



INDUCED ROLL SEPARATORS



The high specification separator

Applicability

MasterMag Induced Roll Magnetic Separators are applied in extraction and concentration or purification of a wide range of minerals, chemicals and metallics.

Separation is achieved by exploiting the magnetic properties of the material, however feeble.

Provided the material is dry, free flowing, and of grain size that allows it to flow through a narrow slot, MasterMag Induced Roll separators should be applicable.

As a guide the following list indicates varying degrees of magnetic susceptibility of typical minerals which may be separated.

Approximate magnetic intensities required for separation:

	Tesla		Tesla
Alabandite	1.5 - 1.9	Monazite	1.4 - 2.0
Ankerite	1.3 - 1.6	Muscovite	1.5 - 2.4
Biotite	1.0 - 1.8	Olivine	1.1 - 1.5
Braunite	1.4 - 1.8	Pyrolusite	1.5 - 1.9
Chromite	1.0 - 1.6	Renierite	1.4 - 1.8
Columbite	1.2 - 1.6	Rhodochrosite	1.5 - 2.0
Garnet	1.2 - 1.9	Rhodonite	1.5 - 2.0
Goethite	1.5 - 1.8	Samarskite	1.6 - 2.0
Hematite	1.3 - 1.8	Siderite	1.0 - 1.8
Hornblende	1.6 - 2.0	Staurolite	1.2 - 1.9
Ilmenite	0.8 - 1.6	Serpentine	0.5 - 1.8
Itabirite	0.8 - 1.4	Struverite	1.0 - 1.6
Kimberlite	0.6 - 1.6	Tantalite	1.3 - 1.7
Leucosene	1.2 - 1.8	Tourmaline	1.6 - 2.0
Limonite	1.6 - 2.0	Wolframite	1.2 - 1.6
Martite	0.2 - 0.6	Xenotime	1.1 - 1.6

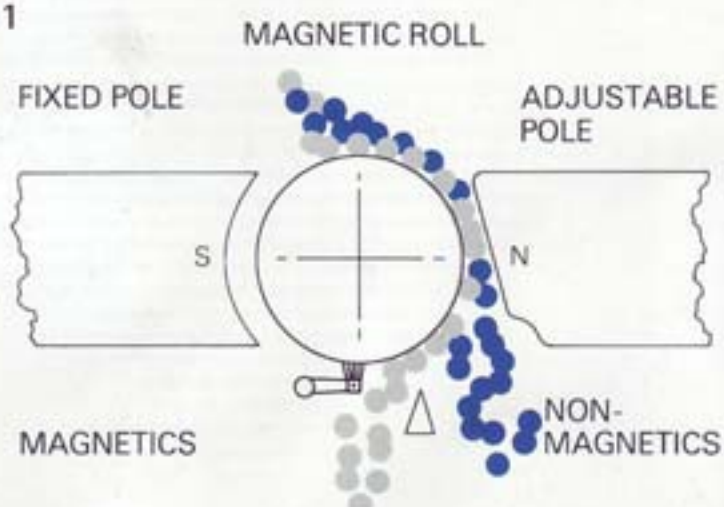
Used for removal of magnetic impurities from:

- Apatite
- Baddeleyite
- Barite
- Bauxite
- Calcite
- Cassiterite
- Corundum
- Feldspar
- Flint Clay
- Glass Sands
- Kyanite
- Limestone
- Manganese
- Mica
- Mullite
- Nepheline Syenite
- Petalite
- Quartz
- Rutile
- Scheelite
- Silicon Carbide
- Spodumene
- Wollastonite
- Zircon

Other Separations including:

- Grinding and Swarf
- Foundry Sands
- Weak magnetic contaminants in metal powders

Fig. 1



Typical Magnetic/Non-magnetic separation.

Principal of Operation

The material being treated is fed from a hopper or vibratory feeder at a controlled rate onto a high intensity magnetic roll. Feebly magnetic material attaches itself to the roll face or is deflected towards the roll. Non magnetic material is thrown off the face at a normal trajectory. Magnetic material is discharged off the roll face at a point of lower magnetic intensity aided by a brush. A splitter plate is interposed between the two product streams (See fig. 1.)

Removal of Highly Magnetic Particles. (For example Abraided Iron and Magnetite.)

Due to the high intensities involved in the operation of the MasterMag series of induced rolls, it is essential that highly magnetic material be removed prior to treatment by the main rolls.

To achieve this we can supply a magnetic scalper roll that forms part of the iron circuit of the main rolls (See fig. 2.)

This system is sufficient when iron levels are below 0.5%. However when this figure is exceeded, the scalper becomes less efficient and should be replaced by a MasterMag permanent alternating Pole Drum Separator. In general we recommend the use of a drum separator (See fig. 3.)

Fig. 2

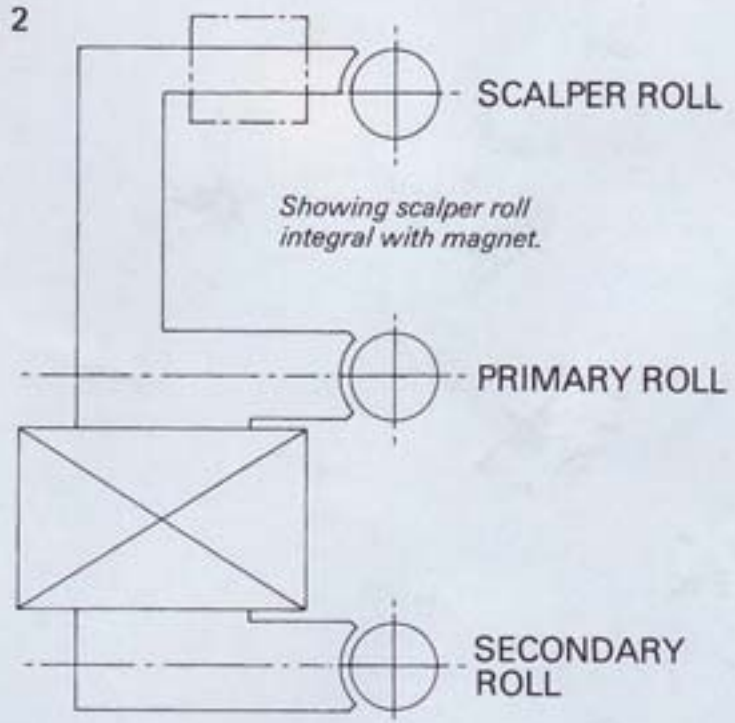
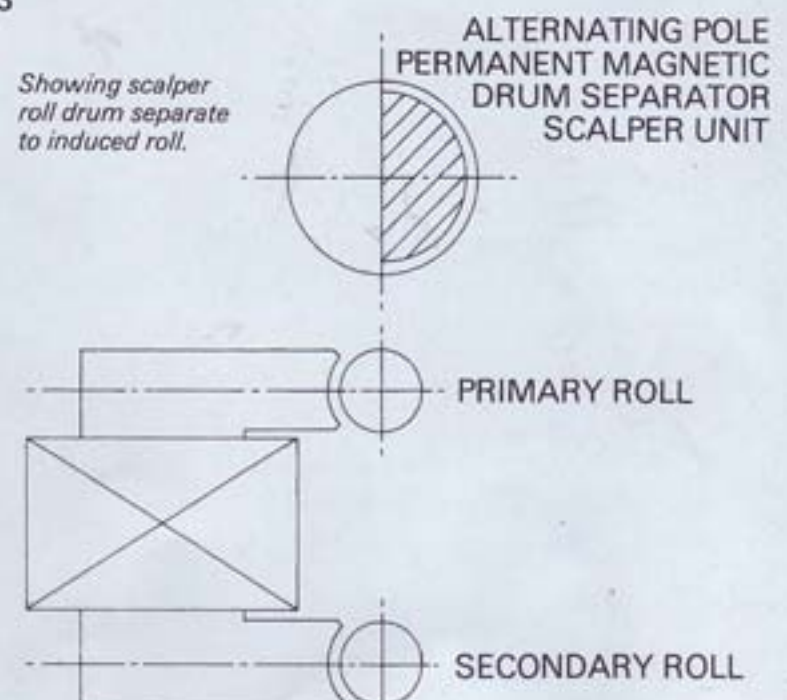


Fig. 3



or with the purchaser in mind

Capacity

Capacity of the separator is dependent on the grain size, the quantity of "fines" present (-50 microns), the degree of purification or concentration required, and the magnetic characteristics of the mineral or product to be removed or concentrated.

Throughputs can vary per metre width of roll from 8 t.p.h for purification of quartz, to 2 t.p.h. for purification of cassiterite.

Some typical capacities are listed below:

Beach Sand Application	Per metre roll width
Extraction of Ilmenite	4 t.p.h.
Purification of Rutile and Zircon	3.5 t.p.h.
High Value Minerals Application	
Cassiterite separation from Siderite	2 t.p.h.
Scheelite from other magnetic materials	1.75 t.p.h.
Upgrading Application	
Hematite from Silicates	5. t.p.h.
Limonite from Silicates	2.5 t.p.h.
Chromite and other Silicates from Serpentine	3. t.p.h.
Industrial Application	
Purification of Abrasive	3.5 t.p.h.
Purification of Plastics	4 t.p.h.

Design Features

MasterMag induced rolls have been perfected by engineers having a lifetime of experience in this field. We have, over a period of years, noted the advantages, and disadvantages of machines of other manufacture and our designs reflect this knowledge.

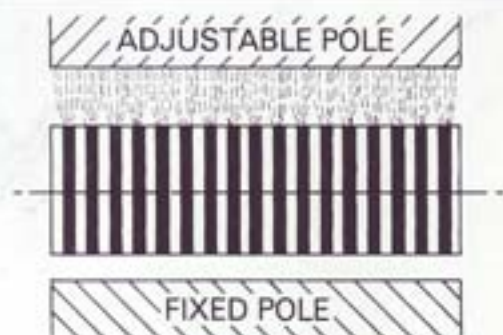
Feed Hopper

Non-magnetic stainless steel construction, finely controlled adjustable feed gate with positive shut off designed for uniform feed with minimum bounce. Large surge hopper can be supplied if required.

Roll Construction

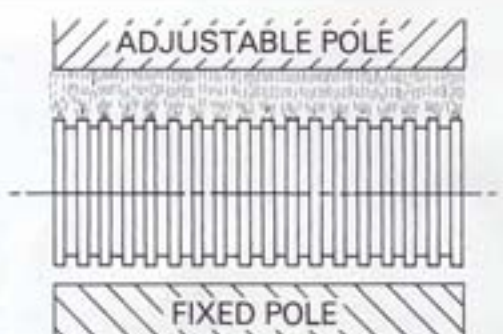
Laminated roll construction with non-magnetic shaft - smooth or serrated roll face (see figs. 4 & 5). High roll speeds (70-550 rpm) with minimum power requirements (see fig. 6). High magnetic intensities (see fig. 7.)

Fig. 4



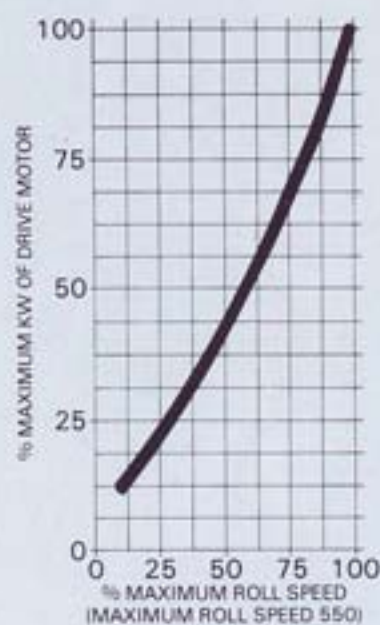
Laminated smooth roll face indicating flux path.

Fig. 5



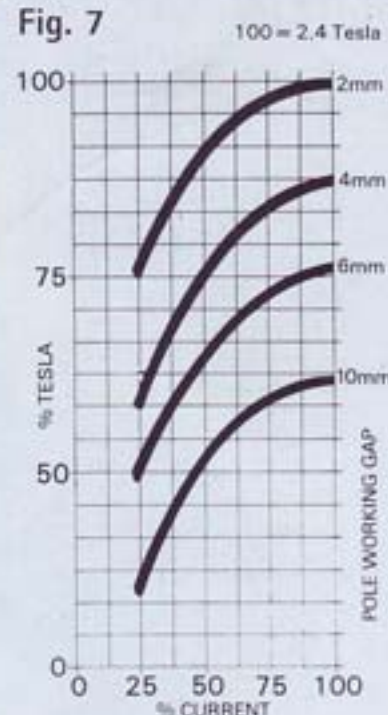
Laminated serrated roll face indicating flux path.

Fig. 6



Graph showing typical relationship of drive motor power to roll speed.

Fig. 7



Graph showing typical variation of Tesla on roll face due to changing coil current or pole to coil working gap.

Drive Motor

Can be constant or variable speed, our engineers can advise, or our laboratory can establish correct speed based on trials.

Adjustable Pole Nose

Maximised dwell time poles of different profiles, again consult our technical engineers for correct selection.

Adjustable Splitter Plates

In stainless steel normally consist of a single splitter, however in certain cases splitter plates can be fitted with provision for middlings product for different modes of treatment (see fig. 9.)

Treatment Options

Purification of non magnetics (see fig. 8.), magnetic product recovery (see fig. 9.), purification of magnetics (see fig. 10).

Chutes

All chutes are stainless steel and are designed to withstand abrasion and to eliminate blockages.

Energising Coil

The magnet circuit provides for minimum flux leakage, continuously rated long life coils are enclosed and employ the most modern techniques for heat dissipation ensuring high amp/turns, low heat generation.

The magnetic intensity may be varied electrically from the control panel or mechanically by variation of the adjustable pole/roll working gap (see fig. 7.)

Control Panel

The totally enclosed control panel is to IP-65 specification incorporating solid state circuitry. A constant current device is available.

Master Magnets Induced Roll Separators are designed with the plant operators in mind for ease of operation and maintenance. Great attention is paid to detail and quality of workmanship.



Induced Roll Separator - Model 4:1000:D

Fig. 8

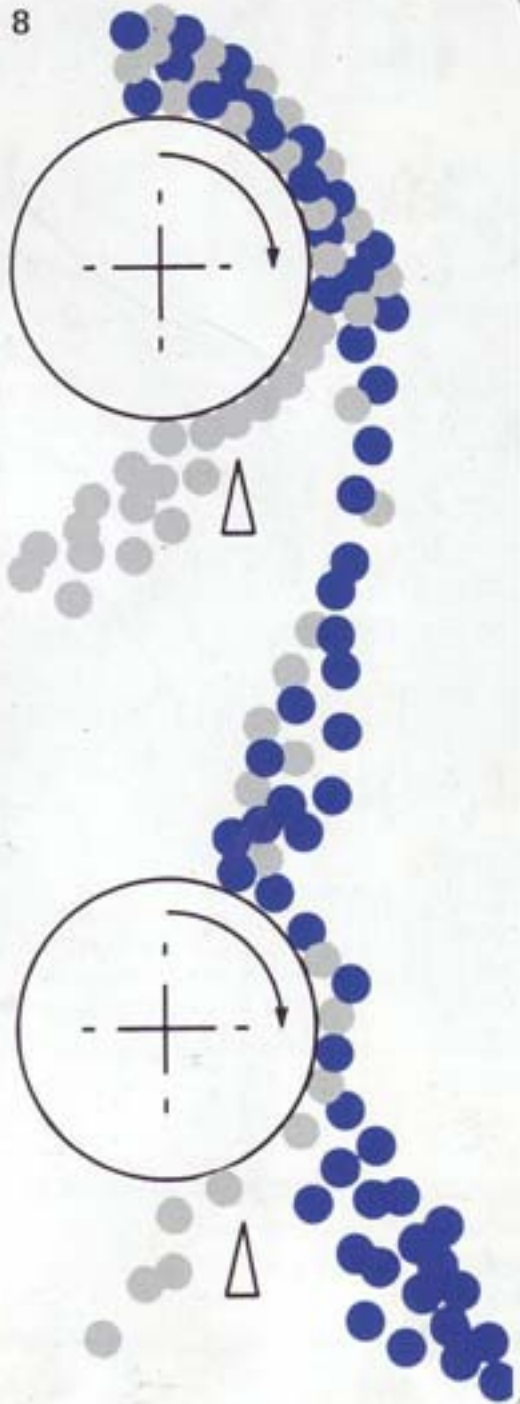


Fig. 9

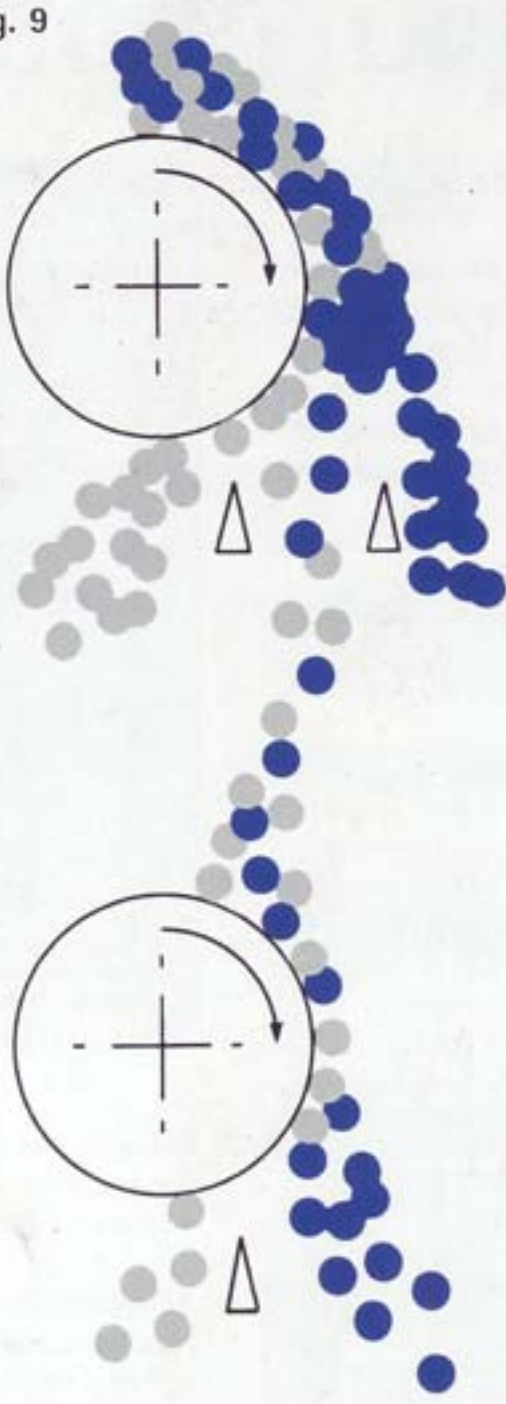
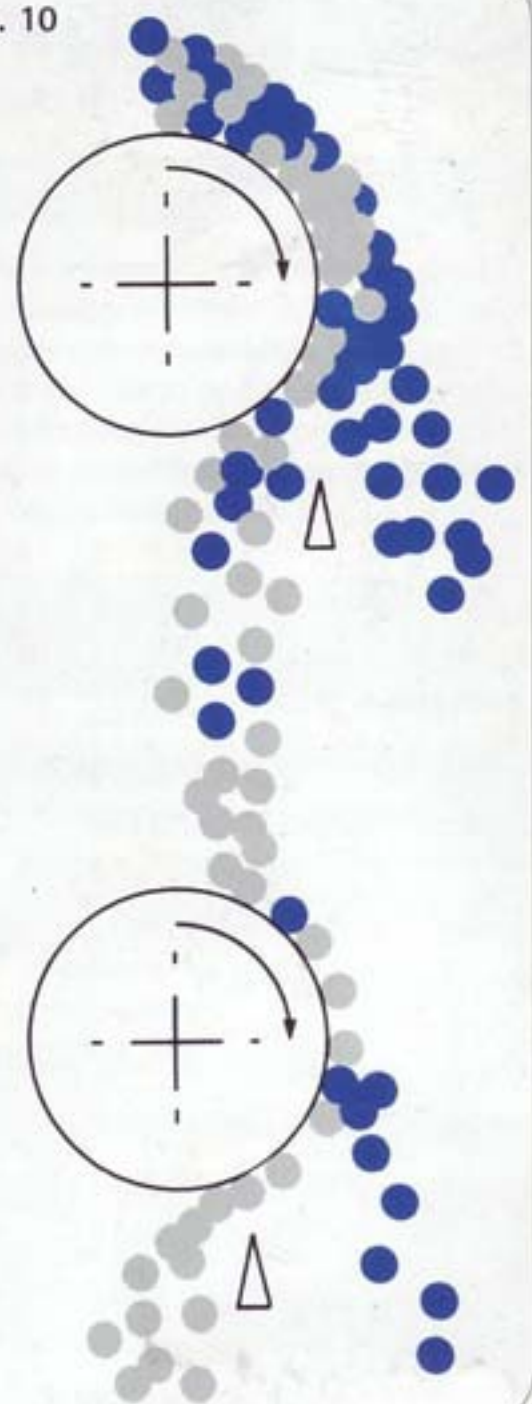


Fig. 10



The Complete Range of Mineral Separation Equipment

Master Magnets engineers have a fund of knowledge and experience across the whole range of industrial magnetic applications, particularly relating to mineral separation. Below are three products from our range used in wet and dry mineral separation.



Masterroll - Model shown Dual Roll with auto belt-tracking



Electro Magnetic Filter with backflush system



Wet Drum Separator

Master Magnets have over twenty five years experience providing innovative magnetic solutions to industries involved in recycling, demolition and reclamation, mining and quarrying, food processing, ceramics production and powders and minerals separation. The MasterMag range of systems are known for high performance and reliable operations and also include suspension magnets, overband magnets, drums and pulleys, eddy current separators and lifting magnets.



MASTER MAGNETS LTD

Incorporating Integrated Recycling Systems Ltd

Burnt Meadow Road, North Moons Moat,
Redditch, Worcestershire B98 9PA

Tel: +44 (0)1527 65858 Fax: +44 (0)1527 65868

Email: info@mastermagnets.co.uk

Website: www.mastermagnets.co.uk