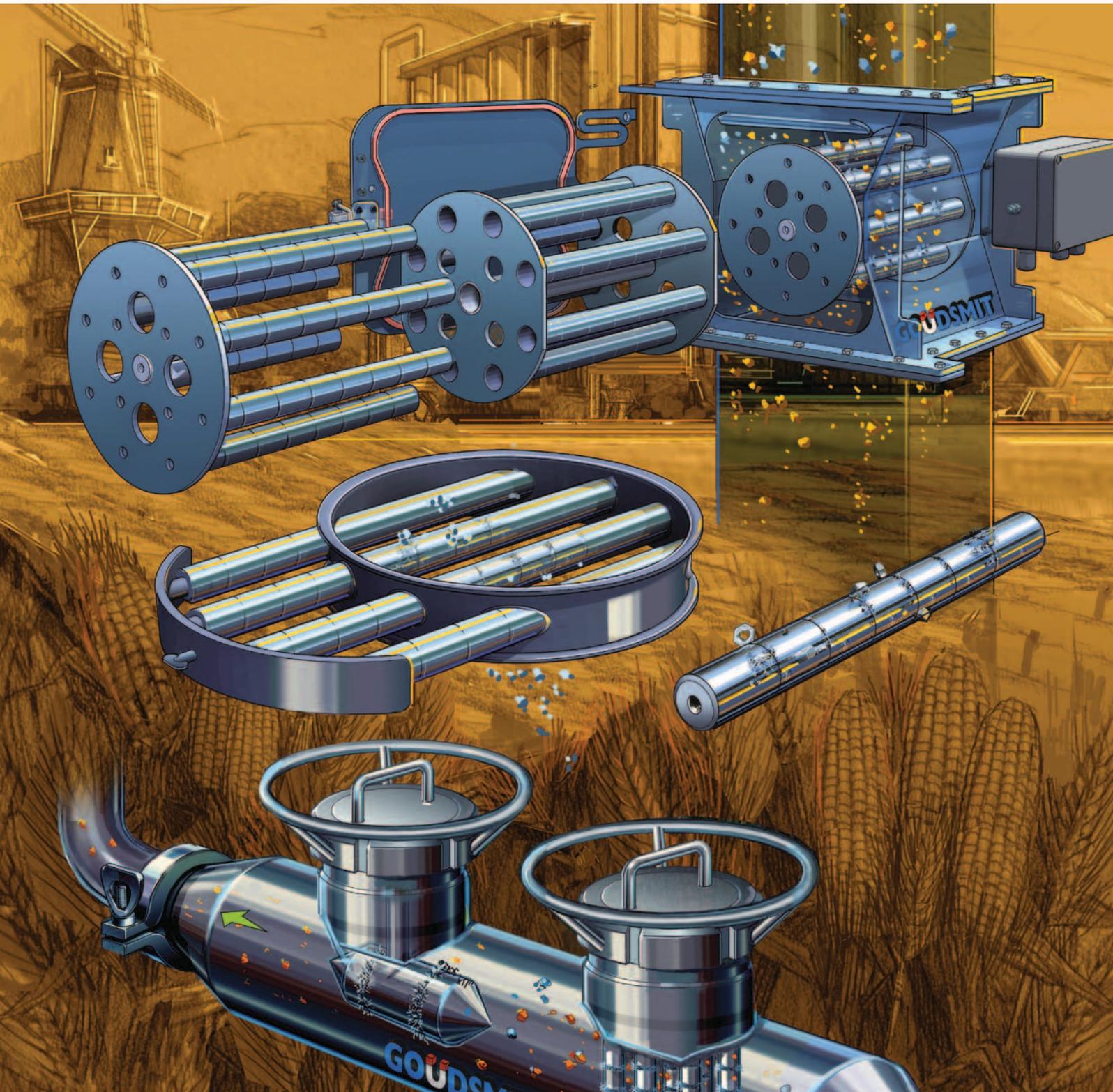


Magnetic Rod systems



Goudsmit Magnetics, driven by magnetism

Goudsmit Magnetics is a third generation family business. We have over half a century of know-how in the field of magnets. This forms the basis for quality in a number of fields: from magnetic materials to magnetic transport, recycling, metal separation, hoisting and lifting devices, as well as magnets for office and promotional purposes. Magnets can be applied in a wide range of industries, including foodstuffs, chemicals, pharmaceuticals, plastics and the bulk industry. Design, production and assembly take place under a single roof. This results in magnet systems that can be used to great advantage in many countries across the world.

Goudsmit develops and produces a broad range of magnet systems, separating ferromagnetic particles from a wide variety of products and from highly diverse production processes. Depending on the product and the requirements, we categorise the magnet systems as:

1. Magnetic rod systems for fine separation
(see this brochure)
2. Plate magnets for the separation of coarse particles
(see brochure Flat systems)
3. Magnets for metal and waste recycling
(see brochure Recycling)

*Magnetic rod systems
for the separation of
fine particles.*



*Plate magnets for the
separation of coarse
particles.*



*Magnets for metal
recycling and waste
recycling.*



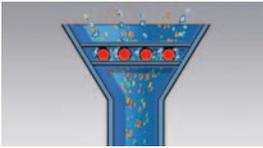
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Rod magnets

The basis for cleanflow magnets and magnetic filters.
In Ferroxdure or Neodymium (Nd-Fe-B) versions.

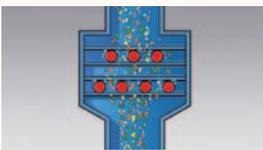
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Grid magnets

Composed of a single layer of rod magnets. Easy to assemble and with low installation height.
Used for minor ferromagnetic contamination, from 1 mm.

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Cleanflow magnets

Multiple grids above each other in a housing.

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Self-cleaning cleanflow magnets

Cleanflow magnets with pneumatic cleaning.

To be used for slightly greater ferromagnetic contamination.

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Rotating cleanflow magnets

With rotating rod magnets, for viscous product streams.

page 6

Used for high ferromagnetic contamination with particles larger than 30 µm.

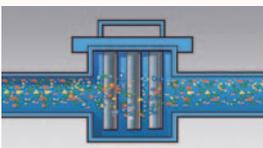
Hygienic cleanflow magnets in accordance to EHEDG guidelines

Fully polished finish, for foodstuffs industry.

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Hydroform rotating cleanflow magnets

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Magnetic filters

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Industrial magnetic filters

For pressurized pipes, up to 10 bar.

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Industrial double-walled magnetic filters

For viscous products in pressurized pipes.

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Hygienic magnetic filters in accordance to EHEDG guidelines

For pressurized pipes up to 7 bar. Fully polished seamless housing.

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High gradient separators

For very fine, continuous separation in free fall or with conveyor belts.

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Drum magnets

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Control and measuring devices

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Service

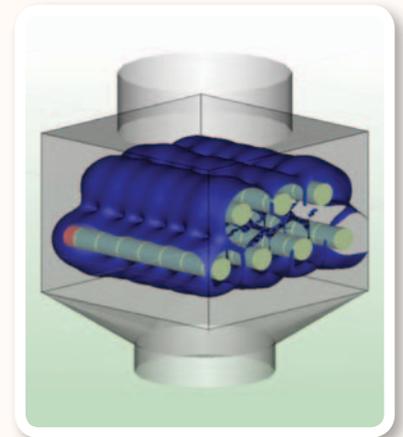
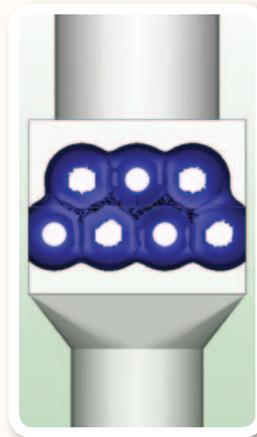
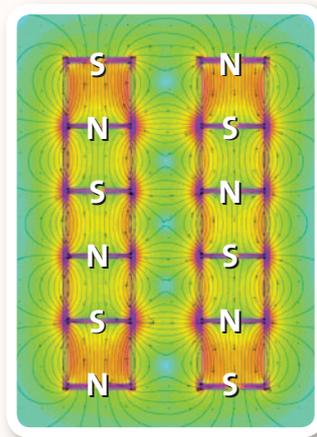
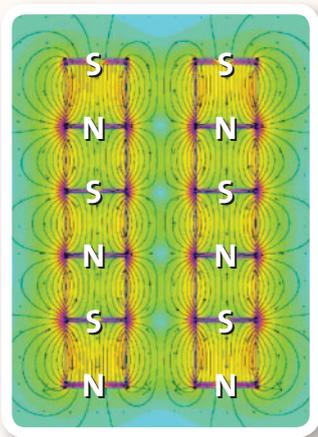
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Rod magnets

Goudsmit rod systems can be used in any location where optimal metal separation is required. Today, this is mostly in the foodstuffs industry, but these systems are also used in the pharmaceuticals, ceramic and plastic industries. The rod magnets that form the systems described in this brochure generate a compact and strong magnetic field. This field attracts even the most fine ferromagnetic particles. The precondition is, that the product and the ferromagnetic particles actually move through the magnetic field.

The following 2D and 3D calculations demonstrate how important the positioning of the magnet poles is. With the correct system construction, the entire product channel is provided with an efficiently separating magnetic field. Available in various versions (see table).

The following 3D calculation shows that with the correct arrangement of the rods, the entire product channel contains the required flux density.



Flux density

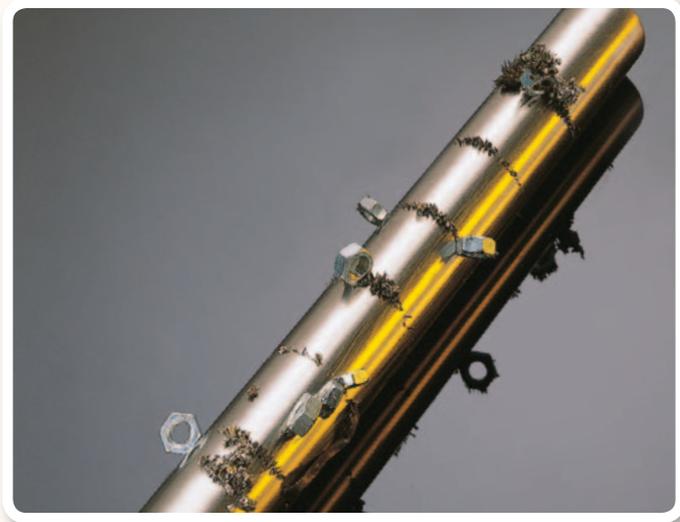
This flux density is simply the number of field lines at a particular point of the magnet. The higher the flux density, the stronger the magnet and the better the magnet captures ferromagnetic particles.

In most magnetic systems, three aspects influence flux density:

1. BR value: the flux density of the actual material, as well as the indication of the ultimate strength of the system. Given that the magnetic material is always inside a protective tube or sealed with a stainless steel cap, the effective flux density strength will always be lower.
2. We measure the flux density on the stainless steel tube.
3. In the fast-cleaning version, the magnetic rod has an extractor tube. The flux density measured on this tube is the effective magnetic strength.

The separation force of a system is a combination of the flux density and the field depth. This refers to the extent to which the product channel is 'covered' by a separating field or the minimum required magnetic value for separating particles. In the drawings shown above with 3D calculations of the total field: the blue exterior indicates the required minimum surface flux density.





Rod magnets				
Type of magnet	Max. temp. (°C)	Br magnetic material (kg)	Max. flux density on rod	Max. flux density on extractor (Aut. system)
GSF 33	180	3.900 - 4.200	3.000	
GSN 42	70	13.400 - 13.700	10.700 - 11.000	7.800 - (10.000)
GSN 42 SH	140	13.400 - 13.700	10.700 - 11.000	7.800 - (10.000)
GSN 52	60	13.800 - 14.100	11.400 - 12.000	8.400 - (11.000)

Rod magnets are available in various sizes with Ferroxdure or super strong Neodymium (Nd-Fe-B) magnets.

Magnetic grids

We use the most basic type of configuration with rods in a single layer, for simple applications or if low installation height is required. Available in various versions and sizes, round or square, with ferroxdure or Neodymium (Neoflux® or Nd-Fe-B) magnets.



Square, waterproof ferroxdure magnetic grid, available in sizes ranging from 100 to 500 mm.



Round, waterproof magnetic grid, available in sizes ranging from Ø 100 to Ø 500 mm. The strong Neoflux® (Nd-Fe-B) type is available in a fast-cleaning version, with extractor.

Magnetic grids		
Dimensions Ø □	Capacity m³/hour Fast flow product	Capacity m³/hour Less fast flow product
100	1	0
150	3	1
200	5	2
250	10	4
300	20	6
350	30	10

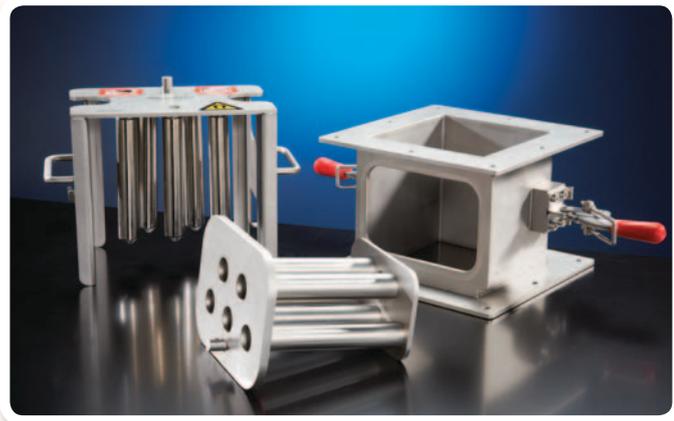
Other sizes available on request.

Cleanflow magnets

For an efficient separation we place two or more layers of rods one above the other. We enclose these two layers in a compact stainless steel housing. This cleanflow magnet is equipped with an easy-to-open inspection/cleaning hatch which ensures quickly removal and cleaning.



For protecting a machine and for removing Ferromagnetic particles of about 1 mm size, the favourably priced Ferroxdure **cleanflow magnets** are ideal.



The standard version of the **cleanflow magnet** has a housing with a square-shaped inlet and outlet \square 150 - 300 mm.

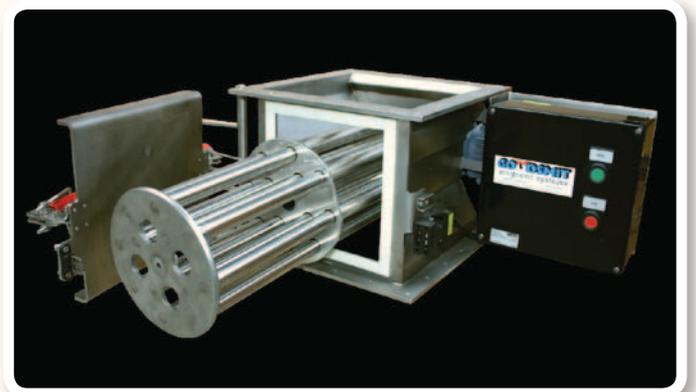
For other dimensions, we can supply the cleanflow magnet in a compact, square version. The larger versions are available with a large side hatch, which makes cleaning even easier and reduces the risk of damage.

Also available in a version for low overpressures.

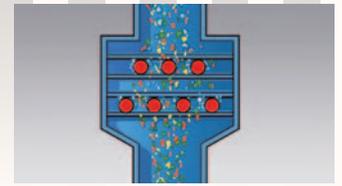
Rotating cleanflow magnets

In instances whereby the placement of the rod magnets forms a problem to the flow, it is possible to have the rods rotate in the product. This avoids bridge formation and subsequent blocking of the product.

The Goudsmit rotating cleanflow magnets may be sold with an **'ATEX dust explosion zone 20/21'** certificate, which enables the user to produce safely in explosive environments. In 2007, Goudsmit was the first magnet manufacturer in Europe to obtain the ATEX Production Quality Assurance Notification.



Cleanflow magnets			
Dimensions \varnothing	Dimensions \square	Capacity m ³ /hour Fast flow product	Capacity m ³ /hour Less fast flow product
100	150	3	1
150	200	7	3
200	250	20	8
250	300	30	12
300	350	45	18
350	400	60	24



Rotating cleanflow magnets trap tiny ferromagnetic (dust) particles in fatty milk powder, with only the metallic particles sticking to the rods.

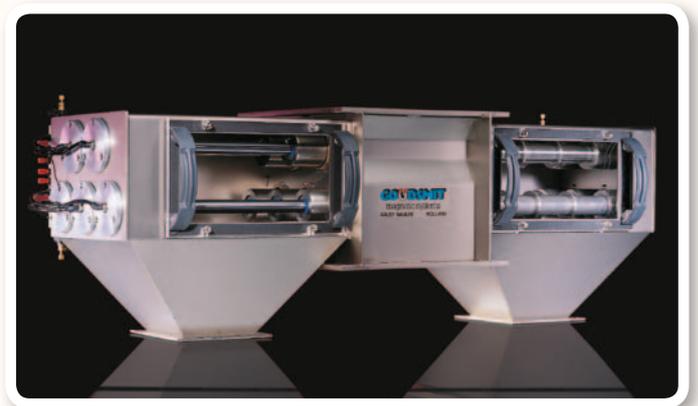
Rotating cleanflow magnets				
Dimensions □	Dimensions Ø	Version	Capacity m ³ /hour Easy flow product	Capacity m ³ /hour Less fast flow product
200	150	6-bars	9	9
300	250	8-bars	22	22
300	250	12-bars	14	14
300 x 450		2 rotor	45	25

Self-cleaning cleanflow magnets

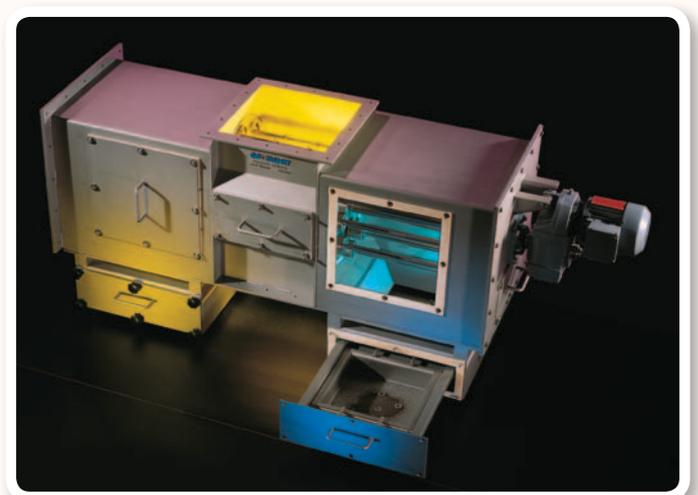
In case of larger ferromagnetic contamination and the subsequent necessity of more frequent cleaning, a self-cleaning cleanflow magnet is an option.

These may be delivered in versions whereby the product flow is momentarily halted or whereby product flow is maintained continuously, even if the device is cleaning itself.

Self-cleaning cleanflow magnets		
Dimensions □	Capacity m ³ /hour Easy flow product	Capacity m ³ /hour Less fast flow product
250	40	22
350	60	30
400	90	45



A self-cleaning cleanflow magnet in operation at a large chemical company.



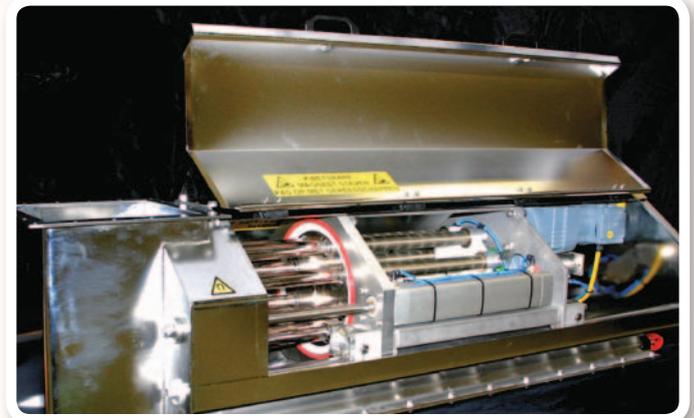
Rotating, self-cleaning cleanflow magnet, with control system, for cleaning without halting the product flow (continuous cleaning).

Rotating cleanflow magnets

Self-cleaning rotating cleanflow magnet

The self-cleaning rotating cleanflow magnet removes metal particles as fine as 35 µm from powders. It has a dust-tight dynamic seal, functions at an overpressure of max. 0.4 bar and has a flux density that reaches up to 11,000 Gauss. Even in high temperature applications.

Self-cleaning rotating cleanflow magnets		
Dimensions □	Capacity m ³ /hour Easy flow product	Capacity m ³ /hour Less fast flow product
320	50	28
400	60	40



Hygienic cleanflow magnets (in accordance to EHEDG guidelines)

The European Hygienic Engineering & Design Group (EHEDG) is a consortium of manufacturers of devices, the food industry, research institutes and the public health authorities. It was founded in 1989 and its most important goal is the promotion of hygiene during the processing and packaging of **foodstuffs and chemicals**. Compliance with the criteria, standards and guidelines established by the EHEDG ensures improvement in engineering for hygienic applications.

The test methods developed determine whether a device is well designed. EHEDG has established a number of criteria and standards and guidelines for the improvement of engineering for hygienic applications. These must be complied with.

Goudsmit bases its design for foodstuffs and chemistry on these standards and has had the honour to be the first EHEDG certified magnet supplier!

A number of **key points** of the EHEDG are: Avoidance of the development of infections (harmful micro organisms) / cleanability and disinfection / use of materials / surface finish and geometry / testing of the design in respect of cleaning and sterilisability.



Hygienic cleanflow magnet (in accordance to EHEDG guidelines).

The fast-cleaning cleanflow magnet with stainless steel 304 housing has a smooth finish (0.8 µm) and is therefore in accordance to EHEDG guidelines. The machine generates a magnetic field of 10,700 Gauss. The magnetic system removes ferromagnetic particles from powdered products (such as milk powder, sugar and flour). With the application of a new generation of Neoflux® (Nd-Fe-B) magnets in self-cleaning rods, weak magnetic particles such as stainless steel 304 can also be removed. Since the assembly of rod magnets of this new cleanflow magnet can be withdrawn from the installation with the help of a rail, the magnet can be operated quickly and safely by the operators.



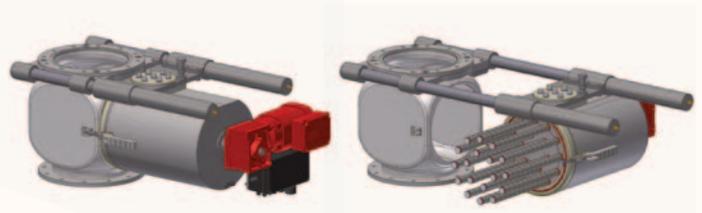
Hydroform rotating cleanflow magnets

For higher finish requirements, we can supply the (rotating) cleanflow magnet in a **hydroform version**. This housing is formed under high pressure from a stainless steel tube. With this housing, there are no laser seams or dead corners!

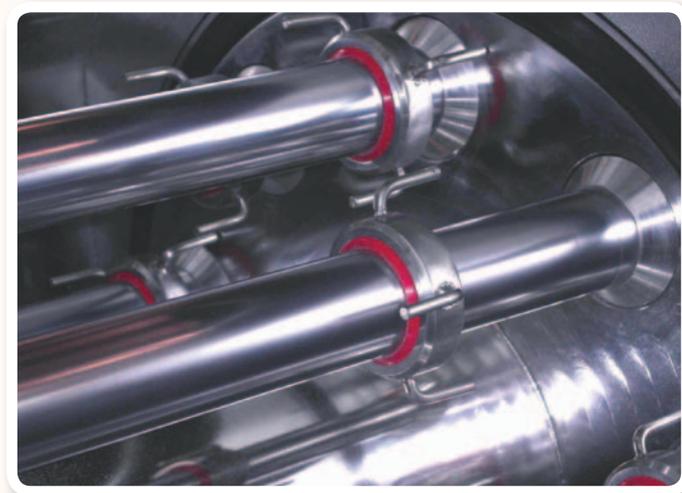
Hydroform rotating cleanflow magnets		
Dimensions Ø	Capacity m ³ /hour Easy flow product	Capacity m ³ /hour Less fast flow product
150	12	9
250	35	22



This hygienic type of the hydroform cleanflow is available in a version for manual cleaning with an arm or hinge and a semi-automatic version in which the rods are cleaned pneumatically.



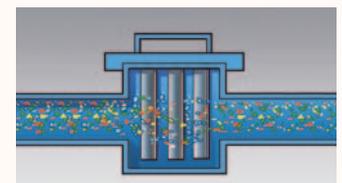
We developed the semi-automatic cleaning, rotating cleanflow magnet, together with a client, for the manufacture of a lactose based product without any metal contaminants. With this product manual cleaning is very difficult.



The magnet has a smooth finish (0.8 µm) and is manufactured in accordance with the most recent hygienic standards.

Magnetic filters

In instances whereby liquids or powders are transported under pressure, Goudsmit magnetic filters remove ferromagnetic particles from a size of **5 µm**. The applications vary: each industry has its own requirements, the principle however remains the same. The strong Neoflux® (Neodymium or Nd-Fe-B) rod magnets penetrate deep into the product. This means they can trap even the smallest ferromagnetic particles. Cleaning takes place by removing the rods via a lid from the product flow. A number of trials have demonstrated that the strong Neoflux® (Nd-Fe-B) magnet can also trap stainless steel scrapings. These very fine stainless steel particles cannot be detected even by a metal detector.



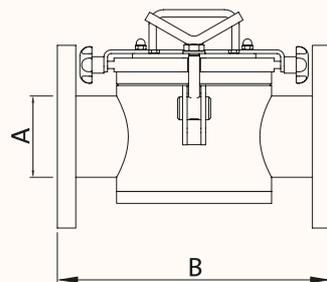
Magnetic filters

Industrial magnetic filters

The **industrial magnetic filter** is available connections from DN50 to DN400. Cleaning is manual.

After opening the lid, the rod magnets can be removed as a single unit from the product flow. Subsequently the rod magnets are pulled from the stainless steel extractor cover and the ferromagnetic particles on the extractor drops off. Since, with greater connection size, the weight of the lid (with the magnets on it) would be too heavy, with a size of more than DN150 the installation is provided with a side conduit.

This type of magnet can, if required, be provided with automatic self-cleaning rods.



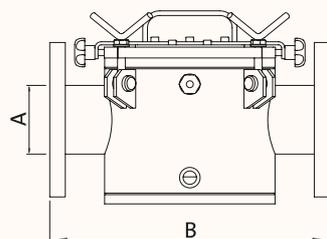
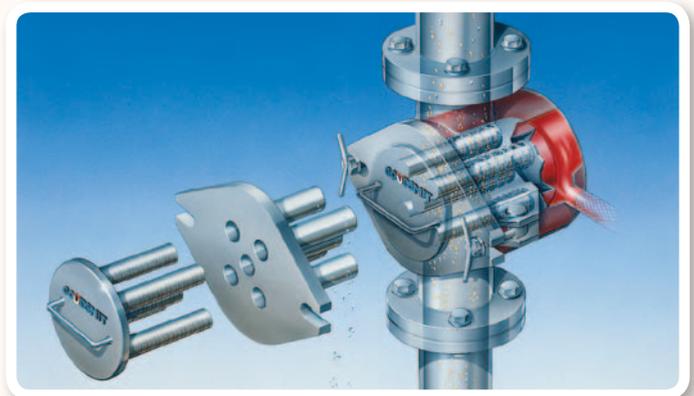
Industrial magnetic filters

Series	Type	Conduit diameter (A)	Installation length (B)	Number of rods
SSFN005038	DN 50	50	230	4
SSFN006538	DN 65	65	230	4
SSFN008038	DN 80	80	300	7
SSFN010038	DN100	100	300	7
SSFN012538	DN125	125	300	7
SSFN015038	DN150	150	360	9
SSFN020038	DN200	200	460	11
SSFN025038	DN250	250	500	13

Double walled magnetic filter

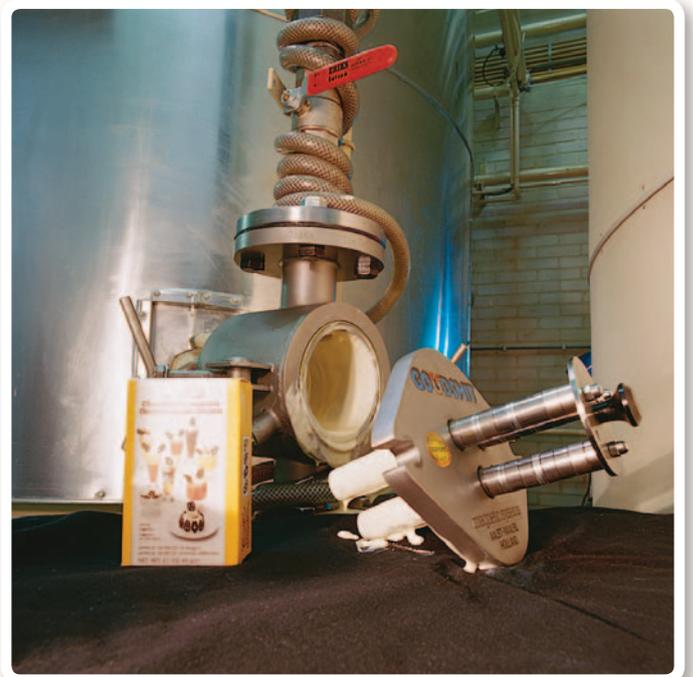
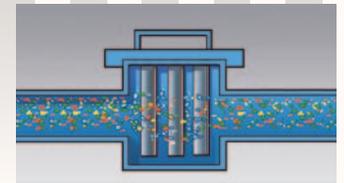
For the removal of ferromagnetic particles from products that solidify, such as chocolate, Goudsmit has developed the **double walled filter**.

The industrial filter is provided with a double wall in which hot water can flow. This keeps the product liquid. Cleaning is the same as with an ordinary industrial filter. The maximum pressure is 10 bar; the hot water pressure is 3 bar.



Double walled magnetic filters

Series	Type	Conduit diameter (A)	Installation length (B)	Number of rods
SSFD005038	DN 50	50	300	5
SSFD006538	DN 65	65	300	5
SSFD008038	DN 80	80	360	7
SSFD010038	DN100	100	360	7



Cleaning in Place

Good cleanability of the filters is important. The rod magnets are surrounded by stainless steel tubes, also known as extractors. The operators can easily remove the rod magnets from this extractor. If the magnetic field is absent, the ferromagnetic particles simply fall down from the extractor or can be rinsed off. CIP (Cleaning in Place) is also possible with the self-cleaning version.

Vegetable and fruit juices

Despite many prevention measures, in practice **metals** are still found in **fruit juices**. The placement of a metal detector does not resolve this problem because the detector cannot recognize smaller metal particles.

Application of super strong Goudsmit magnetic filters (composed of Nd-Fe-B rod magnets) ensures an efficient separation of very small Fe particles and even Fe dust. The magnetic filters are manufactured in accordance to EHEDG guidelines and comply therefore with the stringent requirements of the foodstuffs industry.

Magnetic filters

Hygienic magnetic filters in accordance to EHEDG guidelines

This magnetic filter is specially developed for the foodstuffs industry. The filter is composed of Neoflux® (Neodymium or Nd-Fe-B) magnets that ensure the efficient separation of very small ferromagnetic particles from 7 - 30 µm, weak magnetic stainless steel particles and even ferromagnetic dust. It generates a magnetic field of 10,000 – 11,000 Gauss (+/-5%) on the rods and removes the aforementioned particles from liquid and powdered products. The complete system is made of stainless steel 316, with a smooth finish (0.8 µm) and complies with the highest standards applying to food safety.



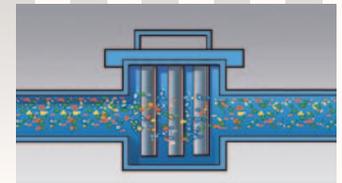
For application in special products with coarser ingredients (e.g. soups) the filter can be fitted with a single Ø 65mm magnet core. In instances whereby this core forms an obstruction because of its size, we can fit the filter with 1 or 2 special magnetic separator blocks on the lids (see photo bottom left). With this, the housing is free of any obstruction.



The magnetic filter can be placed in tubes or pipes in the foodstuffs sector and removes ferromagnetic particles from products that are transported under pressure. Even the most minute particles can be filtered from sticky substances in this way (chocolate, pastes, powders or fruit juices). The placement of a metal detector does not resolve this problem because the detector cannot recognize smaller metal particles. The magnetic filter is available in 7 standard sizes (Ø 25 - 125 mm) and has a flange attachment in accordance to DIN 11864. These filters can also be equipped with welding ends. The standard version of the hygienic filters is fitted with rods Ø 25 mm.

Dairy products

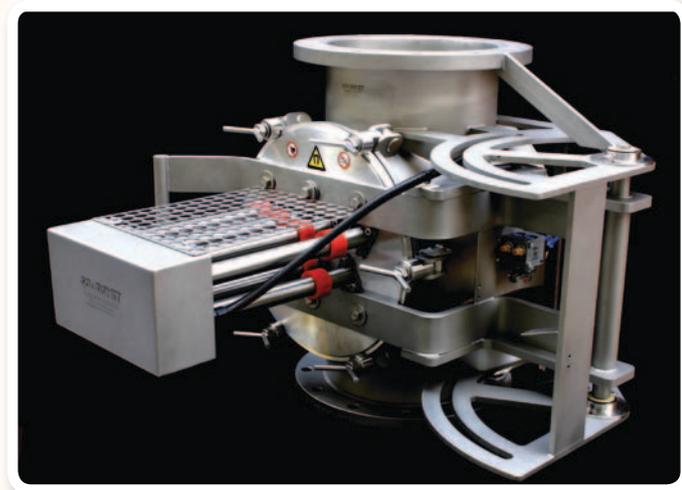
HACCP is a familiar concept in the dairy industry. Whether it refers to milk, cocoa or egg powders, or to yoghurt, cheese spread or deserts, these products must be free of ferromagnetic particles when the consumer buys them. Damages claims and recalls can prove extremely costly. During the production process of such foodstuffs, metal particles in the product can be removed with magnets. (Rotating cleanflow magnets for fatty powders or magnetic filters for sticky products, foodstuffs transported under pressure such as yoghurt or cheese spread.) Goudsmit provides reliability in the form of innovative solutions for the prevention of metal contamination in the foodstuffs industry!



Cleaning

Cleaning metal particles that have been separated can take place in 3 ways. Firstly, manually with the rod magnets enclosed in an extractor being easily removable by the operator.

Secondly, manually + pneumatically, in which case cleaning is done automatically. Thirdly, pneumatically + CIP (Clean In Place), in which case in addition to the cleaning also the rinsing of the rod magnets takes place automatically.



Self-cleaning magnetic filter for application in concentrated fruit juice.



Filter for the removal of binding twine and other undesirable ferromagnetic particles from paper pulp.



A fast cleaning magnetic filter developed together with the client, for hygienic applications.

Cocoa & chocolate

Both in the processing of raw cocoa beans as well as in the end product, undesirable ferromagnetic particles may be present. To remove these, various types of magnetic systems are applied. When unloading the beans a **drum magnet** (see folder 2) separates the coarse ferromagnetic particles (including nails or other metals) before the raw beans are ground into powder.

In the country of origin or during packaging, nails or other metal objects can find their way into the cocoa bean packaging.

Pipe magnets can be placed in the powder line and in the sugar intake. **External pole magnets** can be placed in the so-called "cake dump". **Grid magnets** remove iron particles after the cake is ground.

Subsequently, **rotating cleanflow magnets** are applied before packaging in sacks. The rotating motion of these magnets ensures that the fatty cocoa powder is agitated, with the result that the powder does not stick to the rods. This avoids any costly production stops.

Additionally, the **double walled magnetic filters** remove fine ferromagnetic particles from liquid chocolate, cocoa butter and cocoa liqueur. They can be used for ferromagnetic separation in products that solidify or are transported under pressure.

Semi-automatic magnetic filter

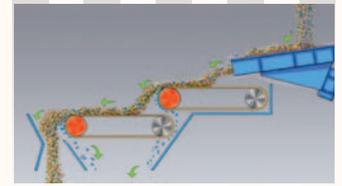
Since the larger types of magnetic filters are difficult to clean manually, in consultation with the operators we have developed a filter with a stronger magnetic field and with a simple action that can remove the separated iron particles from the rods. This means that the magnetic filter can be applied in places that are difficult to access.

Operation

A stainless steel rod holds a strong magnet pack. This pack can be transported inside the tube by means of air pressure. By blowing the magnet pack out of the product flow, the ferromagnetic particles fall off the rod. To avoid the ferromagnetic particles from falling into the product, either they are diverted via a valve box or the cleaning takes place completely outside the product flow.

The rods (\varnothing 33 mm) have stronger magnets than before, so that efficiency and user-friendliness are increased.

High gradient separators



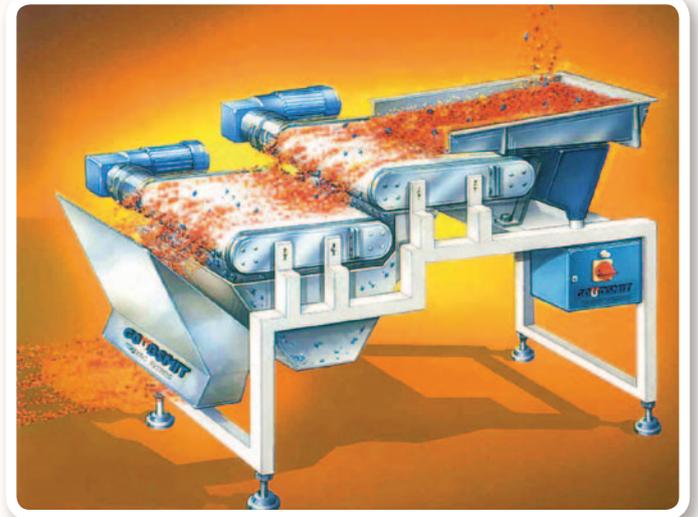
High gradient separators are so strong that they can attract and remove paramagnetic or slightly magnetic materials. For example, stainless steel that has been processed and become magnetic due to mechanical distortion, or even very fine ferromagnetic dust from ceramic materials. A high gradient separator can be installed either as a head roller magnet or as drum magnet.

Application

It can be applied in the processing of food ingredients and additives, chemicals and pigments. Also suitable for dried granular products such as vegetables, seeds, pasta, spices, nuts, tea or dried fruit. In addition to metals, it also removes pebbles, mud, insect droppings etc. The paramagnetic characteristics of many types of soil are the cause that these droppings becoming magnetic. This occurs in particular in herbs and teas.

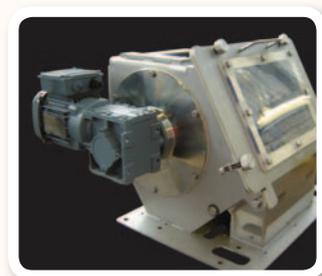
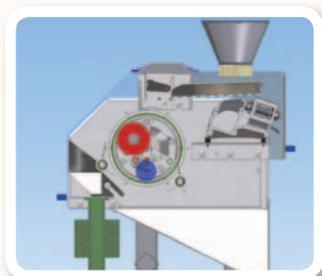
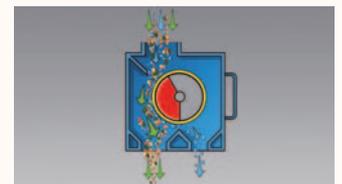
Operation

The high gradient separator is composed of a bypass conveyor line, equipped with a very strong Neoflux® (Neodymium or Nd-Fe-B) drive roller. The substances that are contaminated with metal are fed through a vibrating conveyor. This separates the substances very finely over the conveyor line. When they pass the Neoflux® roller, the magnetic particles are separated and transported away. The non-magnetic particles fall straight down. Via an adjustable flap, the various particles are separated in the correct manner. The HG separator also separates paramagnetic materials.



Drum magnets

Goudsmit refers to the high gradient **drum magnet separator** as the **LenaStar**. This comprises of a **12,000 Gauss** Neodymium high gradient magnetic separator, that during the production process, removes ferromagnetic particles of more than 20 µm and weak magnetic particles of more than 0.1 mm from raw materials or end products. However, it is preferable that the ferromagnetic particles are filtered out as much as possible before this process!

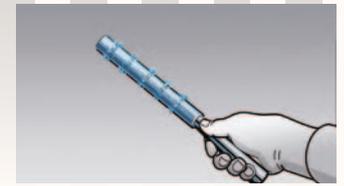


Characteristics of drum magnets

- Changing conveyor belts is not necessary. This saves time and money;
- Simple design and maintenance;
- Can be cleaned easily with water (waterproof version);
- Product dust does not adhere to the surface;
- Compact version, easily incorporated into an existing process.

For dimensions, please see our website:
www.goudsmit.eu

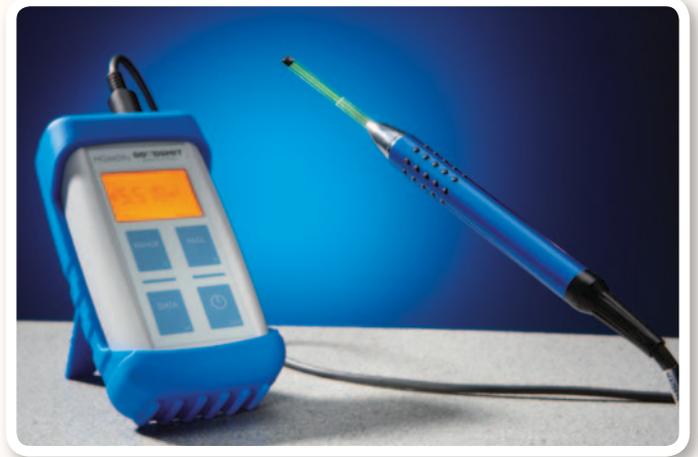
Control and measuring devices



In addition to supplying a broad range of magnetic systems, Goudsmit also provides related services such as the monitoring, installation and maintenance of magnets. Monitoring and inspection devices for own use can also be supplied.

In various industries (including foodstuffs) it is required that magnets are checked periodically. We can provide this service. Our inspectors travel to clients in the Netherlands and abroad to inspect magnets and measure magnet strength. After this inspection, you will receive a certificate for each magnet intended for your audit. Naturally, you can do this inspection yourself. We have the latest flux density **meters** for this purpose. An important feature of our meters is their user-friendliness. This means that people without any specific magnet know-how can measure values reliably.

With this **magnetic inspection rod** you can make a quick check of whether (a section) of the product is contaminated with ferromagnetic (Fe) particles. The inspection rods separate Ferromagnetic particles of more than 30 µm. These very fine Fe particles cannot be detected by a metal detector! Goudsmit inspection rods are always equipped with the strongest Neodymium (Nd-Fe-B) magnets. The trapped Fe particles can be easily removed and analysed.



Service

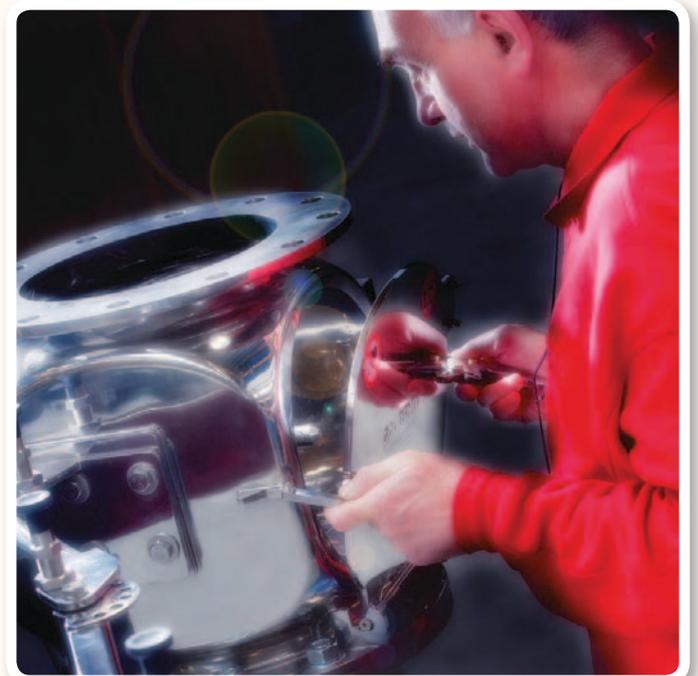
The Goudsmit service department can provide not only installation and maintenance of magnetic systems but also measurement and inspection reports. Regular maintenance and signalling of the captured particles is increasingly important in all industries!

We can provide the following services:

- Installation of new products;
- Setting the controls;
- Control, inspection and measurement of magnets;

- Repairs in workplace;
- Maintenance and replacement;
- Demagnetisation of your product.

All these services can be provided at your location.



The removal of ferromagnetic contaminants from product flows is just one of the magnetic systems provided by Goudsmit Magnetics. Examples of other systems are: palletizing of cans or glass jars with a screw lid, lid transporters, all forms of promotional magnets (also 3D) as well as magnet grippers for baking trays.

For more information, visit our website!
www.goudsmit.eu

