetic particles ensures high separation efficiency. The drum rotates in the opposite direction of the slurry flow, which allows for the recovery of purer magnetic material. Thanks to bottom feeding, there is no need for a valve on the tailings discharge side, and maintaining a consistent slurry level in the tank is not required. However, since the material may accumulate at the bottom of the separator, feeding finer particles is recommended compared to straight-flow designs.

Application Area

Applications requiring high magnetite recovery. Magnetite recovery in coal washing plants.

Working Principle

Slurry with a defined solid-liquid ratio is fed into the inlet collector, where it is hydraulically agitated. The material is then directed to the center of the drum through special pipes located beneath the drum. The semi-filled magnetic drum rotates counter to the direction of material flow. Magnetic particles adhere to the drum surface and move along it in the direction of the slurry flow, covering a relatively shorter path compared to CTC-type separators. When they reach the dry zone where the magnetic field ends, they are released from the drum surface, completing the separation process.

The drum surface, channels, and inlet/outlet boxes can be rubber-coated.

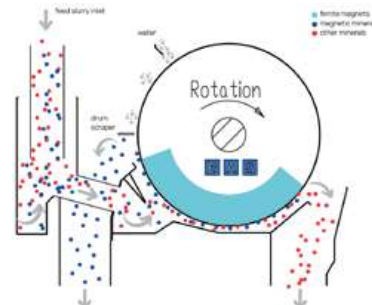
BCR Type Counter Rotation Wet Magnetic Drum Separator



To watch the video
here is QR code;



BCR Type Counter Rotation
Wet Magnetic Drum Separator



HIGH-INTENSITY PERM-ROLL MAGNETIC SEPARATOR WITH VIBROFEEDER

The High-Intensity Perm-Roll Magnetic Separator is an advanced magnetic separation unit that delivers high performance in the separation of minerals with low magnetic susceptibility. Capable of generating magnetic field strengths up to 15,000 Gauss on the belt surface, this system ensures efficient and precise beneficiation of weakly magnetic materials. It is equipped with advanced N52 magnets, an optimized magnetic roll design, and high-speed PU or PVC belt technology. The exact magnetic field strength is determined in BAS laboratories. The separator is designed with user-friendly features such as long service life, easy maintenance, and fast belt replacement.

Thanks to its capability to operate effectively across a wide particle size range (2 mm – 40 mm), it offers flexible solutions for both fine and coarse material applications. Its modular design allows separation in 1 to 3 stages, depending on operational needs.

Application Area

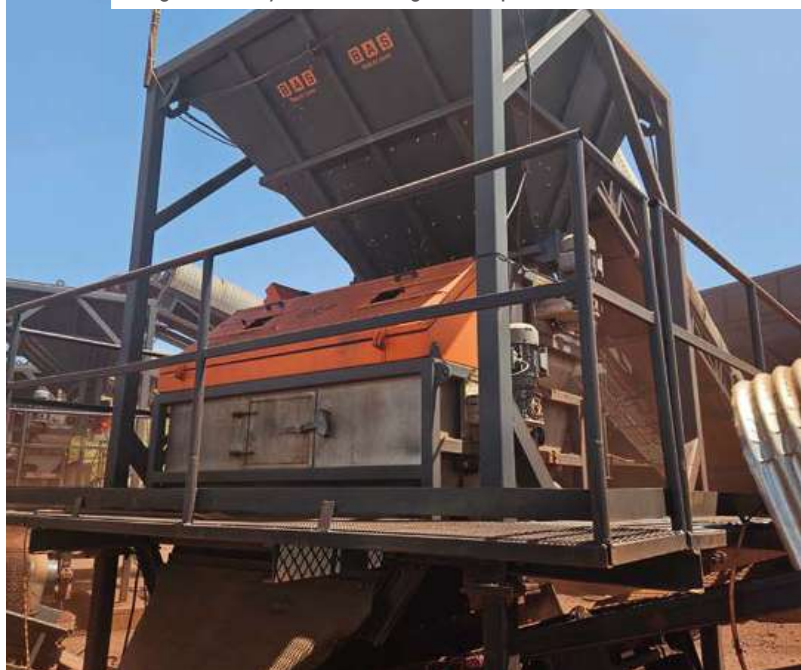
Gangue mineral separation in the beneficiation of quartz, silica sand, feldspar, kaolin, and magnesite. Magnetic separation of weakly magnetic minerals such as manganese, chromite, and hematite.

Working Principle

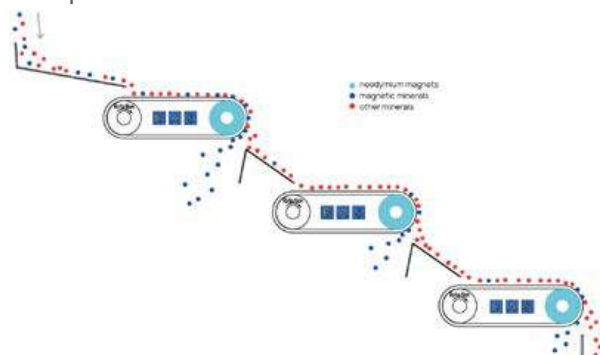
The separation process begins with the material being evenly transferred to a moving endless belt via a vibro feeder. As the material travels over the high-intensity magnetic roll, the non-magnetic fraction is diverted away under centrifugal force.

Simultaneously, the magnetically responsive particles adhere to the roll and are transported by the belt to a separate discharge chute. Depending on the application, vibro feeders are preferred for coarse and high-capacity feeds. The entire system is monitored and controlled through a SCADA and PLC-supported automation infrastructure, ensuring high efficiency and uninterrupted operation.

High-Intensity Perm-Roll Magnetic Separator with VibroFeeder



High-Intensity Perm-Roll Magnetic Separator with VibroFeeder



HIGH-INTENSITY PERM-ROLL MAGNETIC SEPARATOR WITH FEEDROLL

The High-Intensity Perm-Roll Magnetic Separator is a state-of-the-art magnetic separation unit that delivers high performance in separating minerals with low magnetic susceptibility. The system generates magnetic field strengths of up to 15,000 Gauss on the belt surface, enabling efficient and precise beneficiation of weakly magnetic materials. It is equipped with advanced N52 magnets, an optimized magnetic roll design, and high-speed Kevlar belt technology. The exact magnetic field strength is determined in BAS laboratories. This separator stands out with its long service life, easy maintenance, and quick belt replacement, offering user-friendly operation.

The FeedRoll separator, ideal for fine materials (60 microns – 2 mm), allows separation in 1 to 5 stages thanks to its modular design.

Application Area

Gangue mineral separation in the beneficiation of quartz, silica sand, feldspar, kaolin, and magnesite. Magnetic upgrading of weakly magnetic minerals such as manganese, chromite, and hematite.

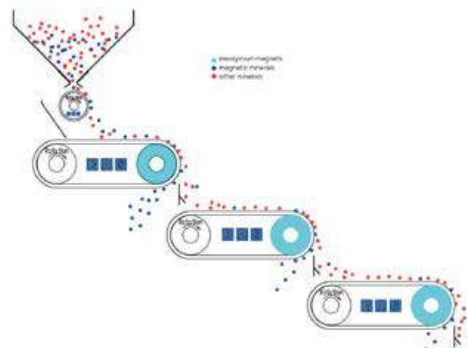
Working Principle

The separation process begins with the material being evenly transferred to the moving endless belt via the feed drum (FeedRoll). As the material passes over the high-intensity magnetic roll, the non-magnetic fraction is deflected away by centrifugal force. Meanwhile, magnetically responsive particles adhere to the roll and are carried by the belt to a separate chute for collection. Depending on the application, FeedRoll feeders provide a compact and efficient solution for finer particle sizes. The entire system is monitored and controlled via a SCADA- and PLC-supported automation infrastructure, ensuring high efficiency and uninterrupted operation.

High-Intensity Perm-Roll Magnetic Separator with FeedRoll



High-Intensity Perm-Roll Magnetic Separator with FeedRoll



HIGH-INTENSITY WET ELECTROMAGNETIC FILTER

High-Intensity Wet Electromagnetic Filters are advanced magnetic separation systems developed for the efficient removal of paramagnetic impurities from non-magnetic raw materials. These systems operate with high efficiency while offering low operating costs. The magnetic field strength is customizable and can be easily adjusted from 1,000 Gauss up to 2.0 Tesla through a user-friendly PLC control panel. With a unique coil and core design and an adjustable matrix structure, the filter provides superior separation efficiency for materials with varying particle sizes and magnetic properties.

Equipped with a pneumatic actuator group, the system includes an automatic cleaning function and an effective washing mechanism that removes magnetic particles adhering to the filter—minimizing the need for manual maintenance.

The electromagnetism of BAS Electromagnetic Filters is optimized to concentrate the magnetic field within the matrix. This ensures highly efficient operation and homogeneous magnetic field intensity across the matrix surface.

Application Area

Gangue mineral separation in the beneficiation of quartz, silica sand, feldspar, kaolin, and magnesite.

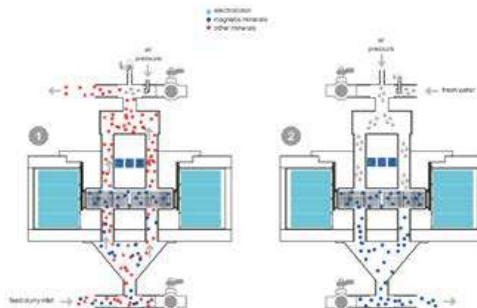
Working Principle

Thanks to its fully automated PLC control, the system can be seamlessly integrated into different processing scenarios. An inlet valve with proportional control precisely regulates material flow. The core matrix coil of the electromagnetic filter generates a high-intensity magnetic field. Magnetic particles separated within this field are removed from the system by the washing unit. The automatic cleaning cycle ensures that filter performance remains consistently high. This makes the system an ideal solution for continuous and efficient production. Depending on the magnetic content of the material, wash and product feed times are continuously monitored and can be easily adjusted via the user-friendly interface.

High-Intensity Wet Electromagnetic Filter



Electromagnetic Filter



WHIMS HIGH-INTENSITY WET ELECTROMAGNETIC SEPARATOR

The WHIMS High-Intensity Wet Electromagnetic Separators are advanced technological systems designed for the beneficiation of paramagnetic and ferromagnetic minerals with low magnetic susceptibility. With a customizable magnetic field strength ranging from 0.5 to 2.0 Tesla, they adapt to various ore types. The matrix structure, which can be adjusted based on particle size, significantly enhances process performance. Structural parameters of the matrix geometry are specially configured based on the grain size, density, and magnetic susceptibility of the processed material. An integrated PLC control system allows all process steps to be precisely monitored and managed.

Application Area

Gangue mineral separation in the beneficiation of quartz, silica sand, feldspar, kaolin, and magnesite. Magnetic upgrading of all weakly magnetic minerals such as manganese, chromite, hematite, biotite, limonite, and muscovite.

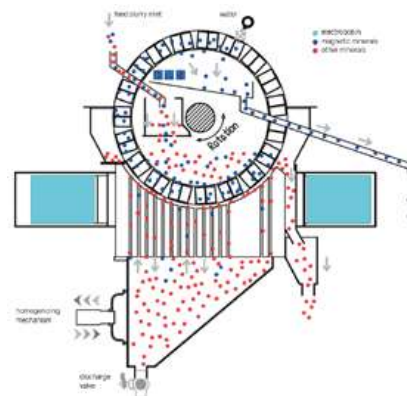
Working Principle

The system begins operation by directing the prepared ore pulp into the magnetic separation tank through specially designed feed channels. Optimized matrices within the vertically moving ring system capture magnetically susceptible materials inside the tank and transport them in the direction of the matrix rotation. Once the ferromagnetic and paramagnetic minerals attached to the matrix reach the zero magnetic field zone, they are washed off and discharged from the system. Weakly magnetic particles that are not captured on the first pass are reintroduced to the matrix through a continuously operating homogenization mechanism inside the tank, ensuring maximum efficiency through repeated contact.

WHIMS High-Intensity Wet Electromagnetic Separator



Wet Electromagnetic Separator



DEMAGNETIZER

A demagnetizer is a device used in iron ore beneficiation plants to eliminate residual magnetism—permanent or temporary magnetic fields that remain within ore particles after magnetic processing. When ore is exposed to a magnetic field, the atoms inside the particles align in a specific direction, becoming magnetized. Once the external field is removed, this alignment doesn't disappear immediately—some residual magnetism remains.

This leftover magnetism can cause unwanted magnetic behavior in the material, making proper particle liberation more difficult. The demagnetizer works on the principle of alternating current (AC), disrupting the internal magnetic alignment of the particles and neutralizing them. This enhances the precision and accuracy of subsequent separation processes.

Application Area

Coal washing plants, magnetite beneficiation plants.

Working Principle

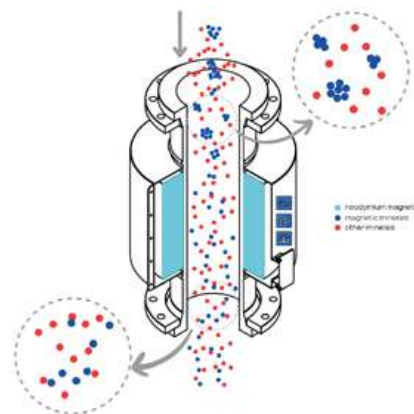
Demagnetizers are typically integrated into pipeline systems. The ore to be processed is passed through a region of alternating magnetic field generated by the device. This alternating field gradually weakens and neutralizes the residual magnetic alignment within the ore. The process is usually carried out before magnetic separation, especially in cases where high-purity separation of fine particles is required.



Demagnetizer



Demagnetizer



AGITATOR TANK

An agitator tank is a mechanical mixing unit used in mining and mineral beneficiation plants to homogenize solid-liquid mixtures. The motor-driven impeller inside the tank keeps the slurry—a mixture of ore and water—in constant motion, preventing sedimentation and maintaining a stable physical consistency. Achieving a homogenous slurry is crucial for high efficiency in physical separation processes, such as magnetic separation. This equipment is specifically designed to balance slurry density and ensure uniform distribution of ore particles within the tank.

Parameters such as tank size, motor power, impeller type, and rotation speed are specially simulated and selected by the BAS team according to the characteristics of the ore and plant capacity.

Application Area

Used before all types of wet physical separation applications.

Working Principle

After the crushed or ground ore is mixed with water at a specific solid ratio to form a slurry, it is fed into the agitator tank. Inside the tank, the impeller is driven by a motor to keep the mixture in continuous motion, preventing the particles from settling at the bottom. This agitation ensures that the particles remain evenly distributed throughout the tank at a consistent density.

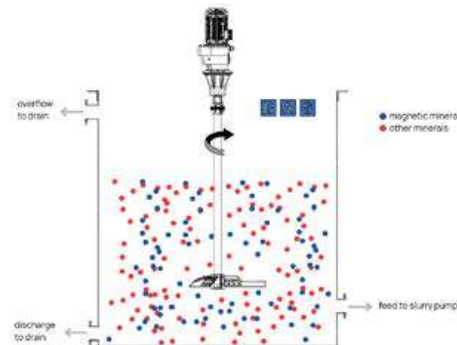
Such homogeneity directly improves the efficiency of subsequent separation processes. At the tank outlet, the homogenized slurry is transferred to physical processes like magnetic separation via a slurry pump. The tank's inner surfaces and mixing components are equipped with rubber or hard metal linings to withstand the abrasive nature of iron ore, thus extending the equipment's service life and reducing maintenance costs.



Agitator Tank



Agitator Tank



EMBS ELECTROMAGNETIC OVERBAND METAL SEPARATORS

Electromagnetic overband metal separators are used to remove unwanted ferrous metals from material streams on conveyors and in chutes. Unlike MBS permanent separators, EMBS units generate an electromagnetic field. The coil inside the separator is energized by high electrical current, which activates the core to produce a strong magnetic field. The overband metal separator consists of a main magnetic block, an endless separator belt, a drive motor, and a steel frame with magnetic insulation. EMBS electromagnetic overband separators can generate at least twice the magnetic field strength of MBS permanent magnetic overband separators. In heavy-duty applications requiring high suspension distances, they can achieve magnetic field strengths of up to 2,000 Gauss at 600 mm.

Application Area

Suitable for all types of conveyor line applications.

Working Principle

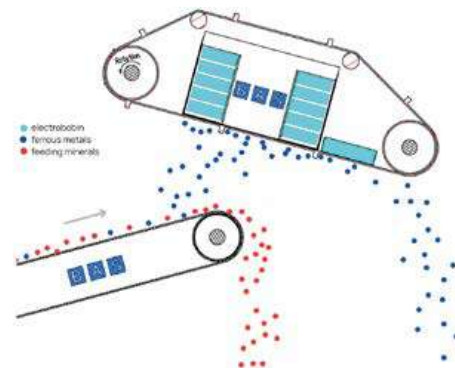
EMBS units are installed above conveyor belts to remove ferromagnetic metal contaminants from conveyed material. As the material moves along the conveyor, ferrous particles are attracted by the strong magnetic field and lifted out of the flow. These particles are then discharged at a designated point by the rotating separator belt, ensuring material purity and preventing damage to downstream equipment. In metal recovery operations, EMBS units can also be used in reverse to extract valuable metals.

Modern EMBS models from BAS do not include a transformer unit, making the control panel more compact, the equipment more efficient, and significantly reducing the risk of overheating compared to other electromagnetic separators. Standard BAS EMBS separators also do not include an expansion tank in their oil-cooled versions, allowing for easier installation in tight or limited spaces.

The BAS EMBS series can be configured for both inline and crossbelt applications and supports suspension heights between 350 mm and 1,000 mm. Standard models are available for belt widths up to 2,000 mm, but custom designs can be manufactured to fit specific conveyor widths and lengths as needed.



EMBS



METAL DETECTORS

Overbelt metal detectors are used on conveyor systems where metal contaminants cannot be physically removed, or to ensure system safety after metal separators.

They are commonly used in nearly all raw material transport lines that do not inherently contain metal. The configuration of metal detectors varies depending on the material height on the belt, particle size, and the size of metal particles to be detected.

Application Areas

Suitable for all conveyor applications in industries such as construction chemicals, cement plants, coal processing, and ore beneficiation.

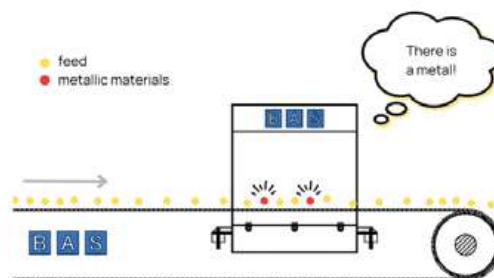
Working Principle

Single-sensor metal detectors operate on a unidirectional detection principle. Mounted beneath the conveyor belt, they detect metal particles in the material passing above. Upon detection, they trigger alarms via visual, audible, flag-based, or relay output signals. Tunnel-type metal detectors, on the other hand, offer much higher sensitivity and are therefore preferred in high-capacity lines or where precise metal detection is required. Detection sensitivity can be adjusted in BAS metal detectors.

Thanks to a digital display control panel, settings can be configured easily by entering numerical values. The system includes a functional interference adjustment menu to prevent false alarms caused by external factors such as electrical noise, grounding issues, and radio signals. These detectors can also operate reliably with belts that include rivet sensors.



BMD-2 Serial Detectors



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**RECYCLING
SOLUTIONS**

**MAGNETIC ORE
BENEFICIATION
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