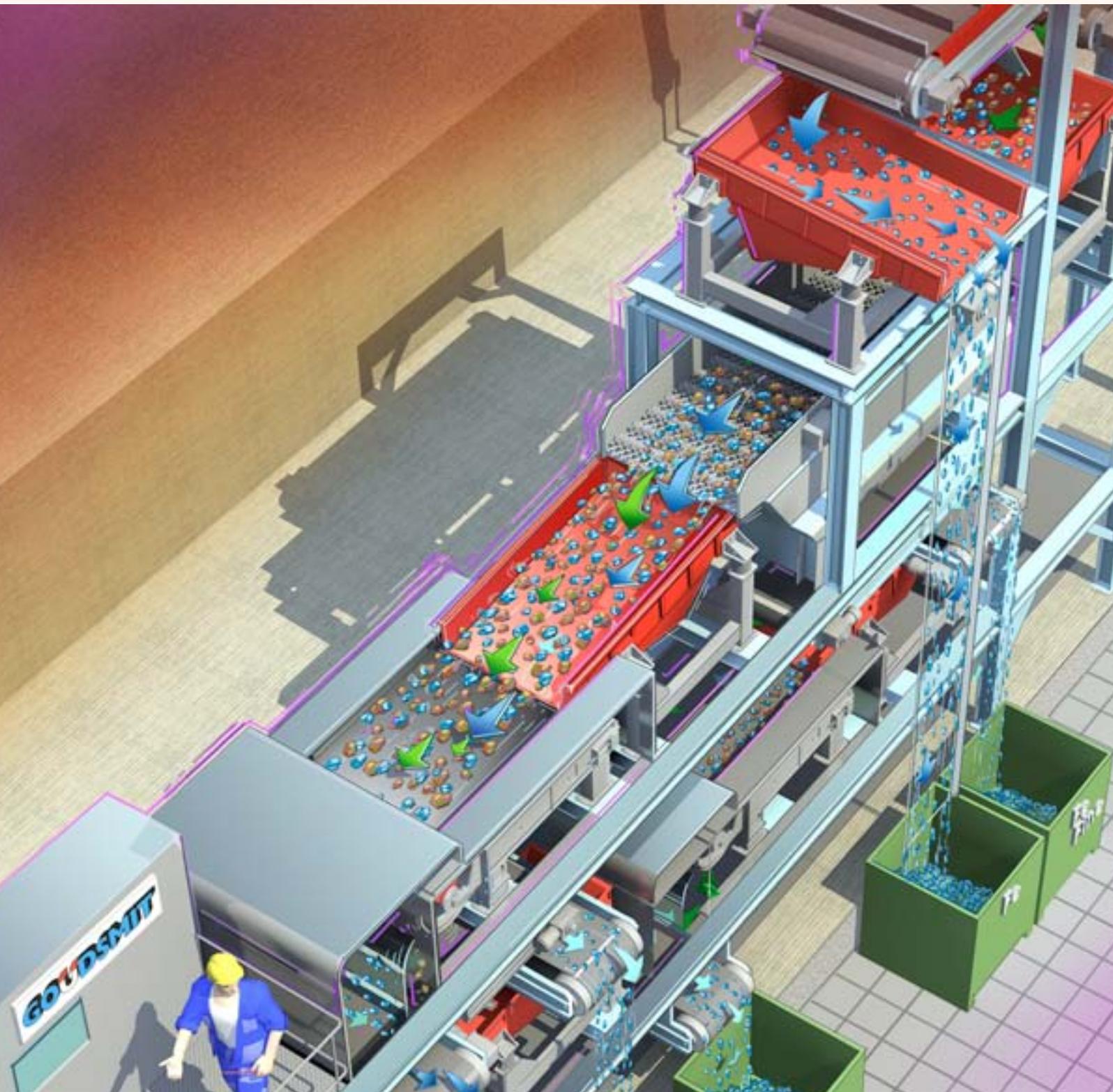


# Magnetic Separators for Recycling



In recent years, **Goudsmit Magnetics** has significantly extended its set of magnetic systems for the recycling industry. This brochure gives an overall impression of the various systems for metal removal. Goudsmit's strength lies primarily in delivering customized solutions.



Since 1959, Goudsmit has built their magnet knowledge and experience and is therefore able to find the right combination of machine robustness and magnetic force. This is especially important in the development and production of permanent magnetic and electromagnetic separation systems. Our team of specialists is constantly working on innovations that are tested extensively in practice. An innovation is the removal of **fine fractions** and weak (**para**) **magnetic** metal parts, as well as **non-ferrous** metal parts. This means an important step forward for the recycling industry.

The website [www.goudsmit-magnetics.nl](http://www.goudsmit-magnetics.nl) includes several tables with data from our standard product range. Please do contact us and explain your recycling issue to us. We will be glad to advise you by phone or in a personal interview. You are welcome to our company in Waalre, where the necessary testing can be performed immediately, if necessary.

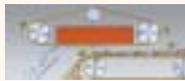
## Contents



### Block magnets

Permanent and electro

5



### Overbelt magnets

Permanent – NEOFLUX® – Ecoline – electro

6 - 7



### Head roll magnets

For conventional iron separation and/or high-grade separation of weakly magnetic parts

8



### Drum magnets

For conventional iron separation and/or high-grade separation of weakly magnetic parts

8



### I-Sens sensor separator

Conventional and/or high-grade separation of non-ferrous metals (which may include stainless steel and copper wire) and a metal content < 1%

9



### Non-ferrous separators (Eddy Current)

Conventional and/or high-grade separation of non-ferrous metals (except stainless steel and copper wire) and a metal content > 1%

10 – 11



### High-gradient magnetic separators

High-grade separation of weakly magnetic or very small iron particles

12



### Metal detectors

Conventional metal detection from about 0.5 mm, only for waste flows with occasional metal particles in it and a metal content < 0.2%

12

### Goudsmit Research & Service

Testing laboratory – Revision – Service

13





GOLDSMIT

Rest Metals

Nfe Large

Fe Large

N Fe



CONSUMERE MAGGIORI RICICLARE MIGLIORI



CONSUMERE MAGGIORI RICICLARE MIGLIORI

Fe

Fe  
Fine

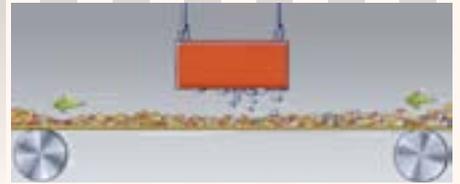
Fe  
ne

# Block magnets

Block magnets are ideal for removal of iron particles from material flows involving relatively few iron particles. They can be mounted above flat and/or trough-shaped conveyors. Goudsmit provides block magnets in both permanent and electro versions. These can be applied in all product and waste flows, and for any bandwidth and layer thickness.

The choice of a permanent or electromagnetic design will depend on the specific situation. We would be glad to advise you on choosing the right block magnet for your application.

Please refer to the website for tables.



*Permanent block magnet for compost*



*Electro block magnet for cement*

## Permanent block magnets

Permanent magnets do not consume any energy and as a result they provide a cost-effective solution. Iron particles absorbed by the magnet must be removed by hand. Semi-manual cleaning with a drawer is a possibility.

## Electromagnetic block magnets

Electromagnets can be switched on and off, making cleaning easier. If voltage is turned off, the iron particles will drop simply off the block. A deeper capture field is possible for larger types of electromagnets. Supply and installation of the control unit for generation of the required DC current will also be provided by Goudsmit.

Construction parts under the magnet should be of non-magnetic material for optimal results.

### Benefits

- Low-priced and easy to install
- Available in various sizes, reflecting the breadth and depth of the flow of material
- Opportunities for heavy duty performance
- Deep magnetic field, depending on strength of type

# Overbelt magnets

Goudsmit has been successfully producing permanent and electro overbelt magnets for many years. A recent development is the lightweight NEOFLUX® overbelt magnet and the ATEX electro overbelt magnet. Such magnets will often be used in the first step of a deferrizing process.

The effectiveness varies from 70 to 90%. If a cleaner product is desired, one or more steps can be added. Overbelt magnets can be mounted both in line with and across the conveyor belt. Both possibilities are shown here.

Goudsmit would be glad to advise you!



NEOFLUX® overbelt magnet complete with Stainless Steel Frame



Permanent overbelt magnet above sorting conveyor

## Permanent overbelt magnets

- Applicable to waste and/or product flows with lots of iron particles.
- Can be positioned across or in line with the product conveyor belt.
- Installation above flat and/or trough-shaped conveyor belts.
- Capture field up to 450 mm is possible.
- Certification possible for environments prone to dust explosions, ATEX zones 22 and 21.

All magnets have a short weakening pole at the end of the main pole, in order to promote releasing of iron particles. The magnetic field will become steadily weaker, as a result of which iron particles will be released easier and are less likely to return to the magnetic pole.

### Benefits

- No energy consumption
- Permanently magnetic
- Low maintenance requirements
- Continuous cleaning (automatic)



Permanent overbelt magnet in line above conveyor belt

## NEOFLUX® overbelt magnets

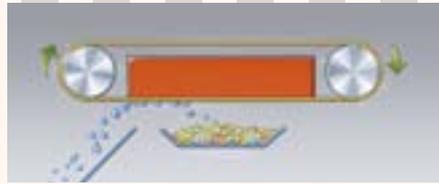
NEOFLUX® overbelt magnets have been especially designed for use on wood and compost breakers that are relatively small and therefore not able to bear a heavy magnet. This magnet often weighs half, sometimes even less than a conventional (ferrite) overbelt magnet. Nevertheless, the NEOFLUX® magnet has a deep magnetic field to be able to separate normal iron particles from various product flows.

An important advantage of the NEOFLUX® version relative to a conventional overbelt magnet is that it is about twice stronger in the first 10 cm capture field. Therefore, NEOFLUX® magnets are very well suited for fine-grained fractions, e.g., < 10 or 5 mm. It is possible to separate particles from approximately 1 mm from the product flow.



NEOFLUX® overbelt magnet on wood shredder (lightweight and compact)

### Cross installation



### Line installation



Standard stainless steel ecoline magnet



2 meter wide electro overbelt magnet for processing construction and demolition waste

### Ecoline overbelt magnets

The Ecoline overbelt magnet series has been designed specifically for general and not too heavy deferrizing situations. The mounting height is up to 230 mm. Price (compared to magnets used) and a very fast delivery are of importance. Goudsmit always has the right parts in stock to be able to deliver to you a complete overbelt magnet within up to 2 weeks.

#### Benefits

- Compact construction
- Stainless steel construction
- Van der Graaf drum motor ATEX 22

### Electro overbelt magnets

- Applicable to waste and/or product flows with lots of iron particles.
- Can be positioned across or in line above conveyor belt.
- To be installed above flat and/or trough-shaped conveyor belts.
- Capture field up to 700 mm is possible.
- Certification possible for environments prone to dust explosions, ATEX zones 22 and 21.
- All magnets have an auxiliary pole to remove iron particles from the magnetic field of the main pole.

#### Benefits

- Can be shutdown completely
- Low maintenance requirements
- Continuous cleaning (automatic)

Please refer to the website for tables.  
[www.goudsmit-magnetics.nl](http://www.goudsmit-magnetics.nl)



Electro overbelt magnet for construction and demolition waste



Electro overbelt magnet for the wood processing industry

# Head roll magnets

Goudsmit head roll magnets are very effective in making iron-free both coarse and very fine-grained fractions. A head roll magnet is mounted as a drive roller in a conveyor belt. Next, it will attract iron particles present in the product and deflect these to the bottom of the belt. There, the iron particles will be released from the magnetic field and collected in a funnel or a slide plate.



Separation particles from shredded aluminum

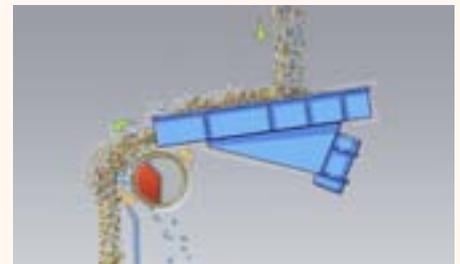
A magnetic head roll is regularly used as a second deironization step in combination with overhead magnets, in order to realize a finer separation after the first separation of coarse steel particles. In this way, the head roll magnet will increase effectiveness. Goudsmit head roll magnets are available in various magnetic strengths. Not only with conventional ferroxdure magnets, but also in extra strong NEOFLUX® versions.

There are **four options** for releasing iron particles from contaminated products:

- **FERROXDURE (FxD) 1800 Gauss**
- **NEOFLUX® 3000 Gauss**  
conventional deironization
- **NEOFLUX® 6000 Gauss**  
separation of weakly magnetic particles, with extremely deep magnetic field of 150 mm
- **NEOFLUX® 9000 Gauss**  
separation of weakly magnetic particles, with shallow magnetic field of about 30 mm (High Gradient Separator)

# Drum magnets

Goudsmit drum magnets are suitable for bulk and recycling products. A magnetic drum is a stationary 180-degree magnet segment around which a stainless steel drum with scrapers runs. Iron particles are held on the drum and pulled to the bottom of the magnet. Scrapers will pull the iron particles from the magnetic field. Result is a clean separation between product and iron particles.



NEOFLUX® drum magnet for glass recycling

Like head roll magnets, these drum magnets are available in various magnetic strengths. Besides conventional ferroxdure magnets, Goudsmit also manufactures heavy duty NEOFLUX® versions.

Products can be made iron-free in **4 phases**:

- **FERROXDURE (FxD) 1800 Gauss**
- **NEOFLUX® 3000 Gauss**  
conventional deironization
- **NEOFLUX® 6000 Gauss**  
separation of weakly magnetic particles, with extremely deep magnetic field of 150 mm

- **NEOFLUX® 9000 Gauss**  
separation of weakly magnetic particles, with shallow magnetic field of about 30 mm (High Gradient Separator)



NEOFLUX® drum magnets with vibrating chute

# I-Sens sensor separator



A recent development within Goudsmit is the I-Sens sensor separator. This system perfectly supplements the separation before or after the Eddy Current separators! The separation principle consists of a conveyor belt in which a sensor plate has been mounted just before the end roll. This sensor plate will detect a metal particle as well as the line where this metal particle is located on the belt. Next, the software will calculate the exact location and the metal particle will be shot from the flow with an air pulse in its free dropping curve and dumped behind a separation partition.



1500 mm wide I-Sens separator with vibrating chute and control unit

With the I-Sens sensor separator it is possible to separate stainless steel, lead, and copper wire from a material flow. Obviously, this type of separator can also be used perfectly as a stand-alone installation.

## Types of sensor and blow bar

### Fine fractions:

sensor and blow pitch of 6 mm

### Medium fractions:

sensor and blow pitch of 12 mm

### Coarse fractions:

sensor and blow pitch of 24 mm

## Available machine widths

600 / 1000 / 1500 / 2000 / 2500 mm.

Delivery may include or exclude matching BOGE air screw compressor.

### Benefits

- Sensor sensitivity adjustable for the desired result
- Suitable for all metal types
- Can improve product quality



Detail of I-Sens separation

# Non-ferrous separators (Eddy Current)

Goudsmit has been making Eddy Current separators for many years. This is a conveyor system with a rapidly revolving magnetic rotor which generates an induction field through magnet poles. The rotational speed generates a rapidly changing magnetic field. In non-ferrous electrically conductive metal particles (non-ferrous metals) a magnetic Eddy Current will be generated. Through this interplay of forces, the non-ferrous particle will be shot from the product flow.

The number of magnetic poles and the rotational speed will greatly affect the separation efficiency. Goudsmit manufactures magnetic rotors with 12 or 44 magnetic poles. The 12-pole rotors are used in coarse fractions from 70 mm. The 44-pole magnetic rotors are used in fine- or

medium fractions. The rotation speed plays a major role. In fine fractions (0-20 mm), the machines can run 4000 rpm and be effective in the separation of small non-ferrous metal particles from about 2 mm.



*Non-ferrous separator with a width of 2000 mm for processing of waste wood*



*Non-ferrous separator type NF2000 in combustion slag fraction*

## Concentric Eddy Current separators

For this type, the magnetic rotor is mounted in the middle of the revolving drum. This results in a large separation angle which is desirable for some product types. This type of separator can easily be used in product flows that are almost or entirely free of iron and only contain non-ferrous metals.

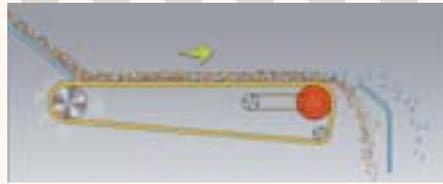
### Available machine widths:

400 / 600 / 800 / 1000 / 1500 / 2000 mm

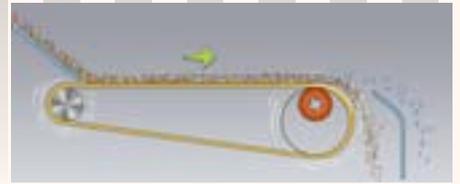


*Three non-ferrous separators type NF1500 on plateau in combustion slag reprocessing*

### Concentric separator



### Eccentric separator



Non-ferrous separator for biofuel (for green electricity)



Non-ferrous separator in the shape of a cascade for the separation of 2-10 mm metal particles from slag



Cable connection between control panel and I-Sens is affected by means of connectors. Quick, safe and can be done by the operator

### Eccentric Eddy Current separators

For this type of Eddy Current separators, the magnetic rotor is mounted from the middle of the revolving drum. This allows the removal time of the metal particle to be affected, which may be desirable in some cases. Separation of non-ferrous metals from a material flow that still contains iron particles will not yield any problems for this machine.

### Available machine widths:

400 / 600 / 800 / 1000 / 1500 / 2000 mm

### Cascade Eddy Current systems

Goudsmit provides and develops Cascade Eddy Current separation systems, in 2- or 3-step towers. Specially developed for processing of very fine fraction of 0.5 mm to 5 mm. It is necessary to process the product in multiple runs for optimal results. The speed can be increased up to 5000 rpm. The capacity of this Cascade E.C. separator is about 3 tons per hour for a very fine fraction. It is important that the product to be processed is bone-dry (naturally or dried).

### Available machine widths:

400 en 600 mm

Eddy Current separators can separate many alloy non-ferrous metals, including aluminum, copper and brass. Separation of stainless steel, lead and copper wire from product flows streams is not possible; this could be done with the I-Sens separator (see previous page).

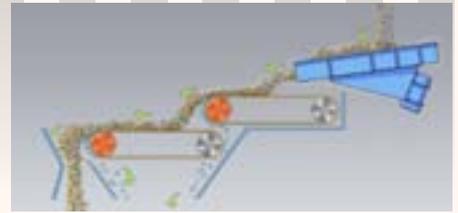


Detail of non-ferrous separator (width: 1500 mm) for WEEE scrap

# High-gradient magnetic separators

High-gradient separators are magnets that are so powerful that they can attract and remove para- or slightly magnetic materials. For example, stainless steel that has been processed through a shredder can become magnetic by means of this mechanical deformation. Think also, for example, of iron dust in the micron area of ceramic materials.

A high-gradient separator can be incorporated in two concepts: the head roll magnet and the drum magnet. Here, the capacity, the supply on the magnet and the amount of magnetic material are very important.



High Gradient 1500, 2-step version for plastic recycling

# Metal detectors

Goudsmit metal detectors are used, among others, in recycling flows as a security device for grinders/granulators/shredders in the initial stage of a processing process. But also as a means for control at the end of a processing process, for example, when processing plastic.

A metal detector is an electromagnetic coil with an electromagnetic field. When a conductive metal particle ends up in this electromagnetic field, there will be malfunction. An action can be triggered as a result of this malfunction, such as

shutting down a belt or activating a separation valve. Metal detectors can be mounted around conveyor belts (METRON) or are used in free fall (QUICKTRON) situations.



Mounting of metal detector.  
Clearly visible: metal-free zone



Belt detector for plastic recycling



Fall detector for dashboard recycling

# Goudsmit Research & Service

## Testing laboratory

In order to provide you with the right advice, Goudsmit has at their disposal an extensive test lab with a wide range of separation equipment. Whether it concerns conventional or high-grade iron and/or non-ferrous separation: everything is possible. In the Goudsmit testing laboratory, it can be identified which separation technique would be the best solution for you.

## Revision

The Goudsmit revision department restores used magnetic systems to their top condition. Goudsmit also revises magnetic systems from colleagues. These can be all kinds of magnetic systems, from head roll magnets to complete Eddy Current separators.

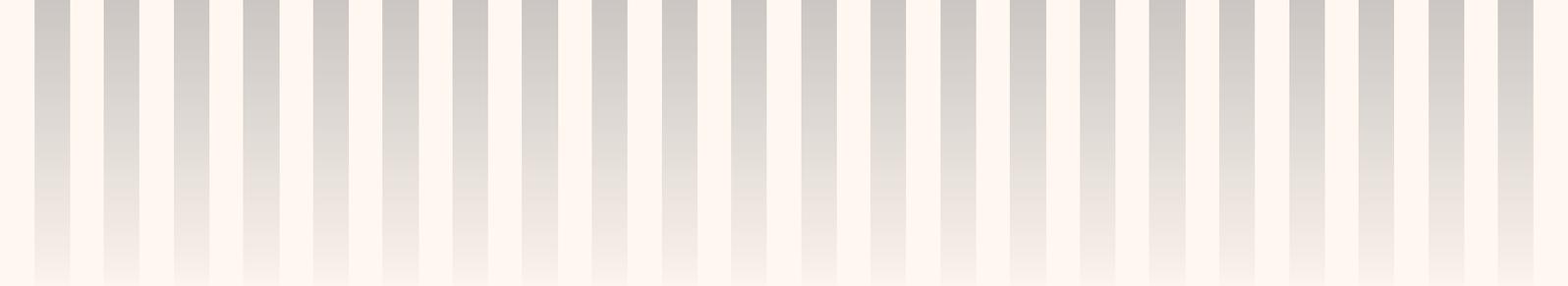


*A Permagraph determines the magnetic energy*



## Goudsmit Service

Goudsmit has highly motivated and well trained service technicians. They are perfectly able to analyze and solve your issue. Quickly and effectively. If you have any questions about maintenance, repairs or spare parts, please contact Goudsmit. Our service staff will arrive quickly on-site to give expert advice.



**GOUDSMIT**  
MAGNETIC SYSTEMS

Petunialaan 19 • 5582 HA Waalre • P.O. Box 18 • 5580 AA Waalre • The Netherlands  
Phone: +31 (0)40 2213283 • Fax: +31 (0)40 2217325  
E-mail: [systems@goudsmit.eu](mailto:systems@goudsmit.eu)