

TRAMP REMOVAL

How to remove tramp metal efficiently?

RELIABLE, EFFICIENT TRAMP REMOVAL

For more than **130 years**, STEINERT magnets have been protecting mining downstream processing equipment from disturbing metallic components, all over the world. **Since STEINERT's beginnings in 1889**, the company develops and continuously improves its wide range of **magnetic separators** to serve the mining industry.

Bucket teeth, rock bolts, wires and even nuts and bolts can seriously damage belts, screens, grinding mills and above all, crushers. Every mineral processing plant needs to be **protected from tramp metal** to reduce wear and tear and downtimes and to save huge repair costs.

STEINERT magnets, with coils made of anodised **ANOFOL®** aluminium strip,

provide the highest efficiency and quality. ANOFOL® is part of the STEINERT group and supplies these highest-quality aluminium strips exclusively for STEINERT magnets. As a result, the **magnets are lighter** and **more energy-efficient** than magnets with traditional copper coils.

STEINERT offers **oil-** and **air-cooled magnets** in combination with **metal detectors**. This solution guide will support you in finding the right solution for your application, and the most effective way to keep your machinery safe and your product quality high.

If you have special requirements, STEINERT is the expert in **protecting your assets**.

Overband magnet (self-cleaning & oil-cooled)

for high-capacity conveyors and ferromagnetic tramp which cannot be removed. The oil filling provides cooling, thus reducing the risk of a burnt coil under extreme environmental conditions.



Overband magnet (self-cleaning & air-cooled)

installed when tramp metal is constantly occurring in the material flow



Overband magnet (manual cleaning) for high bed depths and ferromagnetic tramp



Magnetic head pulley

for the separation of tramp metal in low bed depths to replace a regular drive pulley



Metal detectors to be implemented in systems with low volume of tramp metal

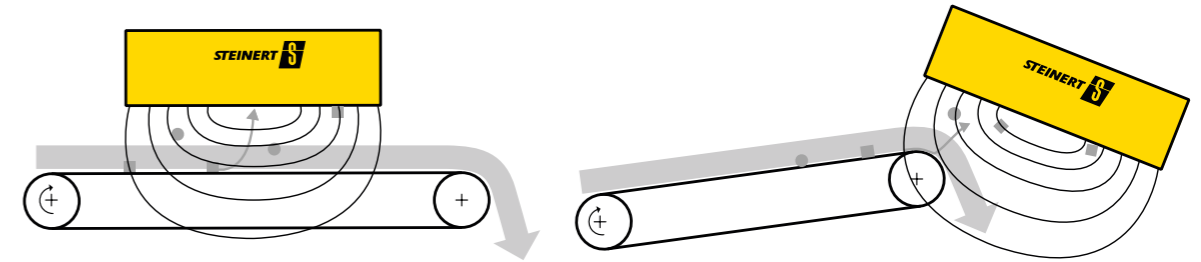
THE STEINERT SOLUTION

SUSPENSION MAGNETS

The following variables will determine the selection of the right suspension magnet:

- + Bed depth in mm or inches
- + Conveyor dimensions: width and belt speed
- + Required installation position: above the conveyor belt or above the head pulley
- + Size of tramp metal to be removed (The shape has an influence on how well the tramp is removed. Spheres are the hardest to separate.)

STEINERT's advice for most applications is to position the magnet above the head pulley. But in some existing plant layouts such a setup is not feasible and one has to choose an installation over the belt. In that case the suspension magnet needs to lift the weight of the tramp material and additionally overcome the weight of the material above it. To realise the same separation efficiency, the size of the magnet has to be bigger or a magnet has to be installed after each conveyor transfer. So in regard to separation efficiency, an installation over the head pulley is optimal.



Suspension magnets

Ferromagnetic tramp is attracted by the magnet when entering the magnetic field. At the installation over the head pulley the magnet can be installed closer because there is no troughed belt.

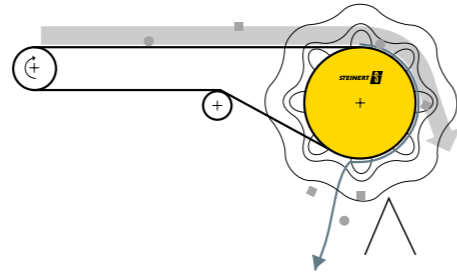
Note: The gauss value in a certain distance to the magnet is not an indicator for the performance. The change of the magnetic field strength in relation to the distance to the magnet is relative to the capability of the magnet to attract ferromagnetic pieces. This is called the force factor.

MAGNETIC HEAD PULLEY

The efficiency of the magnetic head pulley is mainly limited by the magnetic field depth. The bed depth shouldn't exceed 120 mm to ensure an efficient separation of the tramp metal. An additional discharge below the pulley for the tramp is necessary.

Your required head pulley is set by the following variables:

- + Bed depth in mm or inches
- + Drum dimensions: width, diameter and rotation speed
- + Size of tramp metal to be removed (The shape has an influence on how well the tramp is removed.)

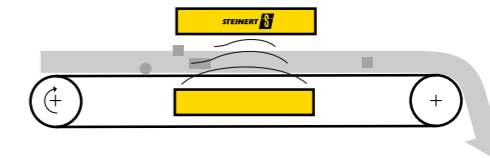


Magnetic head pulley

Ferromagnetic tramp is attracted to the drum and released by the belt forcing it to exit the magnetic field.

METAL DETECTOR

The metal detector type is determined by the size of the conveyor belt. It detects all kinds of conductive materials, like ferrous, non-ferrous metals and iron ores. The signal can be used in several different ways. It is possible to adjust the detector to differentiate between metallic ores and tramp. Additionally, the signal can be used to start a suspension magnet, to monitor a magnet's performance or to mark detected tramp metals, like stainless or high-alloyed steel. In combination with diverter gates or chutes and sensor-based sorting, a highly sophisticated and fully automated solution can be realised.



Metal detector

Conductive material disturbs the regular field of the sensor. This change is interpreted.

*STEINERT Metal Detector
in a coal wash plant*



*STEINERT UME
in a gold mine*



*STEINERT OHSM
in a coal mine*



*Tramp metal
removed out of coal*



*Large and
small tramp metal
removed from
material stream*



*STEINERT UME
in a ship-loading application*



WIDE VARIETY FOR DIFFERENT INSTALLATIONS / 9

*STEINERT Boomerang
in a coal wash plant*



*STEINERT MP
in a gold mine*



TRAMP MAGNETS

self-cleaning

Air-cooled:



STEINERT UME

The electromagnetic overhead suspension magnets are characterised by their extremely strong and far-reaching magnetic fields. They are designed for high bed depths and small tramp metal.



STEINERT UMP

Permanent magnets are very energy-efficient since they do not require a rectifier. They are designed for lower bed depths and mainly big ferrous magnetic tramp.

Oil-cooled:



STEINERT OHSM

High intensity oil-cooled overband magnets that have been developed for high-capacity conveyors where the standard UME/UMP have difficulty in removing tramp metal. These magnets are proven to work efficiently even in extreme conditions.

Magnetic head pulley:



STEINERT BRP/BRE

The magnetic head pulley can be implemented in existing plants and replaces regular head pulleys. STEINERT will manufacture the magnetic head pulley according to your design requirements. It can be used to separate tramp metal in all sizes as well as a method for dry magnetic ore beneficiation (cobbing). It is ideal for reclaiming small, weak magnetic particles from conveyed material.

TRAMP MAGNETS

manual cleaning

*Designed for installations with tramp occurring from time to time.
Also Atex/UL Zone 21 compatible.*



STEINERT AME/AMP

These types of magnets provide a cost-saving solution for separating tramp metal that occurs only occasionally. They are not self-cleaning, therefore they require a removal cycle during which the magnet has to be swung away from the belt briefly. Attracted ferrous parts fall off once the electromagnet (AME) is switched off. The weaker AMP has to be cleaned manually.



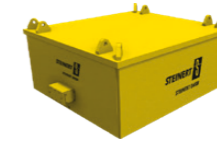
STEINERT Boomerang

This giant magnet works for high-capacity discharge installations. The shape of the magnet reflects the material trajectory. For wide conveyor belts with high conveyor speed and layer thicknesses at extreme throughput.



STEINERT MP

This magnet can be connected directly to the main power supply, which allows extremely fast commissioning and also saves space because no control cabinet and extra rectifier of any kind is needed. It works for high bed depths with tramp metal magnetics and is easy to relocate.



STEINERT OHSM

This magnet is constructed for high bed depths and small tramp metals which cannot be removed by STEINERT AME/AMP. Made for extreme ambient conditions, the oil-cooled system is ideal for batch removal in the case of low tramp iron volumes.

METAL DETECTOR



STEINERT Metal Detector

The detector has diverse functions. It can be implemented in systems with low presence of tramp to start the electromagnet or as a control after the installed overband magnet to detect both magnetic and also non-ferrous metals. It is easy to set-up and use.



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