

ZGF Maggie Product Data Sheet with Description and Operation

The Most Advanced, Automatic,
Non-Disposable Liquid Filtration System



Maggie is the Premier Magnetic Separation Technology for Removal of Ferrous Contaminants & Particles Performance, Simplicity, Consistency, Reliability and the Lowest Cost of Ownership



ZGF Maggie technology is a fully automatic, in-line, high intensity, self-cleaning magnetic separator. The innovative and patented Maggie is the best available technology for separating magnetic contaminants from process fluids. **Maggie removes most ferrous particles 5 micron and larger and will also remove sub-micron particles without damaging critical process fluids** such as machining coolants, cleaning / degreasing solutions and polymer quench fluids.

ZGF's Maggie is an effective, efficient and environmentally responsible solution that can optimize life-cycle cost and minimize the environmental footprint of industrial operations.

Maggie has the lowest 10-year lifecycle cost in the industry. The annual total cost for a 250 gpm system is <\$5,000 / year, including Annualized Capital Cost and Refurbishment after 10 years.

- ✓ Spare Parts: < \$150 per
- ✓ Operating Costs (power & air): < \$5 per year
- ✓ Maintenance: < \$200 per year
- ✓ Annual O & M cost: < \$350 per year

Our patented Maggie magnetic separation systems are the ultimate in filtration technology, providing cost, quality, health & safety, and environmental benefits. Maggie is the Premier Magnetic Separation Technology for the Capture and Removal of Ferrous Contaminants and Particles from Liquids.

ZGF provides a full range of Maggie systems to meet all your requirements.

Model	Product	Flow Rate (gpm)		Inlet / Outlet / Purge
		Water-based	Oil	
MG100	Maggie 1-core	12	8	0.75" / 0.75" / 0.75"
MG300	Maggie 3-core	35	25	1" / 1" / 1"
MG600	Maggie 6-core	70	50	1.25" / 1.25" / 1.25"
MG1200	Maggie 12-core	125	85	2" / 2" / 1.5"
MG2600	Maggie 26-core	250	175	3" / 3" / 1.5"
Manifold Arrangement	MG1200 or MG2600	unlimited	unlimited	user determined
Mini Smart Drum	Fluid Recovery	Batch Process		1" / 1"
Smart Drum	Fluid Recovery	Batch Process		1.5" / 1.5"
Smart Drum PLUS	Fluid Recovery	Batch Process		1.5" / 1.5"

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MAGGIE FEATURE	YOUR BENEFIT
High intensity magnets generating >10,000 gauss	Capable of capturing sub-micron particles that pass through conventional filters, Lower operating costs
Selective contaminant removal	Will not strip any components from the process fluid, consistent process performance & reliability
Consistent and reliable performance	Improved quality and lower operating costs
Full 1-year warranty on Maggie assembly	Reduced operating and maintenance costs
Fully automatic, self-cleaning operation	Reduced maintenance and operating costs, Labor is now available for other value-added plant services
Pressure fed, zero by-pass design	Better particle capture efficiency – Improved product finish and less wear to machine components
In-line design	Eliminates need for additional pumps, motors and controls reducing maintenance and operating costs
Compact design	Saves valuable floor space. Four times smaller than conventional media-based filtration systems
Virtually No Maintenance	Improved Health & Safety due to reduced Worker Exposure. Reduced operating & maintenance costs.
Efficient and environmentally responsible design, Low energy requirement	Creates no additional waste (i.e. no disposable media, no packaging). It uses less energy than a light bulb.
Secondary batch processing system (Smart Drum)	Allows for recovery of valuable process fluids and reduces waste. Reduced operating costs.
Permanent media, stainless steel body and cores	Media-free, Replacement not required, No waste, No disposal, Improved Productivity
Minimal moving parts through simplicity of design	Increased reliability, Reduced maintenance and operating costs



Maggie – Filter Mode

- Dirty fluid flows into Maggie at the top
- Clean fluid is discharged through the bottom / outlet port
- Purge port closed
- Magnetic shuttle assembly is in the lower position

Maggie – Purge Mode

- Dirty fluid flows into Maggie at the top
- Solids laden fluid exits through the bottom / purge port
- Outlet port closed
- Magnetic shuttle assembly is in the upper position



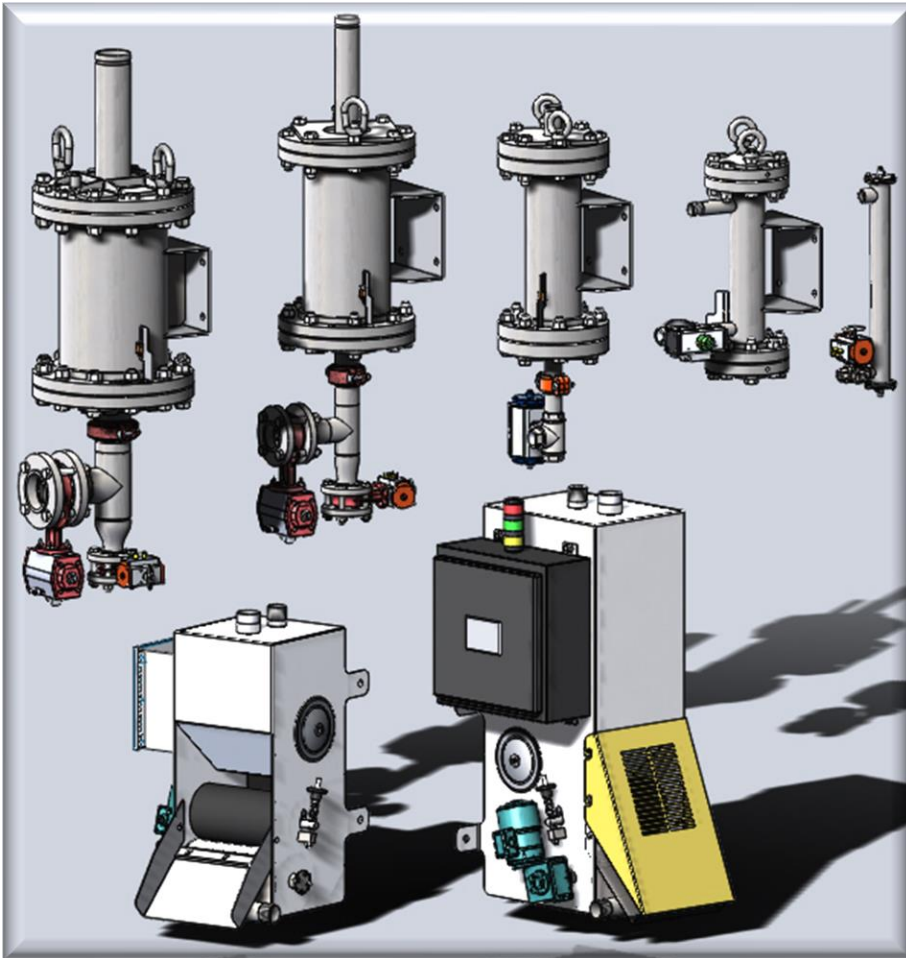
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Maggie / Smart Drum – Basic Description & Operation



ZGF Maggie technology is a fully automatic, in-line, high intensity, self-cleaning magnetic separator. The innovative and patented Maggie is the best available technology for separating magnetic contaminants from process fluids. **Maggie removes most ferrous particles 5 micron and larger and will also remove sub-micron particles without damaging critical process fluids** such as machining coolants, cleaning / degreasing solutions and polymer quench fluids.

The five Maggie models (MG100, MG300, MG600, MG1200 & MG2600) are designed to handle flow rates from 1 gpm to 250 gpm. Multiple Maggie's can be assembled in a manifold arrangement to meet any flow requirement. The Maggie product family also includes the Mini Smart Drum, Smart Drum and Smart Drum PLUS (SD) fluid recovery devices. The purpose of the SD is to physically remove the magnetic fines from the Maggie purge fluid and return the fluid back to the process.

Maggie is fabricated from stainless steel. It is fully compatible with a wide range of liquids and operating conditions up to 170°F and 100 psi. Maggie is available with a welded tube seal design, as well as a variety of O-ring tube seal elastomers (Viton, Buna, EPDM and ETP), and several valve seat materials (Viton, Buna, EPDM, Teflon and PFA). O-ring seal elastomers and valve seat material selections are based upon compatibility with the process fluid.

Maggie's stainless-steel body houses our proprietary magnetic cores. The magnetic cores are thin walled, seamless stainless tubes that seal magnetic shuttle assemblies. Each magnetic core contains several magnet/pole combinations that can generate in excess of 10,000 gauss on the tubes surface. The magnetic cores are assembled into different Maggie sizes/models to best accommodate the flow and loading characteristics of the application/process.

Maggie is available with two control options:

- Analog Timer – for use with MG100, MG300 and MG600
- Logic Module – for use with any Maggie model or Maggie system

Maggie features two modes of backwash control - automatic based on time interval and manual override.

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Below is a basic description of operation for the Maggie and Smart Drum.

Maggie: Liquid enters the Maggie at the top via the inlet connection at system pressure (no additional pumps required). The velocity of the fluid is reduced as it enters Maggie, maximizing the time that particles are in contact with the magnetic field. Maggie's patented design forces the dirty liquid to follow a tortuous flow path within Maggie. A baffle plate located in the center of Maggie forces the liquid to the outside wall. The liquid must then travel to the inside of Maggie, through the high intensity magnetic field and across the magnetic tubes, before exiting Maggie from the bottom. Given the reduced velocity, coupled with high intensity magnets, and the patented flow path, particles as small as 1 micron are captured.

The purge valve / port is fitted immediately below Maggie to enable the debris to be removed as quickly and effectively as possible. Consequently, all debris is removed from the inside of Maggie. This results in a very efficient purge, requiring very little fluid. The purge duration is typically 4 to 6 seconds.

Smart Drum (SD) fluid recovery device: Purge fluid from Maggie flows to the SD at system pressure. The inlet diffuser and upper tank serve to reduce the pressure and act as a surge tank. The fluid drains via gravity from the upper tank into the lower pan and across the magnetic drum before exiting the system. All fluid must pass across the magnetic field prior to discharging from the front of the unit. There is no by-pass flow. The magnetic drum rotates and captures the chips/fines in the pool of liquid in the pan. As the drum continues to rotate, the fines/chips are removed by the plastic scraper, and they drop onto the tray situated at the front of the SD. The fines/chips fall off the tray and into a customer supplied chip bin located below. The fluid from the SD is directed back to the process. Flow out of the SD is via gravity.

Purge Cycle: The purge cycle is initiated either automatically via a user defined timed event, or manually by pushing the manual purge button. Upon purge cycle initiation, the following sequence occurs:

1. The Maggie purge process commences. The Maggie purge time is typically 4 to 6 seconds. By having this time adjustable, optimum purge efficiency can be achieved. The Maggie purge process sequence is as follows:
 - a. A pneumatic signal causes the clean discharge valve / port to close while simultaneously opening the purge valve / port.
 - b. Using compressed air, the magnets are quickly shuttled above the baffle plate. Magnetic debris trapped by the magnets on the tubes cannot travel upwards due to the design and positioning of the baffle plate, and the continuous flow of fluid from the inlet.
 - c. Because the magnets have been shuttled above the baffle plate, the magnetic debris has no attraction to the tubes and is quickly purged from Maggie out through the purge valve / port. The purge is directed to the SD.
 - d. After a brief delay, the magnets are shuttled below the baffle plate.
 - e. The clean discharge valve / port is opened, and the purge valve / port is closed.
2. The Maggie purge is discharged into the inlet tank of the SD. The inlet tank is designed with an inlet diffuser to handle the initial surge of fluid. The fluid then flows through an adjustable engineered orifice and into the lower pan containing the magnetic drum.
3. As the magnetic drum rotates and collects magnetic debris, clean fluid exits the SD through the gravity discharge.
4. In summary, the Maggie purge flows into the inlet tank, through the engineered orifices, into the pan and across the drum, and exits via the gravity discharge port.
5. Magnetic particles are captured on the magnetic drum due to the low velocity in the tank, proximity of the fluid to the drum, and the strength of the magnetic field. The magnetic fines caught by the drum are removed by the plastic scraper as the drum rotates past. The fines/chips fall onto the tray and into a customer supplied chip bin located below, while the clean, magnetic particle free fluid drains via gravity back to the system.