Efficient separation in mining!

STEINERT separation solutions for mineral processing applications
– innovative, proven, cost-effective.
Whether steel and aluminium for vehicle manufacture, cement for construction, industrial minerals in aggregates, coal as energy, or pigments for colourful living – mineral raw materials have countless applications in our world. They provide the crucial bedrock for industrial progress and will continue to do so into the future. At the same time mineral processing companies continually face more challenges. It’s not just about developing new deposits but also about processing efficiency – particularly the leaner ones. Crucial to processing machines is their availability, and as part of your larger operation they will need to consume less energy, water and chemicals. All in all these are challenges which can only be met using advanced, perfectly integrated technology. This is exactly what STEINERT provides.

**Comprehensive process expertise.**

STEINERT draws on over 100 years of experience in process engineering – a decisive advantage when it comes to giving you comprehensive advice on selecting the right sorting technology. Our engineers don’t just have their knowledge of each individual machine to draw on. They will also keep your whole process firmly in mind when developing your solution. On top of that our research unit can conduct extensive test runs using your own materials. These are the best conditions possible for designing a specific solution – consistent with your goals.

**Global presence and comprehensive service.**

Mineral processing is a global business that requires global partners, always available and quick to respond. Today, with manufacturing plants in Germany, Australia and Brazil STEINERT is globally represented. What’s more, we have a global customer service network with specially trained service partners. Our international presence guarantees you competent advice, local support with commissioning, as well as speedy replacement parts delivery and maintenance support.

Conventional separation technology and advanced sensor sorting technology from the one provider.

Our sorting machines have been used successfully for decades, all across the world – from Germany to China, Finland to South Africa and Alaska to Chile. We now offer a unique range of equipment for processing mineral raw materials, from conventional suspension magnet separators to advanced sensor sorting. And all from one provider.

Our plans always keep one thing in mind: your overall process.
STEINERT Suspension Magnet Separator (UME)
The solution for sorting coarser metal.

STEINERT electrical suspension magnets are truly tried and tested when it comes to protecting processing plants from unnecessary waste or damage and ensuring their safe operation. They are particularly suited for large belt widths, high belt speeds (up to 75 m/s), and deeper burden depth. They reliably remove tramp iron such as roof bolts, star pickets and drill pipes from coal, limestone and copper ore in the processing stream. No wonder these high-performance magnets are also in demand below the ground, in coal mining. To achieve maximum performance the suspension magnet should be positioned lengthways above the belt conveyor – and of course the belt drums should be non-magnetic. STEINERT is also the only manufacturer to offer both oil- and air-cooled suspension magnet separators for every performance category – and we’ve been doing that for decades. Typical applications include bulk goods handling in large ports and power plants.

Steinert Suspension Magnet Separator UME.png

Wet Drum Separator (WDS)
For processing iron ore and heavy media.

STEINERT’s permanent-magnet wet drum separators have been beneficiating iron ore and heavy media successfully for decades. In iron ore processing the wet drum separator separates magnetic iron ore such as magnetite from waste rock – at P80’s commonly down to 28 µm. STEINERT has continued to develop several aspects of the WDS. Heavy media recovery – magnetite or ferrosilicon – is near 100% efficient. The feed-mechanism and separation zone are optimised according to maximum flow principles. By introducing powerful neodymium-iron-boron magnets, fields of up to 5,000 Gauss can be achieved, meaning STEINERT can also offer so-called mid-intensity magnetic separators (MIMS). Advanced 3D calculation software incorporating finite-element analysis helps to fine-tune the magnetic field. For greater throughput volumes, diameters of up to 1.2 m and operating widths of up to 3.6 m as well as back-to-back and parallel arrangements are possible.

Wet Drum Separator WDS.png
STEINERT Magnetic Drum (MT)
Ideal for industrial minerals over 1 mm in size.

STEINERT’s magnetic drums are used for industrial minerals such as sand, salt and ceramics, various slags and capping duties in iron ore – usually in order to separate materials with high- to low-magnetism over 1 mm in size. High-efficiency magnetic removal of hard, ferrous material is vital in ensuring the longevity and economy of the plant as a whole. STEINERT magnetic drums are available as axial pole or radial pole systems. In the axial pole system polarity alternates along the drum circumference, circulating and cleaning the material thoroughly. In the radial pole system, however, all the material that is attracted remains fixed in place, making this method especially suitable for preventing loss of magnetic material where the throughput is high. In addition, STEINERT offers a wide range of permanent magnets for both systems.

STEINERT High Gradient Magnetic Separator (HGS)
Perfect for sorting pourable bulk material.

STEINERT’s high gradient magnetic separators find their applications worldwide in the processing of salt, mineral sands and other industrial minerals, and in the construction materials industry. And not without reason – the HGS is perfect for sorting pourable bulk materials with particle sizes between 200 μm and several millimetres.

The HGS consists of a short belt conveyor with a permanent magnet disc-system installed in the head drum. Thanks to powerful neodymium-iron-boron magnets, even weakly magnetic minerals are separated out. The system’s special alternating configuration of magnetic and steel discs enables higher ranges, and allows field gradients to be adjusted to the application. Further features such as quick-clamp mechanisms, precise band-guiding and fields of up to 22,000 Gauss testify to the superior quality and performance of our sorting machines.
Versatile and time-tested:
Separation using magnetic separators.

The goal of every processing operation is to produce clean, market-ready end products. STEINERT has continued to develop and improve the classic separation solution to respond optimally to the exacting requirements of diverse processing operations. Today we offer a wide range of magnetic separators: permanent magnet, electromagnetic and hybrid systems.
New technologies, new sorting criteria, new possibilities.

STEINERT XSS® X-Ray Sorting System
Sorting criterion: X-ray absorption.

With the XSS® X-Ray Sorting System STEINERT is the first company to develop a process that allows for a wholly innovative sorting criterion in mineral processing: the absorption of X-rays passing through a particle. The greater the atomic mass of the basic chemical element (periodic table) in the particle, the greater the absorption. The greater the difference in atomic mass between individual particles the easier it is to differentiate between them.

The XSS® allows you to “see through” the particle and detect material components within the particle such as zinc, copper, gold, diamonds and coal. That pays off since it allows you to separate valuable from non-valuable rock fragments at an early stage. This makes any further crushing and sorting operations unnecessary.

X-rays from the XSS® are generated electrically in a high-voltage tube, which means that there is no radioactive source. The resolution limit is around 1 mm. The width of the air jets is adjusted to reflect the resolution limit and the particle size distribution.

STEINERT FSS® Colour Sorting System
Sorting criteria: colour, shape and brightness.

The FSS® Colour Sorting System is an optical sorting process and uses differences in colour and brightness within the visible light spectrum as sorting criteria. Amongst other applications it is possible, by registering discoloration, to determine differences in moisture levels. The FSS® is suitable for detecting differences in particle shape, for example sorting elongated and cubic particles.

The lower-end resolution of the FSS® is around 1 mm depending on marginal constraints. Depending on the process requirements, either one or two opposing sides of the particle are analysed, using one or two cameras.

As with all optical processes, clean optics and constant lighting should always be assured, something STEINERT has tried to accommodate as far as possible in the design of the system.

Colour sorting is a surface process, so good sorting results require particle surfaces to be clean and recognisable.
STEINERT ISS® Induction Sorting System
Sorting criterion: electrical conductivity.

Like the XSS® X-Ray Sorting System, the ISS® Induction Sorting System recognises material differences within the particle. The evaluation criterion is primarily the electrical conductivity of the material. Small, thumb-width sensors under a conveyor belt or slide emit electromagnetic oscillations. Electrical conductors moving over them alter the oscillations, and a computer determines the signal difference for each particle. Exact particle sorting is thus made possible with conductor thicknesses as small as 1 mm. The ISS® can detect, for example, gold in a piece of rock and aluminium in a chunk of slag, can separate non-magnetic steel from iron ore, and can separate out specific nickel ores.

Metal detectors
For all metallic, non-magnetic contaminants.

When it comes to separating metal contaminants that are non-magnetic, such as high-alloy excavator teeth, metal detectors are often used. They detect metal in a similar fashion to the ISS® Induction Sorting System, by registering differences of magnetic induction in the detector. As a rule metal detectors can detect all types of metal. If required they can be equipped to differentiate between iron ore and metal. Given a signal the belt conveyor can be stopped, flaps activated, or a suspension magnet switched on.
See the invisible.  
With innovative sensor technology.

STEINERT sensor-sorting systems open up new opportunities in mineral processing. They don't just transform process engineering, they also make it more precise – and therefore more efficient. This remains as true when producing a market-ready end product as in the early stages of separating valuable from non-valuable rock.

Sensor sorting is a dry-mechanical process – it requires no water or drying. All you need is electrical energy. This is so sensors can detect the optical or inductive properties of each particle, visible or invisible. Computers then compare these with previously stored values, such as electrical conductivity or an absorption coefficient for X-rays. Should one or more of these attributes match, compressed air blasted from a targeted jet removes the identified particle from the material flow – all of this in a matter of milliseconds and with micrometric precision. That's how lead and zinc ore are differentiated, diamonds are detected in rocks, limestone is sorted according to colour, and much more.

With each responding to specific requirements, STEINERT offers three different sensor-sorting systems for mineral processing. These are the FSS® Colour Sorting System, the XSS® X-Ray Sorting System and the ISS® Induction Sorting System. Other technologies such as metal detectors complete our product offering. Naturally, our technologies can also be combined as required. STEINERT sensor systems do work at resolutions of below 1 mm, although the ideal particle size is between 5 and 300 mm – depending on particle mass, shape and associated parameters. You have a choice between conveyor and slide system. Slide machines are compact, carry the material for as long as possible, and are particularly suited to evenly shaped materials. Conveyor systems also sort particles of uneven shapes reliably, and are particularly suited to mid-size particles.