



**MASTER
MAGNETS
LIMITED**

***WET DRUM
○
SEPARATORS***



The high specification separator

This range of Mastermag Wet Drum Separators has been designed by engineers having a wealth of knowledge and data, gained over many years of Wet Drum applications and users experience.

Our designers rely heavily on tried and trusted methods of separation, whilst embodying all the most recent effective and proven developments concerning magnet design and materials.

We offer a complete service to mining and mineral industries, our wide and competitive range of Wet Drum Separators allows us the freedom to select the correct size and type to meet precisely your process needs in the best technical and cost effective manner.

FEATURES

Magnet System

This is the most critical part of any Wet Drum design, ours reflects many years of experience and development.

The permanent magnet unit involves the use of strontium ferrite non deteriorating ceramic magnets, enclosed in stainless steel cases.

The electro magnet unit has a coil employing the most up to date cooling features, ensuring low heat generation, and quick dissipation. Giving high and efficient amp/turns performance.

Both electro and permanent drums have a multi pole high flux gradient, and gauss value ensuring maximum adhesion of magnetics to drum cover, whilst gyrating magnetics and releasing entrapped non-magnetics as the product passes over alternate stationary poles within the drum.

The magnet system within the drum is adjustable radially to ensure optimum setting and internally by shims allowing minimum clearance between drum cover and magnet bringing the magnet poles as close as possible to the media ensuring maximum magnetic field strength.

Drum Construction

The main cover is in stainless steel, as is the replaceable wearing cover — the drum can be rubber covered if required. Stainless steel end flanges have inner and outer seals ensuring the cover and flange joints are watertight.

Sealed for life proprietary flange bearings have grease nipples fitted and are protected from the slurry running down the flange by a simple radial cover.

Bright drawn mild steel shafting ensures a rigid assembly and eliminates any possibility of flexing.

A flat on the shaft allows the magnet system to be radially adjusted to the optimum setting, before being locked in position by the split fixed bearing.

Beneath the bearings, packer plates allow the clearance between tank and drum shell to be adjusted.

An integral plate wheel running outside the tank transmits the drive to the drum end flange.

Tank & Launder

Manufactured in stainless steel the two compartment header box ensures uniform feed to drum.

The launder design depends on the type of process involved. A step feature ensures that the slurry impinges on the drum face directly, where the magnet is the strongest.

Interchangeable rubber orifice rings in a bayonet fixing tails outlet ensures quick and simple adjustment for flow control.

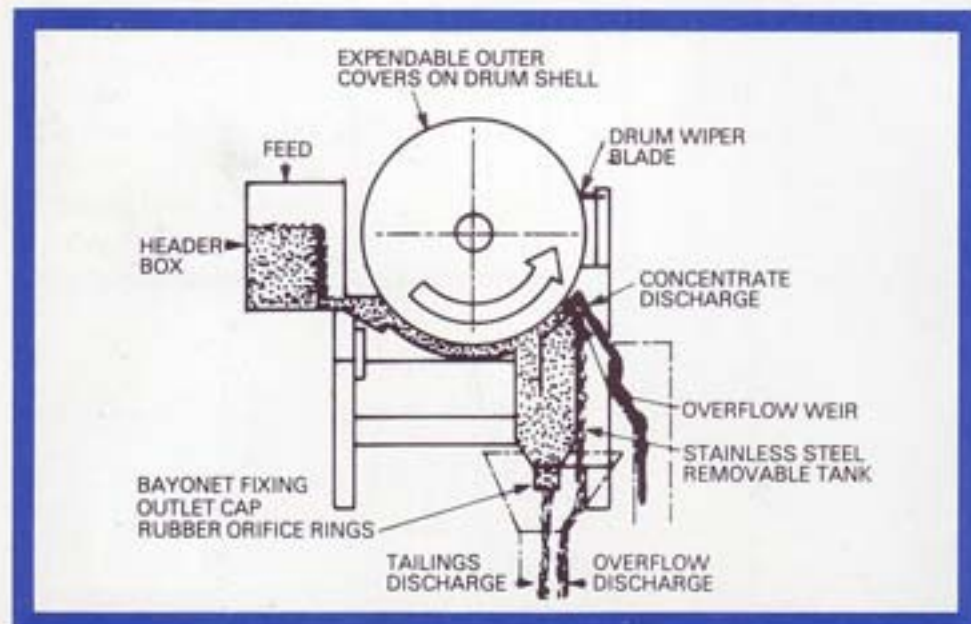


Fig. 1 Principle of Operation

Drum Scraper, Spray Pipe and Spill Boxes

Rubber scraper is standard though spray pipe is never fitted in heavy media recovery as a high specific gravity is the aim.

Spill boxes for intermediate water supply are fitted when multi drum installations are used.

Principle of Operation Fig.1

A slurry containing the magnetic component is fed between the rotating magnet drum cover and casing.

The stationary magnet system which has several radial poles attracts the magnetic component to the drum face, and the rotating cover carries the magnetics from one magnetic pole to another, at the same time gyrating the magnetic particles, allowing entrapped non-magnetics to fall away back into the slurry mainstream, and ensuring a clean magnetic product is discharged clear of the slurry tailings.

Three basic tank design exist. Concurrent fig. 4, counter flow fig. 5 and counter current (Steffenson) fig. 6.

Applicability

Mastermag Wet Drum Separators can be used for increased efficiency in the following:-

- Heavy media plants for recovery of magnetite or ferrosilicon.
- Iron Ore concentration.
- Extracting ferromagnetics from various slurries.

Heavy Media Plants

'Mastermag' Wet Drum Separators can process dilute feeds direct from screens, to concentrated feeds in coal plants. Our drums can deal efficiently with the variations in the amount of magnetite that occur due to high or low tonnage of coal, in a constant volumetric throughput of slurry.

Magnetic recovery will be influenced by the weight and grain size and % of non magnetics present relative to magnetics, figures 2 & 3 indicates a typical % recovery that can be expected from a slurry.

Recovery figures of 99.9% can be achieved.

Concentrate Specific Gravity

Magnetite 2.1 to 2.2 and ferrosilicon 2.9 to 3.0 can be achieved but again can be affected by the amount of magnetics present, position of magnet or drum, or the level of the slurry passing through the separator (which is most important).

Magnetic Concentrate Cleanliness

Once again the % of magnetics in the feed can influence the cleanliness as can the presence of sticky clays and slimes.

Iron Ore Concentration

Special tank designs are available for cobbing, roughing and finishing operations in single and multiple stages.

Maintenance

As always our equipment is designed with the purchaser in mind, being cost effective initially and having minimum maintenance requirements so that downtime is always kept to a minimum.

We advise that certain items subject to wear such as bearings and expendable cover are kept in stock.

Planning

Designers are free to consult our engineering department whilst "planning in" plants, but in any case should bear in mind certain points, e.g. headroom for lifting drum out of casing, accessibility of motor, and at the opposite end of shaft for magnet adjustment.

Multi stage units may be necessary, and these are included in our range.

Ancillary Equipment

The Mastermag range of equipment that can work in conjunction with Wet Drums briefly consists of:-

- Demagnetising Coils.
- To prevent magnetics discharged from a Wet Drum settling too quickly due to flocculation.
- Magnetising Block.
- When flocculation is required.
- Laboratory Wet Drum for test purposes.
- Magnet Chute.
- To determine the recovery efficiency of Wet Drums.
- Tube Tester.

For determination of the magnetic content of ores and assessing probable performance of Wet Drums.

or with the purchaser in mind

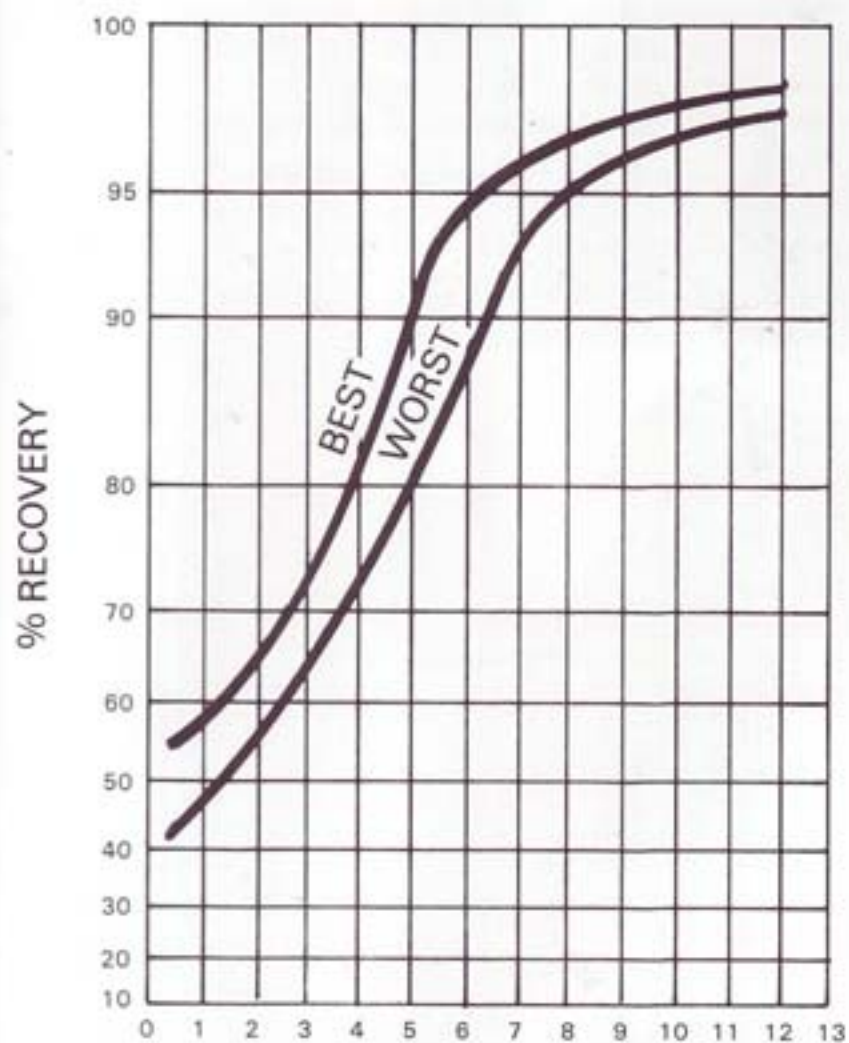


Fig. 2 Magnetite or Ferrosilicon in Feed (Grammes/Litre)

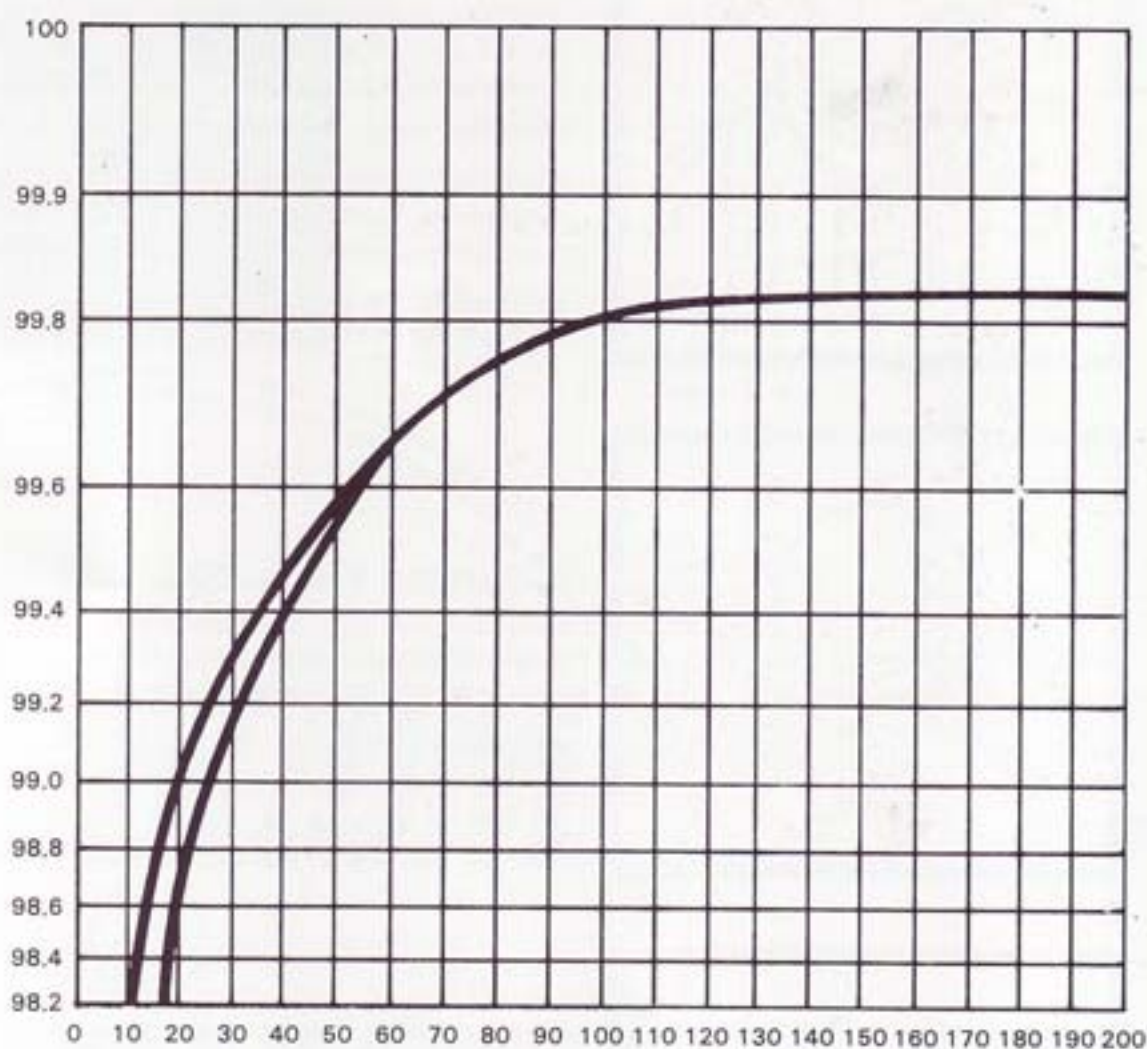
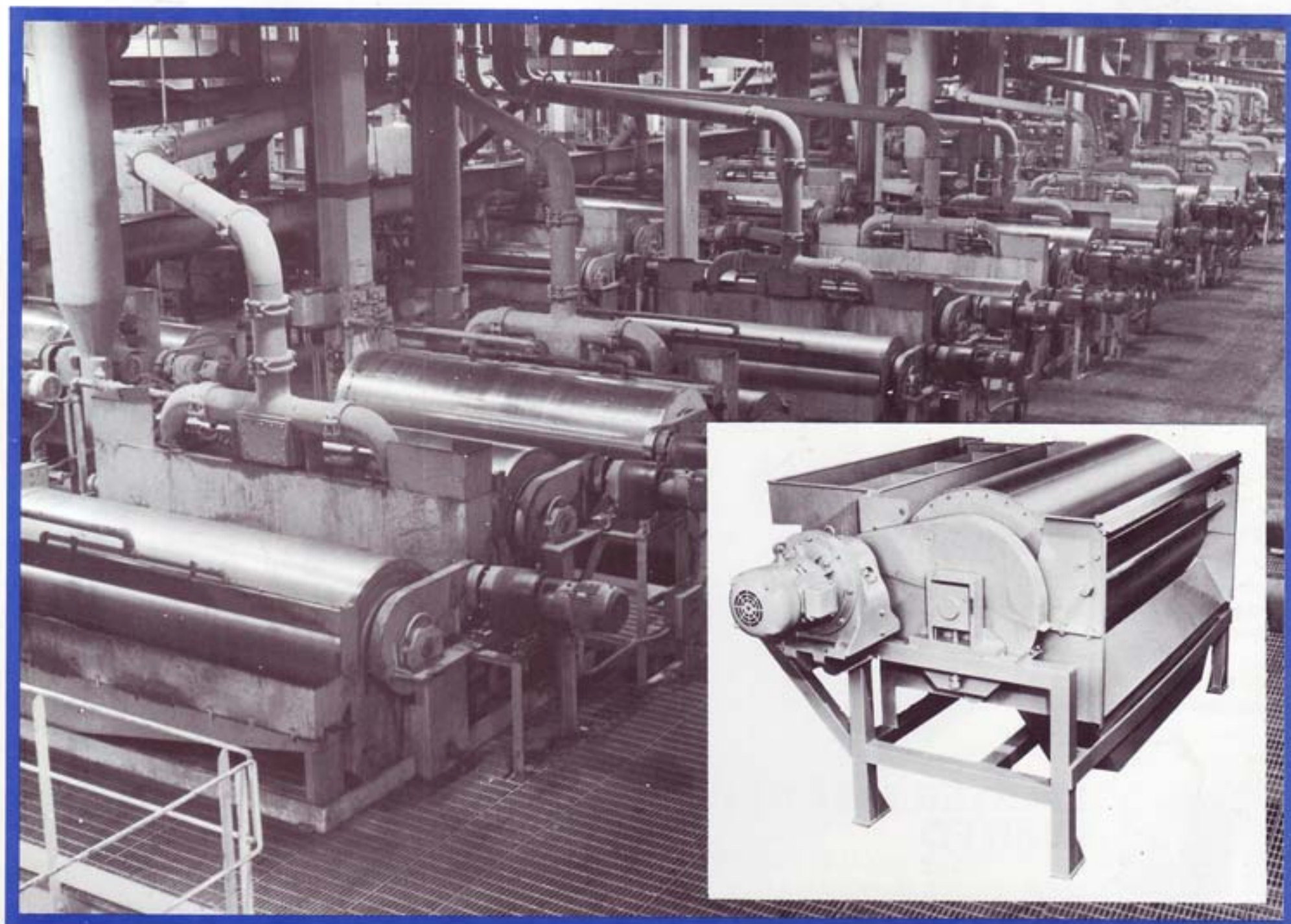


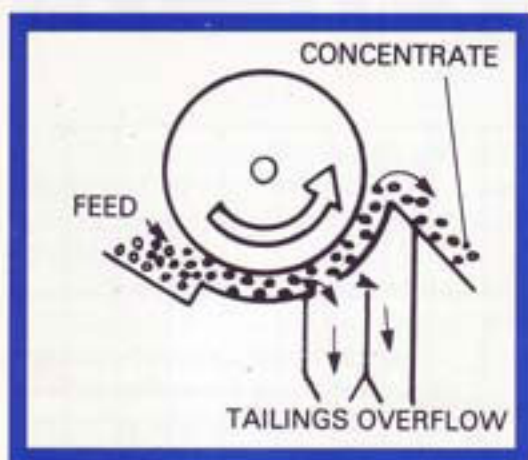
Fig. 3 Magnetite or Ferrosilicon in Feed (Grammes/Litre)



Double Drum Units in Steel Works

Typical Concurrent Mastermag Wet Drum Separator

Three basic tank designs



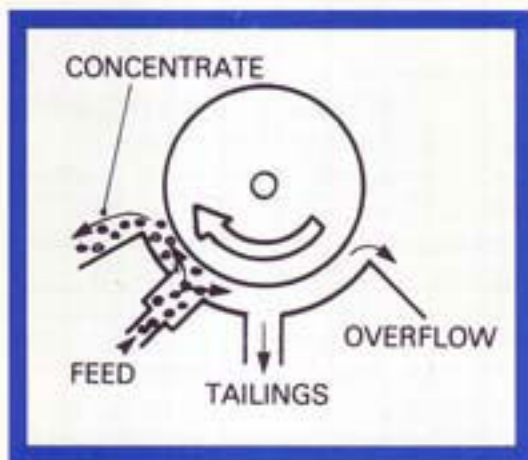
Concurrent Fig. 4.

This is normally used where high recovery of medium and high concentrate specific gravity are the main requirements, another feature is that large particles up to 6mm. can be handled. A solids content of 35-45% by weight is ideal.

The slurry enters the feed box from which it is uniformly distributed over the full width of the drum.

A stepped launder ensures that the slurry impinges on the drum face, which at that point has a powerful magnetic pole, the magnetics immediately adhere to the drum face, from there, as previously described, the drum cover passes the magnetics from pole to pole, purifying the magnetics in the process.

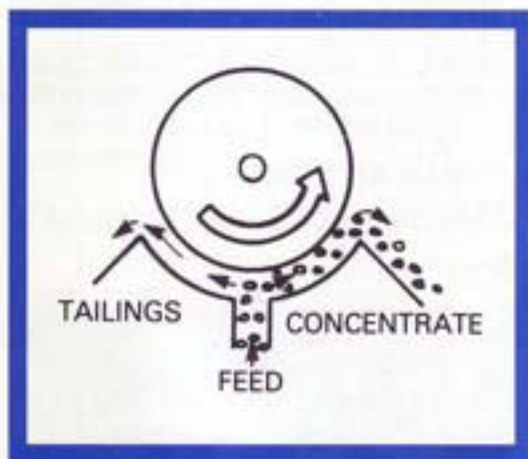
To maximise recovery of magnetic or ferrosilicon it is advised that the tailings from the first drum unit forms the feed to a second drum unit.



Counter Flow. Fig. 5.

Primarily used where surges in throughput are experienced, possibly involving high magnetics content and where magnetic material losses are to be held to a minimum whilst a clean concentrate is not of prime importance.

The particle size can be 3 - 4 mm. but preferably minus 0.5 mm. (-30 mesh) the best performance being achieved with a solids content of 30 -40% by weight.



Counter Current (Steffenson). Fig. 6.

Considered the ideal finish providing a high grade concentrate with maximum loss of fine magnetics.

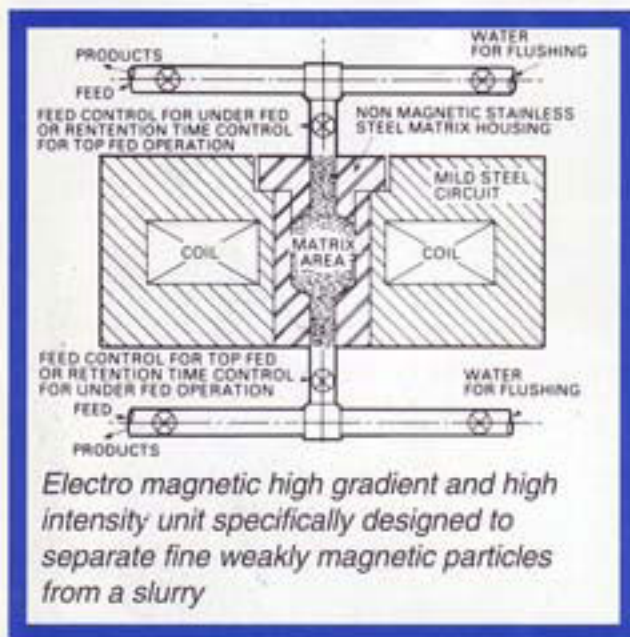
The slurry enters the casing directly beneath the drum, the casing design forces the tailings to travel one way whilst the drum cover and magnetics travel in the opposite direction.

In case the powerful washing current dislodges any magnetics the tailings are re-introduced, and re-processed.

The Complete Range of Mineral Separation Equipment

Mastermag 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.

Other products include overband separators, suspension magnets, magnetic drums and pulleys, lifting magnets and magnetic conveyors.



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