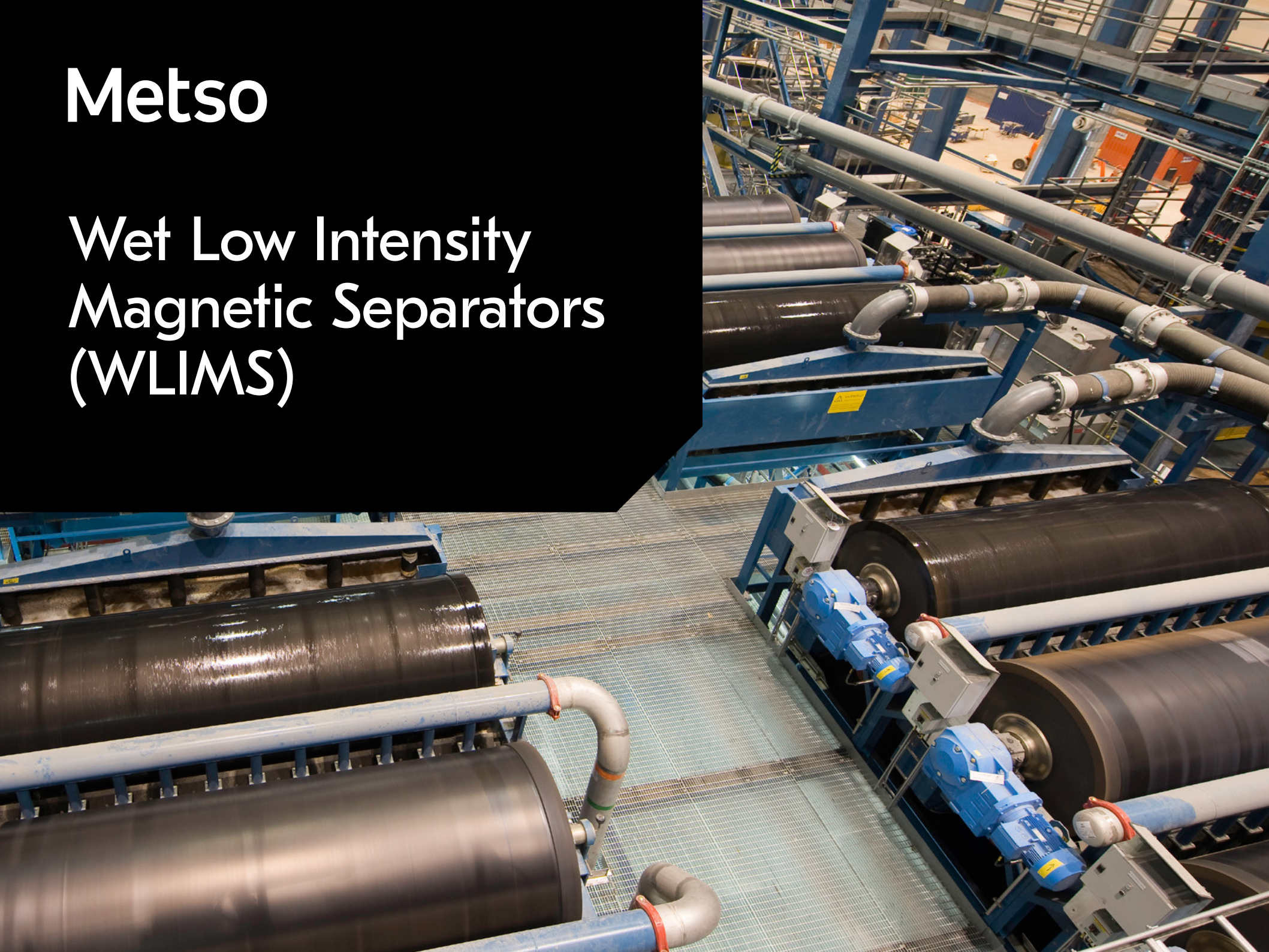
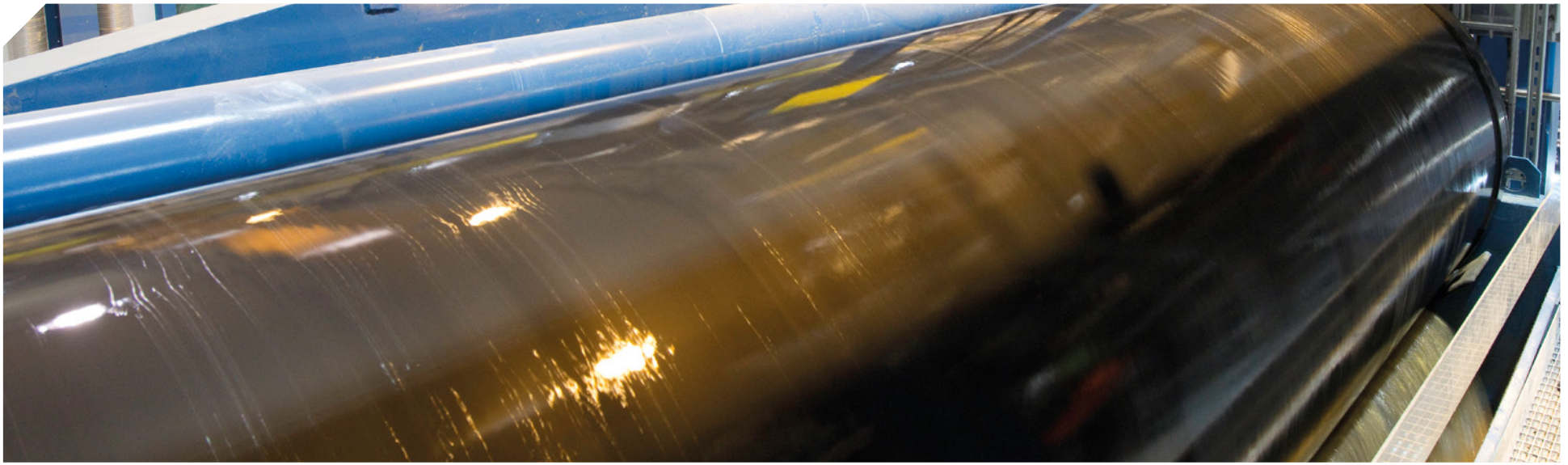
Metso

Wet Low Intensity Magnetic Separators (WLIMS)





Series WS1200 CC, CR (CRHG), DM (DMHG), DW (DWHG) and CTC

Wet Low Intensity Magnetic Separators (WLIMS)

Metso has been engaged in magnetic separation for over hundred years. Metso has produced more than six thousand magnetic separators used in both dry and wet processing.
Metso wet magnetic separators are continuously undergoing improvements to meet the ever increasing demands of our customers.
Metso has been and is still the leader in the development of high capacity, high performance wet low intensity magnetic separators (WLIMS).

Metso's wet magnetic separators are available in several sizes and tank designs in order to meet the requirements in iron ore processing. Metso has always worked closely with the iron ore industry, resulting in some unique magnetic separator features with outstanding operating performance.

Metso wet magnetic separators are available in the WS1200 series - 1200 mm (4 ft) drum diameter with drum lengths up to 3,6 m (12 ft). Two different magnet systems are available as well as five tank designs, enabling processing of the full range of magnetic ores and particle sizes.

Customers and applications
Customers for the equipment in this brochure are to be found mainly in the iron ore industries located on all continents. Large concentrator operations in the USA, Canada, Ukraine, Russia, South Africa, Sweden, Norway, Spain, Iran, and India are among Metso's customers.

Metso's customers have reported exceptionally high recoveries for specific feed tonnages. During a refurbishment of a USA plant, old units from a competitor were replaced by new Metso magnetic separators. The number of machines installed was reduced by about 80 percent. While improving both recovery and grade it also added flexibility to the plant to process various ores.

The LIMS is also operating in many other applications such as titanomagnetite production, removal of grinding media in e.g., ball mill discharge products, pyrrhotite reduction in sulphide ores, iron reduction in e.g., glass sand and feldspar production. It is also commonly installed for the removal of ferromagnetic matter ahead of WHIMS (Wet high intensity magnetic separators) or HGMS (High gradient magnetic separators) units. LIMS is standard equipment in dense media circuits.



After market services
Our greatest asset is our peoples experience assuring competent technical field services and parts supply for systems and equipment designed, manufactured and supplied by Metso.

Our safety certified field service engineers have specialized experience working on both existing and new processing equipment and systems. They are trained to search for the cause of problems and to use our knowledge of similar machines and the latest available technology to help you maintain and improve your operation.

Our technicians provide a highly specialized service to customers through our parts supply programs. Genuine replacement parts are supplied to keep equipment in productive operation with the right part at the right time.

Magnetic separation theory
The magnetic separation process is complex in many respects due to minerals varying magnetic susceptibility. the amount of middlings, and the processed ore's particle size distribution.

The magnetic force acting on a specific particle is dependent upon these factors as well as other properties such as magnetic flux and magnetic field gradient, which are created by the separators magnet system. The product of the field multiplied with the magnetic gradient, also called the magnetic force index, varies between different magnetic system designs and is a factor when selecting the most suitable magnet system for any specific purpose.

As in many applications, the magnetic force is competing with other forces such as gravity and hydraulic drag; therefore, the feed volume and tonnage must be balanced to obtain the desired level of performance.

Generally speaking, the smaller the particle size being processed is, the lower is the feed capacity of the equipment. By selecting a higher magnetic field strength (magnetic Flux density) the feed capacity can be increased considerably. In many cases the fines recovery increase significantly with the field strength.

Tank design CC and CR (CRHG)

CC – Concurrent

The concurrent magnetic separator design, features:

- Feed box with serrated overflow weir for even feed distribution.
- Feed entry section to improve on feed pulp distribution thus ensuring full width feed to the drum.
- Short pick-up zone, reducing the risk of coarse material settling in the tank.
- Exchangeable outlet spigots in the tank bottom, allowing coarse material to discharge trouble free.

Suited for processing of coarse ore up to 6 - 8 mm (3 mesh) and, with special arrangements, up to 15 mm (5/8 inch). The pulp density recommended for this type of tank is 30 to 50 percent solids by weight.

CR – Counter-rotation

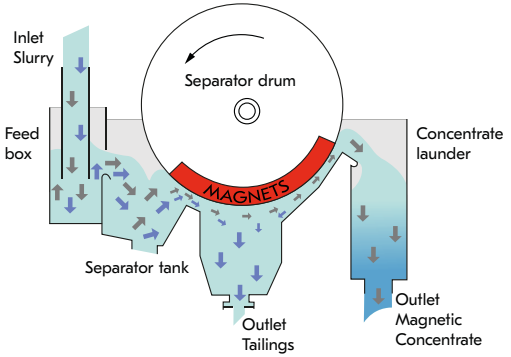
The counter-rotation magnetic separator design, features:

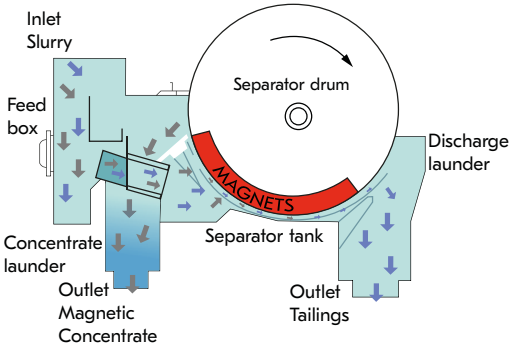
- Feed box with feed tubes.
- Feed entry section to improve on feed pulp distribution thus, ensuring full width feed to the drum.
- Long pick up zone.
- Spigot-less, full width weir with adjustable (manual) overflow discharge of the effluent for pulp level control allowing surges in feed flow.
- Feed tubes are wear protected on the outside by moulded polyurethane saddles and on the inside by polyurethane inserts.

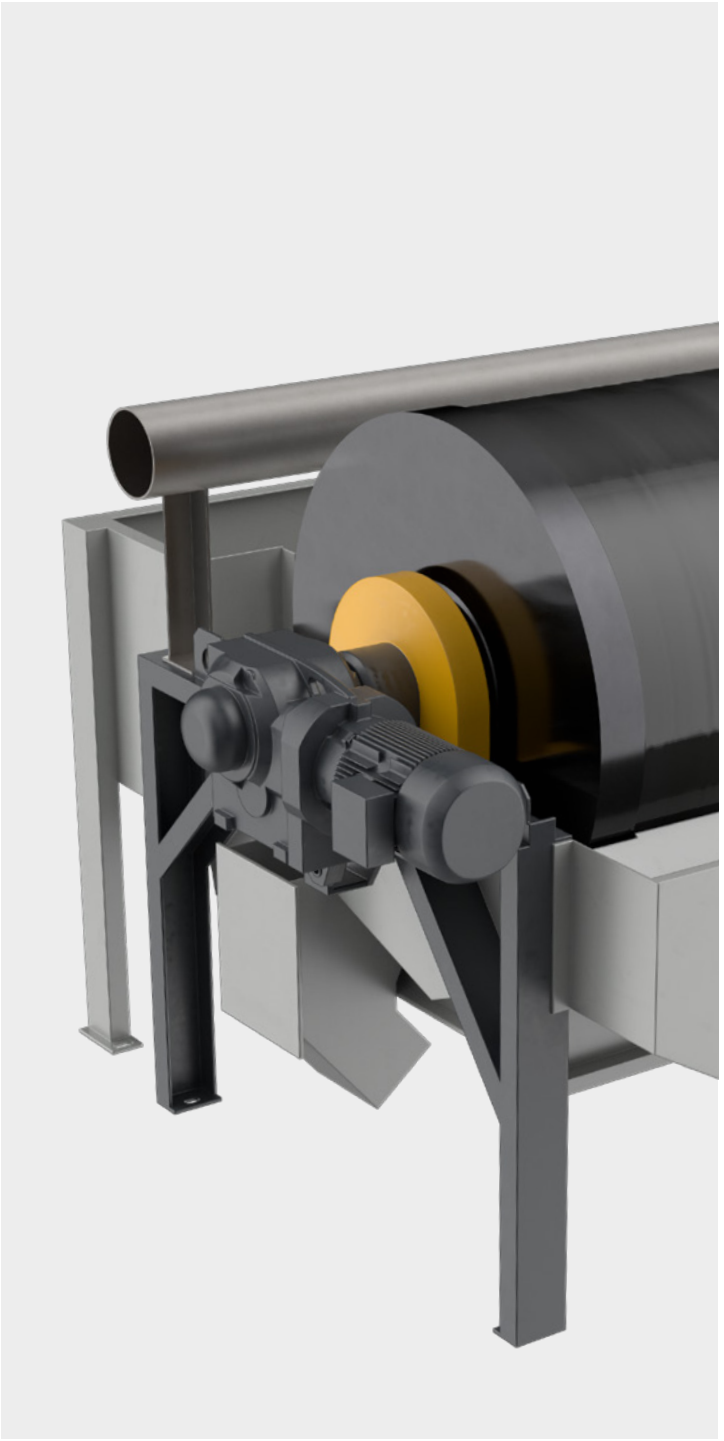
The CR tank is suited for processing medium coarse ore up to ca 3 mm (6 mesh) at medium to high pulp densities, 30 to 50 percent solids by weight.











Tank design CTC and DW (DWHG)

CTC – Counter-current

The counter-current magnetic separator design, features:

- Feed box with serrated weir overflow for even feed distribution.
- Feed entry section to improve the pulp distribution to the full width of the drum.
- Medium long pick-up zone.
- Fixed, full-width effluent overflow weir for pulp level control.

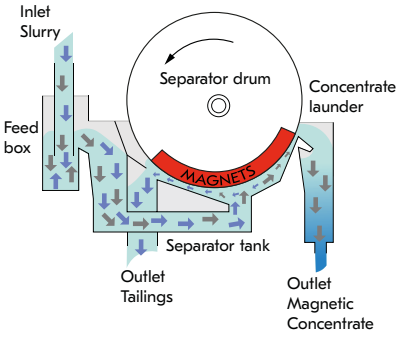
The CTC tank design is suited for processing fine to medium sized ore up to 0,8 mm (20 mesh). The pulp density range recommended for this type of tank is 25 to 45 percent solids by weight.

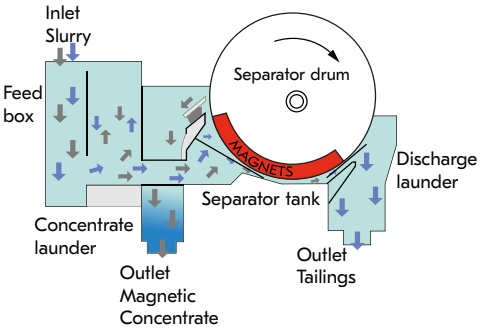
DWHG – Counter-rotation

The DWHG magnetic separator design, features:

- Counter-rotation tank design.
- Extremely long pick-up zone.
- Entry chamber designed to allow for entrapped air to escape and to improve concentrate drainage.
- Extended magnet assembly arc to compensate for disturbances due to air entrapped in the pulp.
- High gradient type magnet system assembly for fine to extremely fine magnetic material recovery.
- Full-width adjustable (manual) overflow weir for pulp level control, allowing feed flow surges.

This tank design is especially intended for the recovery of magnetic matter from dilute flotation tailings with entrapped air. Particle size limits are dependent on flow rate but up to 1 mm material will normally not cause any concern.







Features and benefits

Magnet system
The heart of the magnetic separator is the magnet assembly. Metso provides two different assemblies: high capacity and high gradient, (HG).

The high-capacity assembly is the standard magnetic system. The main differences between the two magnet assemblies are pole pitch, pole sizes, and number of poles. The magnet assemblies are similar in design with both having a number of main poles and a number of intermediate cross poles for flux control and enhancement of the magnetic performance. The magnet poles are attached to a rigid steel yoke, which, in turn, is attached to the drum shaft.

The high-capacity assembly is comprised of six main poles and four intermediate cross poles, while the high gradient assembly has twelve main poles and eleven cross poles. A special magnet assembly is the DWHG, which consists of fourteen main poles and thirteen cross poles.

The high-capacity assembly has a higher magnetic flux rating but due to its inherently lower field gradient the magnetic attraction force is actually lower when compared with the high gradient type.

The High gradient version is hence more capable of recovering material, which is finer or less magnetic; however, its capacity is reduced as its magnetic force drops off faster as the distance increases from the magnets. The high-capacity magnet system arc is 124° and has a rating of 120 mT at 50 mm from the magnet surface. The high gradient magnet system has an arc of 113° and a rating of 120 mT at 15 mm from the magnet surface. The DWHG magnet system has an arc of 133° and a rating of 120 mT at 15 mm.

Magnet drum
The magnet assembly is mounted inside a revolving drum consisting of a stainless-steel shell with aluminium (Silumine) heads. The magnet assembly is stationary but is peripherally adjustable. The drum shaft is supported by spherical roller bearings. All drum bearings are lubricated from the non-rotating shaft end.

Wear protection
The separator feed slurries are at times very abrasive and hence all tanks, boxes and launder interiors are rubber lined. The revolving drum is lined with either rubber or stainless steel and its ends are fitted with specially designed drum end collars. For some applications these wear protection measures need to be reinforced by increase of liner thickness or replacement by even tougher material such as ceramics or polyurethane.



Magnet positioning



Inside of CR feed-box



Direct gear motor drive

Adjustment of magnet and drum position
The magnet drum and magnet assembly can easily be adjusted to obtain the optimum process performance. The adjustment possibilities include

- Magnet assembly positioning in relation to concentrate discharge weir.
- Horizontal positioning of drum
- Vertical positioning of drum

Feed boxes
The primary slurry distribution system to the separators feed boxes is normally not part of the equipment supply; however, Metso can optionally supply or advise on solutions for such systems.

All feed boxes are normally made from mild steel and rubber lined. Rubber lined stainless steel boxes are available on request. Other feed boxe features are:

- For models CC and CTC the overflow weir is serrated for more even pulp distribution over the drum length.
- The CR model feed box discharges through a number of PU-lined steel tubes into the separator tank

Drum drive system
The drum on any Metso magnetic separator has a drive shaft, which can be adapted to any type of drive. The drive components position is favourable since they are located outside the tank, away from pulp splashes and water.

Our experience shows that the drum speed is very seldom altered and hence most of our separators have been delivered with direct-drive geared motors.

This system has proven to be safe, efficient, clean, and quiet and requires very little maintenance.

The normal peripheral speed of the drum is 1,2 m/s unless another drum speed has been agreed upon.

Metso is a frontrunner in providing sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. By helping our customers increase their productivity, improve their energy and water efficiency and environmental performance with our process and product expertise, we are the **partner for positive change.**

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