



Magnet systems for the food and
pharmaceutical industries



Bakker Magnetics

Global Attraction



Metal is one of the materials most commonly used in industry. Nevertheless ... iron particles are undesirable in finished products, semi-finished products, or raw materials – particularly in the food industry. Companies make every effort to remove as much of this contamination as possible. It will be self-evident that iron is removed with magnets. During the past decades Bakker Magnetics has become specialized in the development and manufacture of systems for industrial iron-separation processes. Bakker Magnetics' efforts have resulted in the acquisition of a great deal of specialized knowledge - knowledge which has been employed in the development of a complete new range of magnetic separators for the food, pharmaceutical and chemical industries.

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BAKKER MAGNETICS' METAL SEPARATION SYSTEMS COMPLY WITH ALL THE REQUISITE LEGISLATION AND REGULATIONS

The increased stringency of food-hygiene legislation has given cause to Bakker Magnetics' appointment of a project team that was assigned the main duty of investigating the measures to be implemented in the design and manufacture of metal separation systems for the food industry.

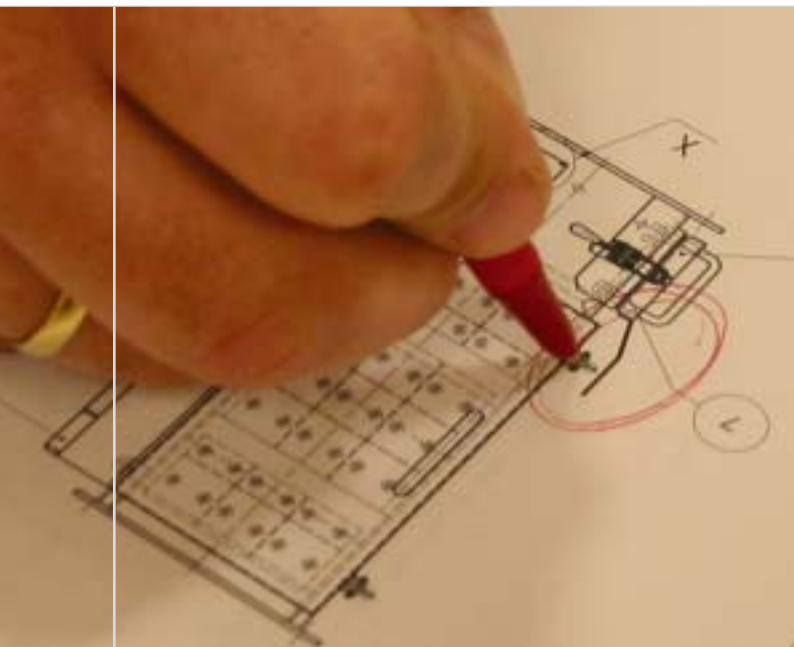
Issues such as product liability have given cause to the decision by food and pharmaceuticals manufacturers to implement appropriate quality assurance systems for their operations. These quality assurance systems need to include product specifications, critical control points, standards, and control procedures. The companies also need to carry out risk and hazard analyses. The HACCP [Hazard Analysis Critical Control Point] system is frequently used by manufacturers to identify and control risk factors.

As a result of Bakker Magnetics' multinational operations the company cannot restrict its review of legislation and regulations solely to those applicable in the Netherlands and Europe. Consequently the preparations for the new range were based on worldwide standards and norms (FDA, EHEDG).

During the development of its new range of separation systems Bakker Magnetics made no concessions in the selection of the materials to be used in their construction. Consequently all systems make use of top-quality stainless steel. Moreover all magnet systems are constructed from the most suitable form of Neodymium magnets for the application. The use of this extremely-powerful magnetic material obviates the need for calibration in normal applications. In addition to thorough consideration for the selection of the materials of construction, extreme care is taken in the finishing of the systems. Consequently all welds are of a watertight design, and the surfaces which can come into contact with the product undergo an electrolytic-polishing process. The design avoids all dead ends and areas that could trap product. During the design particular account was taken of the removal of the separated iron contamination. Consequently the design is based on the ability to complete the thorough cleaning of the system within a short space of time, thereby minimizing the resultant capacity and production loss.

The technical specifications are enclosed in an appendix to this brochure.





SUITABLE FOR USE IN ALMOST EVERY TRANSPORT SYSTEM

Bakker Magnetics' metal separation systems are of a modular design, as a result of which they can readily and rapidly be installed in both new and existing raw-material transport systems. Bakker Magnetics' applications staff will be pleased to advise you in drawing up the optimum solution for your specific iron-separation problem. To this end you can make use of the questionnaire enclosed in an appendix to this brochure. We will then reply as quickly as possible with tailor-made advice.

A distinction can be made between a number of basic iron-separation principles, each of which offers specific properties suitable for use in given processes and/or products. A magnet system can be supplied for virtually every position in transport systems. For example, standard systems are available for the removal of metal particles in the incoming flow of raw materials, during the various transport and processing stages, or immediately prior to the final inspection. The best result is usually achieved by the use of a variety of magnetic separators at different locations in the process. Magnet systems not only prevent metal contaminants in the product; they also offer protection to your valuable equipment. Bakker Magnetics standard product range is divided into metal-separation systems for solids and liquids. The standard systems are suitable for use at operating temperatures of up to 80 °C. Systems suitable for temperatures up to 150 °C are available on request.

All systems for the separation of metal contaminants from solids are fitted with pre-drilled square flanges. Adapter pipes and packings are supplied for installation in pipes of non-standard diameters. More information is given on page 16 of this brochure.

All magnet systems can be cleaned with a high-pressure sprayer.

NEODYMIUM, THE MOST POWERFUL MAGNETIC MATERIAL!

Neodymium is the most powerful magnetic material available. This "rare earth" magnetic material is used in locations at which extremely thorough iron separation is required. BM employs this material in all the systems listed in this catalogue. This results in an excellent efficiency, and ensures for the separation of very small iron particles (as small as a few microns) and other weak ferromagnetic metals from the product flow.


Research & Development

Bakker Magnetics' Research and Development department is constantly engaged in research into new applications for magnets and magnet systems. The use of modern, advanced computers and innovative simulation software enables the department to establish the optimum magnet configuration. Our Engineering department uses the latest CAD (Computer Aided Design) programs.

Quality policy

An integral quality policy drawn up in accordance with ISO standards constitutes a guarantee for the reliability of the products and systems. Bakker Magnetics has been awarded ISO 9001:2000 certification. It will be self-evident that all Bakker Magnetics magnet systems comply with the European Machinery Directive.

ATEX

All systems listed in this catalogue are suitable for use in explosion zone 22: CE  II 3D, T 80°C. In many instances the systems can, subsequent to consultation with Bakker Magnetics, also be used in other zones.



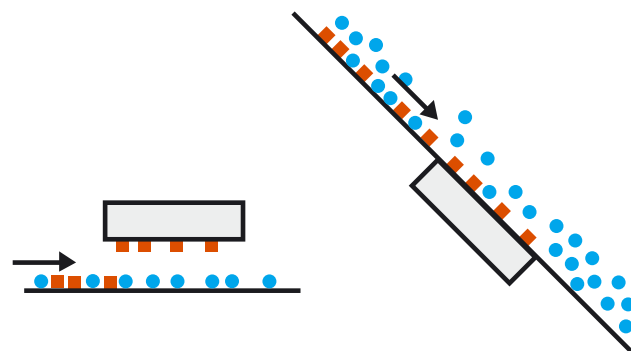
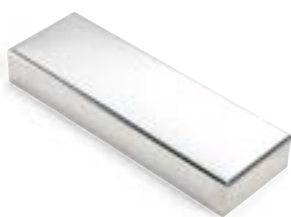


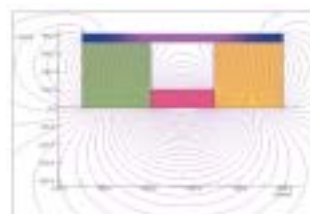
Plate magnet FDA/VI

Plate magnets are used to remove iron from product flows on conveyor belts, vibratory feeders, during free fall, in vertical or inclined pipes, under slide plates, etc. This type of plate magnet includes a Neodymium magnet system of an optimum power, and designed such that the unit offers an extra strong and deep-reach magnetic field. The magnet system is brought in as close as possible contact with the raw material. The system can achieve an extremely high efficiency, depending on the product, the particle size and the conveying velocity.

The standard product range encompasses models of a variety of lengths. Virtually every required length can be supplied by special order. The unit is cleaned by hand; manually-operated or pneumatically-operated cleaning drawers are available as an optional extra.



Flux-plot



SPECIFICATIONS

Execution:	manual cleaning
	permanent magnet
	waterproof
Housing:	stainless steel grade 1.4404
	for the purposes of assembly the rear-plate is provided with threaded holes
Surface treatment:	electrolytic polishing



Bar position Type X



Bar position Type Y



Grid magnet

RV/VI and RVEC/VI

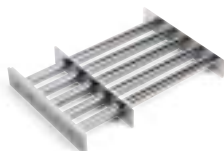
Grid magnet RV/VI

Permanent grid magnets fitted in hoppers or pipes can be used for the removal of iron particles from raw-material flows. These grid magnets are comprised of powerful magnetic bars which guarantee the thorough removal of iron particles from products passing through the grid in free fall. The iron particles are captured by the filter bars. The grid magnets are cleaned by removing them from the product flow and then manually removing

RV/VI



RVEC/VI



the iron particles. Grid magnets are usually employed in free-flowing products contaminated with small amounts of iron. In many situations a number of grid magnets are installed above each other; to this end two different versions are available in which the magnetic bars are positioned out of line with each other. This “staggered configuration” improves the contact between the product and the magnetic bars. The sophisticated magnet configuration guarantees an extremely powerful and intense magnetic field. The design is based on an optimum combination of a field which is as powerful as possible at the surface with a working depth which is as deep as possible.

Grid magnet Easy Clean RVEC/VI

Grid magnets can also be supplied in a special easy-clean version. This type of grid is fitted with what is referred to as an extractor. This stainless-steel sleeve renders the grid magnets extremely easy to clean. Sliding the magnetic part from the extractor releases iron particles which were captured by the magnet; the entire unit can then readily be cleaned or rinsed clean. The extractor sleeves are open at both ends, thereby preventing product from being trapped in the system, and in turn precluding the risk of microbial growth.

A handy HDPE strip simplifies the replacement of the magnetic part in the extractor.

SPECIFICATIONS

Execution:	easy manual cleaning
	permanent magnet
	waterproof
Housing:	stainless steel grade 1.4404
Diameter of magnetic bars:	25 mm
Diameter of extractor sleeves:	28 mm
The magnetic bars are positioned at a centre-to-centre distance of 50 mm.	
The magnetic rods are recessed in the end strips	
Surface treatment:	electrolytic polishing





MAGBOX

housing

MAGBOX/VI

The MAGBOX is a complete iron-separation unit for installation in pipes. This unit can readily and rapidly be installed in existing pipes. The standard types of MAGBOX housing are supplied without grid magnets. The housing can be equipped with one or two grid magnets, as required, whereby use can be made of the standard RV/VI grid magnets of the easy-clean RVEC/VI grid magnets (please refer to page 7). The product falls freely through the system; iron particles in the product are captured by the grid magnets.

The front of the MAGBOX is equipped with a removable swinging door, which is secured by two quick fasteners with release button. Once the cover has been opened the grids can be removed for cleaning. MAGBOX magnet systems are often used as the last check in the production process, for example shortly before the finished product is packaged. One of the major benefits of the MAGBOX is its low overall height.



SPECIFICATIONS

Overall height:	190 mm
Material:	stainless steel grade 1.4404
The cover is fitted with a silicone seal	
A handle is fitted to the cover	
The rear of the housing is equipped with an earthing clamp	
Surface treatment:	electrolytic polishing





MAGBOX

semi-automatic

MAGBOX SA/VI



A semi-automatic version which is also available is even easier to clean. The cleaning procedure is as follows. The product flow is interrupted. The quick-action clamps are released, and the magnet system together with the stainless-steel jackets are slid out of the housing. Once the entire magnet unit has been slid from the housing the magnetic part is slid out of the extractor; the iron particles which are then released from the sleeves will fall down outside the housing. The iron particles can then be collected separately.

All the standard MAGBOX systems are fitted with pre-drilled square flanges. Bakker Magnetics has a large range of standard adapter pieces which can be used to integrate the separators in all sizes of existing pipes [please refer to page 16]. Since there are no dead ends or areas in the system, and all joints are welded, the units comply with all requirements imposed by the food industry. Automatically-cleaning variants and/or systems for continuous processes are available on request. The same is applicable to rotary grid magnets.

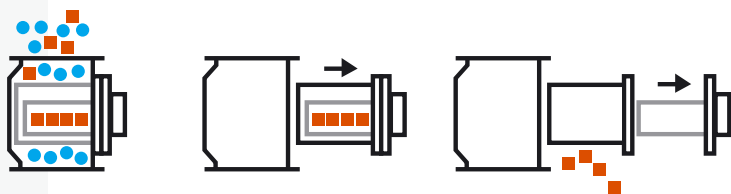
SPECIFICATIONS

Execution:	simple manual cleaning
Material:	grade 1.4404
Equipped with a dual-layer magnet system	
The magnetic bars are positioned at a centre-to-centre distance of 50 mm.	
Equipped with a silicone seal	
Handles are fitted to the front and intermediate panels	
The cover is secured by two quick-action clamps with release button	
The rear of the housing is equipped with an earthing clamp	
Surface treatment:	electrolytic polishing
Equipped with CE label	



Power-Mag

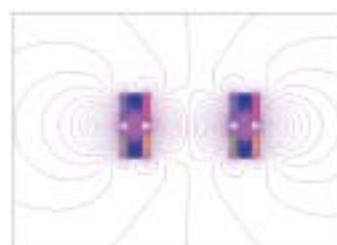
Power-Mag / VI



SPECIFICATIONS

Execution:	semi-automatic cleaning
	permanent magnet
Overall height:	300 mm
Material:	stainless steel grade 1.4404
Connection flanges:	equipped with pre-drilled flat flanges
The rear of the housing is equipped with an earthing clamp	
Equipped with CE label	
Surface treatment:	electrolytic polishing

This revolutionary model has been especially designed for applications which require a combination of a low overall height, a powerful magnet system in the product flow, and a minimal risk of bridge-building. The increased distance between the magnetic units as compared to conventional grid magnets renders this system suitable for use with products which do not flow freely and/or readily adhere to or accumulate on surfaces. This system is also ideally suited to the separation of iron particles from coarser products or hygroscopic raw materials. The magnetic units are integrated in stainless-steel sleeves, which are also referred to as extractor. The peaked upper surface of each sleeve reduces the risk of the accumulation of product and, ultimately, bridge-forming. The cleaning process is semi-automatic. The product flow is interrupted. After releasing the quick-action clamps the magnet system and stainless-steel sleeves are slid from the unit using the handles fitted to the sides of the intermediate panel. Once the entire magnet unit has been slid from the housing the magnetic units can be slid out of the sleeves using the handles on the front panel. The iron particles are then released by the sleeves without falling into the housing, and can be collected. The magnet system is then returned to its original position, and is once again ready for use.



Flux-plot



Power-Mag Automatic

Power-Mag AUT/VI



The Power-Mag can also be supplied in a remote-controlled self-cleaning version. The product flow needs to be interrupted before activating the cleaning cycle. After the activation of the cleaning cycle by an electrically-operated valve two pneumatic cylinders slide the magnet system and stainless-steel sleeves from the housing. Once the entire magnet unit has been slid from the housing two further pneumatic cylinders slide the magnetic units clear from the sleeves; the iron particles are then released, and collected via an iron-particle outlet. The magnet system is then returned to its original position, and is once again ready for use.

All pneumatic components are suitable for use in the food industry. The system is fitted with a control cabinet, inclusive of a compressed-air set. A pushbutton in the control cabinet can be used for the local operation of the cleaning system.

SPECIFICATIONS

Execution:	automatic cleaning
	permanent magnet
Overall height:	400 mm
Material:	stainless steel grade 1.4404
Connection flanges:	equipped with pre-drilled flat flanges
The magnet units are moved using sliding sleeves on slide rods	
Operating pressure, pneumatic system:	6 bar
Remote control by means of an electrically-operated valve; input signal 24 VDC	
In the event the air pressure falls away the magnet units remain in the housing	
All moving parts are shielded by stainless steel guards	
The guards can be removed for inspection or maintenance	
The outlet for the discharge of the separated iron particles is fitted with a flange	
The rear of the housing is equipped with an earthing clamp	
Equipped with CE label	
Surface treatment:	electrolytic polishing





CHUTE MAGNETS ARE SUITABLE FOR
VIRTUALLY EVERY CONCEIVABLE
APPLICATION!

Chute magnets

BKM/VI



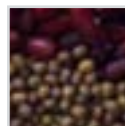
SPECIFICATIONS

Execution:	simple manual cleaning
	permanent magnet
Material:	stainless steel grade 1.4404
Connection flanges:	equipped with pre-drilled flat flanges
Magnetic section:	2 plate magnets, type FDA/ND
Fitted with silicone packings	
The magnets are secured with 2 x 2 quick-action clamps released by pawls	
The rear of the housing is equipped with two earthing clamps	
Handles are fitted to both magnets and intermediate panels.	
Equipped with CE label	
Surface treatment:	electrolytic polishing

The chute magnet system has been developed for the efficient removal of iron particles from raw materials which do not flow freely, such as powders, and tacky or oily products, and/or scrap. The system is installed in one of the pipes used to transport the raw materials during the production process. The unit is located in a fully-welded stainless-steel housing which can be installed in the pipe in a manner such that it in effect constitutes an integral part of the pipe. To this end use can be made of the adapter pieces illustrated on page 16.

Chute magnets are characterized by the location of the magnet poles outside rather than inside the product flow. Extremely powerful plate magnets located on opposite sides of the housing capture iron particles contaminating the product flow. These magnet plates are actually of a strength such that the external core is suitable for use with a column of material. The standard system is equipped with two intermediate panels which swivel together with the magnets. On swivelling the magnets further open than the intermediate panels the separated iron particles are released ready for collection. To prevent particles captured by the magnets from being released into the product flow each intermediate panel is fitted with two sloping poles.

The overall height depends on the bore of the housing. Since no parts obstruct the product flow they are ideally suited to high-throughput systems. Chute magnets can, in consultation with Bakker Magnetics, also be installed at an angle. The BKM/VI chute magnet can also be used in pipes used for pneumatic transport at an underpressure. Please contact Bakker Magnetics' applications staff for information about maximum transport speeds. The BKM-HD/VI chute magnet is available for use in pneumatic-transport systems operated at an overpressure. More information about this model is given on page 15. Systems for horizontal pneumatic-transport pipes are available on request.





Chute magnets Automatic BKM AUT/VI



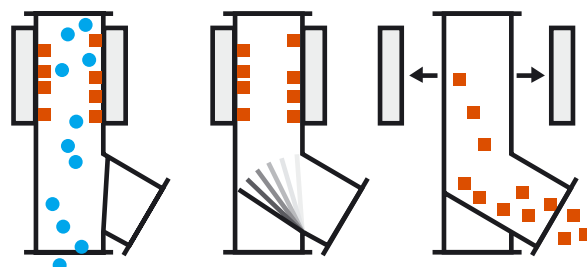
SPECIFICATIONS

Execution:	automatic cleaning, permanent magnet
Material:	stainless steel grade 1.4404
Connection flanges:	equipped with pre-drilled flat flanges
Inclusive of pneumatically-operated 2-way valve box fitted with silicone seals	
Magnetic section:	2 plate magnets, type FDA/ND
The plate magnets are moved using sliding sleeves on slide rods	
The repositioning of the magnet blocks is uniform	
Specifications of the pneumatic system:	
operation of the valve box by means of a rotating cylinder	
inclusive of the compressed-air set	
local/remote functions, pushbutton in the control cabinet	
dimensions of the control cabinet: 300 x 200 x 150 mm.	
Operating pressure, pneumatic system: 6 bar	
Remote control by means of an electrically-operated valve; input signal 24 VDC	
In the event the air pressure falls away the magnets remain against the housing	
Equipped with CE label	
Surface treatment:	electrolytic polishing

The BKM-AUT/VI chute magnet is equipped with remote controls and a fully-automatic cleaning system. A valve box incorporated in the system ensures that the iron particles captured by the magnets are discharged outside the housing during the cleaning process. This system is suitable for non-continuous processes.

After stopping the material flow the cleaning cycle can be activated by giving a signal to an electric valve. The valve box rotates and the magnets are moved outwards to remove the magnetic field from the housing. The captured iron particles are released and discharged via the valve box away from the product flow. The housing is fitted with rising poles designed to prevent particles captured by the magnets from being released into the product flow.

Continuous-flow systems for continuous processes are available on request; these units are designed such that the transport and separation processes can continue without interruption during the cleaning cycle.





Chute magnet Overpressure

BKM HD/VI

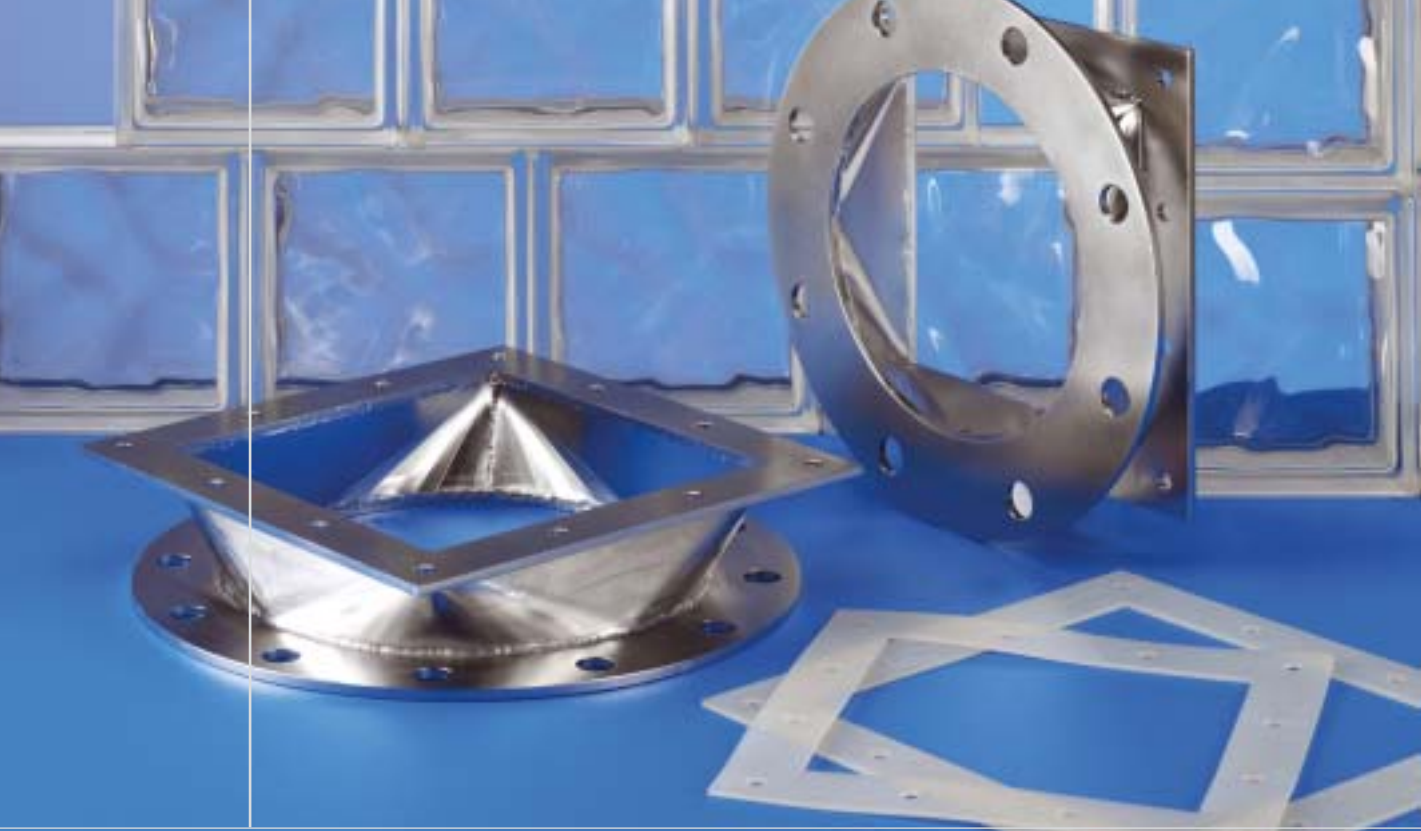


Magnet systems of the BKM-HD/VI type have been developed especially for use in pneumatic-transport systems operated at an overpressure. The standard unit is available in two dimensions, i.e. a housing 150 mm square and a housing 200 mm square. The system is supplied with a separate receiving tray which must be slid into the opening at the base of the housing when cleaning the unit. This opening is hermetically sealed during the production process.

SPECIFICATIONS

Execution:	simple manual cleaning
	permanent magnet
Material:	stainless steel grade 1.4404
Magnetic section:	2 plate magnets, type FDA/ND
The magnets are secured with 2 x 2 quick-action clamps released by pawls	
The rear of the housing is equipped with two earthing clamps	
Surface treatment:	electrolytic polishing
Max. overpressure:	2 bar
Equipped with CE label	





Adapter pieces VC/VI



Packings with an appropriate hole pattern are available for all standard BM flanges. The packings are made from 40 Shore silicone of FDA quality

The standard BM magnet systems for the food and pharmaceutical industries are fitted with flat pre-drilled square connection flanges. A wide range of standard adapter pieces are available for the integration of these systems in an existing pipe. One end of these adapter pipes is fitted with a pre-drilled square flange mating with the flange on the magnet system. The other end is fitted with a flat connection flange with a hole pattern in accordance with DIN2576. Non-standard adapter pipes are available on request.

The magnetic liquid filters illustrated on page 18 are fitted with connection flanges in accordance with DIN2575 ND10 NW80. Adapter pipes for these units can be supplied on request.



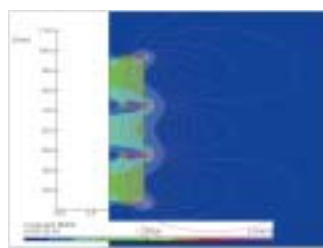


Magnetic Filter bars FS/VI



Magnetic filter bars can be installed at every required location in systems used to transport solid or liquid product. The filter bars of the FS/VI model are comprised of an extremely powerful Neodymium magnet system in a watertight stainless-steel housing. Blind threaded holes at each end of the unit simplify their installation. Units to be installed as "fingers" in the product flow are available with a tapped hole at one end. Units intended for stand-alone use can also be supplied without threaded holes. The sophisticated magnet configuration guarantees an extremely powerful and intense magnetic field. The design is based on an optimum combination of the retentive force on the surface and a working depth which is as deep as possible.

Flux-plot



SPECIFICATIONS

Execution:	manual cleaning
	permanent magnet
	waterproof
Diameter:	25 mm
Surface treatment:	polished





Magnetic liquid filter FV / VI



Iron particles can also be present in liquid products. The permanent magnetic filter offers an effective means of removing these particles. The magnet system is comprised of Neodymium magnets which are fitted in a stainless-steel housing equipped with inlet and outlet ports for the liquid. The magnet system can rapidly be removed for cleaning by releasing a number of quick-action couplings.

Cleaning is considerably simplified by the extractor principle used in the design of the filters. Once the magnet unit has been removed from the extractor both components can readily rinsed clean.

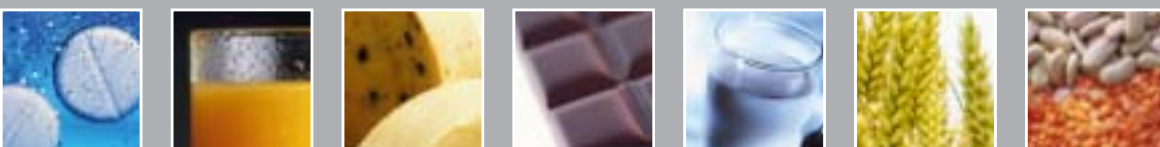
Viscous liquids can be pumped through the filter under pressure. The extremely powerful magnetic field is capable of filtering particles of a size of 10μ upwards from the liquid. A drain-plug fitted to the base of the housing simplifies cleaning the filter.

A model is also available for iron separation from rapidly solidifying fluids (chocolate, molten cheese, etc.). These units are equipped with a jacketed housing which can be connected to a hot-water circuit, thereby reducing temperature losses during the iron-separation process to negligible levels.

SPECIFICATIONS

Execution:	simple manual cleaning
	permanent magnet
Material of housing:	stainless steel grade 1.4404
Max. pressure:	10 bar
Connection flanges:	equipped with flanges in accordance with DIN2576 ND10 NW80
Surface treatment:	electrolytic polishing
Equipped with CE label	





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