649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com

MAGNETIC FILTRATION -

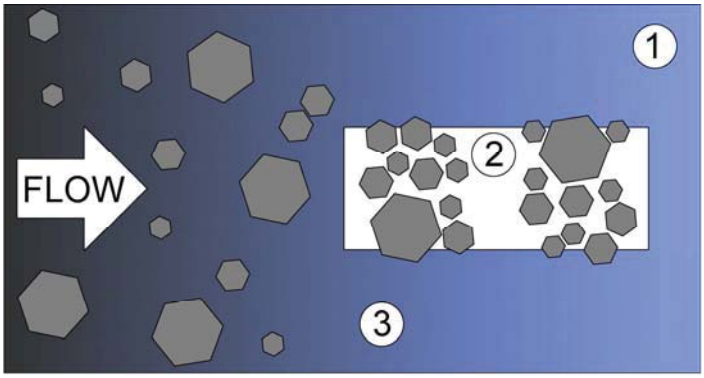
HIGH EFFICIENCY, HIGH CAPACITY

- 12,000 Gauss Magnet Rating.
- High Intensity Rare Earth Neodymium Iron Boron Magnets. The **STRONGEST** Magnets available in the world.
- Large and sub-micron ferrous particles are retained.
- Magnetic cores pull ferrous material away from the filter media resulting in minimal flow restriction.
- Reduces the amount of consumable media used while increasing fluid quality.
- Stainless steel cores protect the magnetic assembly and isolate it from the flow stream.
- Reusable and Maintenance free during their expected ten (10) year plus lifespan.
- Routine inspection allows for indication of equipment wear of upstream equipment. Magnetic filtration can be used as a predictive maintenance tool.

***Top Left**: Close up of saturated core. **Bottom Left**: Core tube assembly installed in P2 bag filter. **Right**: Standard P2 bag core tube saturated with ferrous material.*

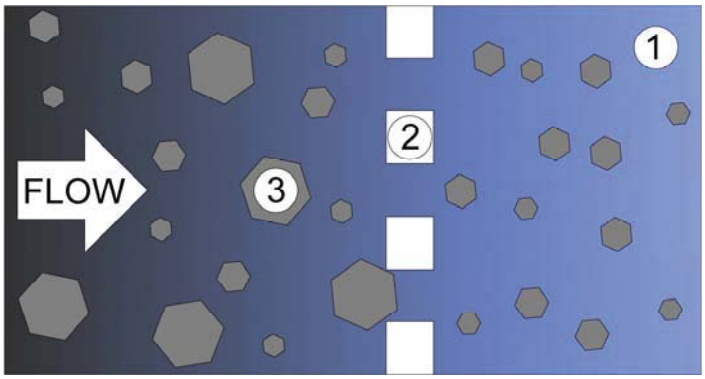
MAGNETIC vs. MEDIA FILTRATION

Magnetic Filtration



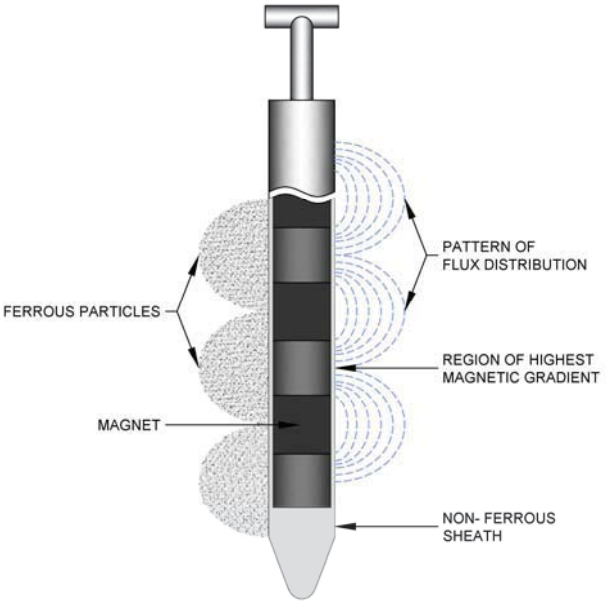
1. All ferrous particle sizes are attracted to the magnetic core and retained.
2. Once a dense layer of contaminant is collected it can be easily disposed of or recycled and the magnetic core reused. Virtually no fluid is retained.
3. Proprietary core magnet configuration ensures a strong magnetic field resulting in heavy collection rates.

Media Filtration



1. Only particles larger than the media filtration rating are retained. Smaller particles pass downstream and remain in the fluid stream.
2. Once the pressure drop reaches an unacceptable value media disposal is required.
3. As contaminant is collected the pressure drop across the media increases resulting in decreased flow rates.

HOW IT WORKS



Magnetic filters work by producing a magnetic field or loading zone that collect ferrous particles. The magnets are arranged inside a non-ferrous core to form a magnetic field that has a non uniform flux density or magnetic strength. Particles are most effectively separated when there is a strong magnetic gradient from low to high. The higher the magnetic gradient, the stronger the attracting magnetic force acting on particles drawing them toward the loading zones.

The magnetic force acting on a particle is proportional to the volume of the particle, but is disproportional to the diameter of the particle. The magnetic force on a particle varies with the cube of the particle's diameter. For example a two (2) micron particle is eight times more attracted to a magnetic field than a one (1) micron particle.

FILTER SOLUTIONS INC. uses magnets that have a flux density (magnetic strength) of 12,000 gauss (Compared to a ordinary refrigerator magnet of 80 gauss). Magnets are arranged in a non-ferrous tube to produce a large magnetic force and a resulting large magnetic gradient. The result is a magnetic assembly that successfully collects and removes ferrous material from a media stream in high collection volumes.

BLACK POWDER AND PIPELINES

Black Powder is a contaminant found in pipelines transporting natural gas, hydrogen condensates, and liquefied petroleum gas (LPG). It is, in most cases, a solid ferrous (magnetic) iron oxide or iron sulphide contaminant of various particle size distribution that can cause a range of problems. These include product and equipment contamination, erosion wear in compressors, instrument and filter clogging, erosion and sealing problems for valves, and equipment flow restriction and plugging.

Typical sources of black powder are:

- Pipe Mill Scale resulting from the pipe manufacturing process through the high temperature oxidation of steel.
- Flash rust formed from the presence of water during the pipeline hydro-test, or water moisture found in wet gas.
- Internal pipeline corrosion that is microbial induced when sulfate reducing bacteria (SRB) colonizes on a pipeline wall allowing for localized pitting corrosion, or that caused by Sour Gas (H2S) and it's reaction with steel.
- The presence of oxygen, hydrogen sulfide and carbon dioxide have also been linked to creating favourable conditions for the corrosion of carbon steel pipe.

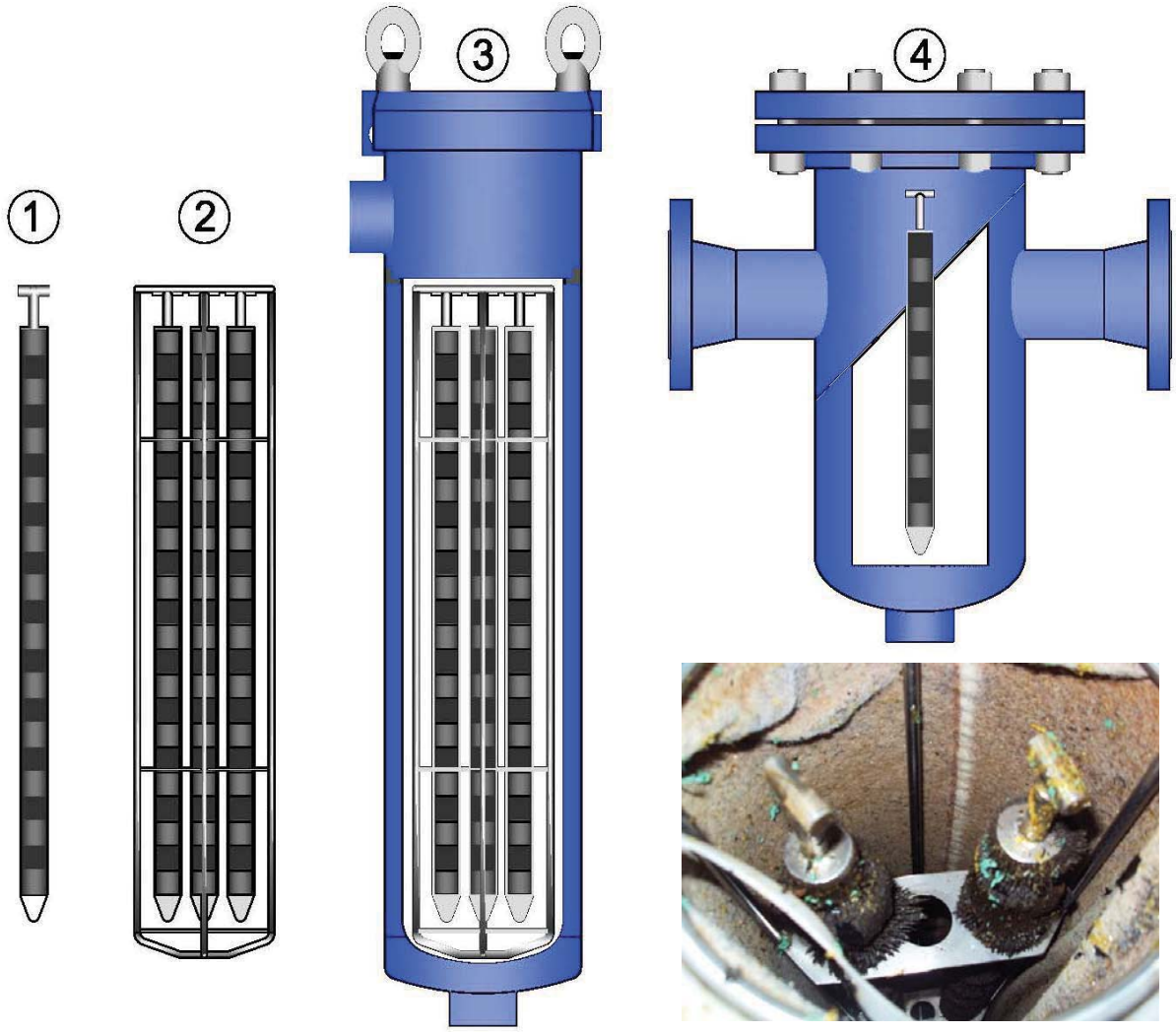
FILTER SOLUTIONS INC. manufactures magnetic filtration and separation equipment that removes Black Powder from pipelines down to sub-micron levels.

Our magnetic equipment installed before pumps, turbines, compressors and refineries offers long term equipment protection while improving gas or liquid hydrocarbon quality.

649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com

649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com

STANDARD PRODUCTS



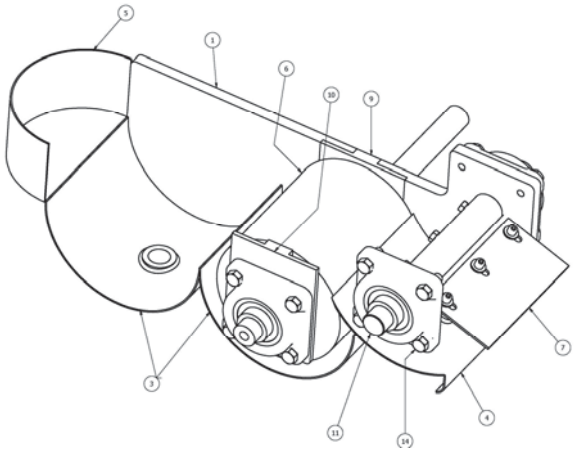
1. **FILTER SOLUTIONS INC.** manufactures magnetic core tubes in various lengths and configurations. Core tube ends can be supplied with various connection details including lift handles, straight or tapered threads, magnetic base stands and others.
2. Magnetic core tubes can be supplied with racks that allow drop in installation into standard P1 and P2 bag filter baskets among other sizes. Racks can be provided to hold between one (1) and five (5) magnetic core tubes. These racks support the core tubes and, due to the high magnetic strength, act to safely retain the magnet in the fluid stream. The racks also ensure separation between the disposable bag and core tubes allowing for a uninterrupted flow path.
3. Complete bag filter assemblies can be supplied with core tubes and racks installed at the factory. **FILTER SOLUTIONS INC**. manufactures a complete line of bags, cartridges and filters housings.
4. Strainer assemblies and baskets can be supplied with removable magnetic cores. As well, **FILTER SOLUTIONS INC**. frequently retrofits existing strainer baskets with magnetic assemblies and/or can manufacture new baskets for existing housings that incorporate our magnetic filtration technology.

CUSTOM SOLUTIONS

FILTER SOLUTIONS INC. welcomes custom designs from our clients. Our **ASME U-Stamp** certification ensures you will receive quality magnetic filtration solutions.

Magnetic Coolant Rollers

FILTER SOLUTIONS INC. has designed and tested a magnetic coolant roller. Contaminated fluid is dumped into the basin where a rotating magnetic assembly collects the ferrous contaminant and discharges it into a discharge basin. Collected ferrous contaminant is automatically scrapped into a customer supplied collection container for recycling while clean coolant can be drained from the basin and reused.



649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com

FILTER SOLUTIONS INC

649 Enfield Road, Burlington, Ontario L7T 2X9 Toll Free: 877-352-2301 Fax: 905-637-3031 info@filtersolutions.com www.filtersolutions.com