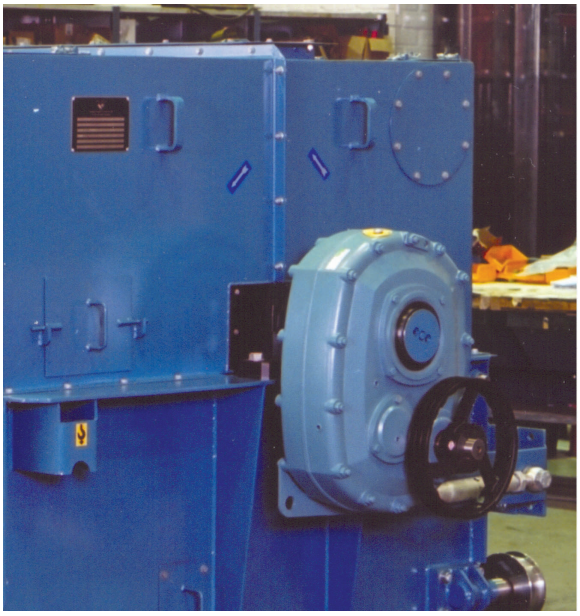
Drum separators

Dry low intensity magnetic separation

Metso dry drum separators have been developed mainly for dry separation of ferromagnetic ores with particle sizes finer than 20 mm. In addition to this conventional application, the dry drum separator has found a wide range of other applications such as:

- Iron and steel slag treatment
- Reduced pyrite ash separation
- Calcined ilmenite production
- Metal powder production
- Supergrade magnetic concentrate production
- Removal of ferromagnetic particles prior to highintesity magnetic separation
- Control of iron contamination in glass sand production.



Efficient separation can be obtained with particle sizes in the range of 0.01 to 25 mm. By utilizing separators with different drum speeds, it is often possible to obtain a high grade concentrate with middlings and tailings as separate products.

Often, dry magnetic separation can be more flexible than conventional wet magnetic separation and can provide large savings in grinding costs by recovering the valuable minerals at an early process stage.

Design

The dry drum separator consists of a stationary magnetic yoke with a number of permanent magnets placed insidea rotating drum of non-magnetic material.

The magnets have alternating polarity and are normally of strontium-ferrite. The revolving drum is made in two versions:

1) for low speed, stainless steel with a replaceable wear cover of rubber, polyurethane or stainless steel and,

2) for high speed, reinforced plastic with rubber or polyurethane wear protection.

The magnetic drum assembly is contained in a dust proof housing with an opening at the bottom for discharge of both magnetic and non-magnetic products. These products are separated by means of a splitter placed under the drum inside of the housing. The whole unit can be dust vented by connecting the plant exhaust system to the outlet provided on the housing.

Parts of the housing exposed to wear are normally protected by replaceable rubber or steel wear plates. Inspection of the drum and housing is made through inspection hatches. The housing is easily dismantled for erection and maintenance.

The feed arrangement is dependant upon local conditions. For run-of-mine fines, a belt feeder is recommended. For other materials, a vibrating feeder, (or in the case of dusty material, completely covered drum feeders) can be used. The housing is equipped with a standard replaceable feed chute.

To meet the various requirements the separators are manufactured with two different drum diameters; i.e. 916 and 1200 mm and drum lengths from 300 mm to 3000 mm in. The separator design allows for an easy combination of drums into double- or triple- drum units.

For more information, contact your local Metso representative. www.metso.com
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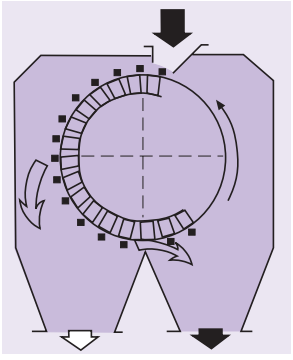
Drive

The drive is normally comprised of a speed reducer, V-belts, pulleys, and motor. The adjustment of the separator drum speed is easily achieved by changing V-belt pulleys when the change is reasonably small. Normally the drum peripheral is set between 1 and 6 m/s but applications with speeds up to 9 m/s exist. Optionally, the separators can be supplied with a variable speed drive. For sizing of drives and motors, Metso should be contacted.

Product chutes under the drum housing are normally not provided as these are often designed to fit local conditions. Metso will assist with these upon request.



Operation principles

The material to be separated is fed on top of the moving drum and accelerated by the drum. The non-magnetics are thrown off by the centripetal force while the attached magnetics form clusters in the magnetic field which covers 50% of the circumference of the drum. The clusters follow the rotating drum to the discharge point and are discharged in the concentrate chute.

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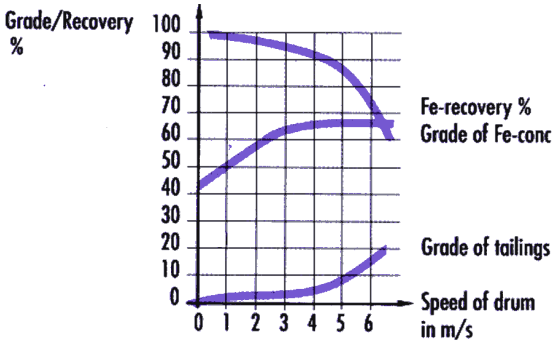

Capacity

The capacity per meter of drum length varies from about 10 to 200 metric tons per hour depending on the particle size of the feed and its magnetic properties. The use of multiple drum units will generally increase the overall separation capacity.

Prior to final selection of equipment, it is recommended that careful laboratory and pilot plant studies of the ore to be treated be performed to determine optimum selction of equipment.

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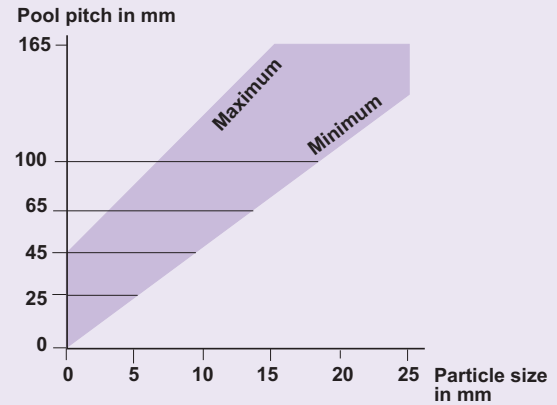
Selection of pole-pitch

The pitch of the magnetic poles is of great importance and is chosen to suit the particle size and magnetic susceptibility of the material to be handled. Standard separators can be supplied with magnet assemblies having 25, 45, 65, 100 and 165 mm pole pitch. A guidance in the selection of pole pitch is given by the graph below.

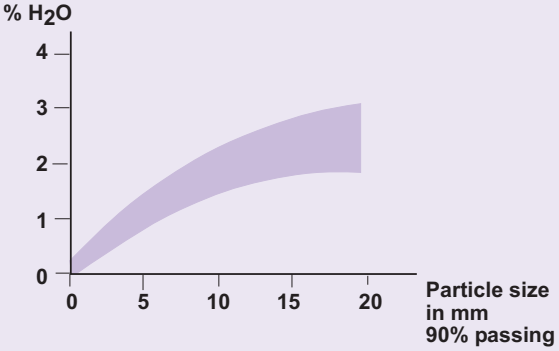
The final selection of pitch may differ.



Selection of pole pitch

Moisture limit in feed

The limit of the moisture content normally acceptable in the feed is illustrated below.



Maximum allowable moisture content in feed

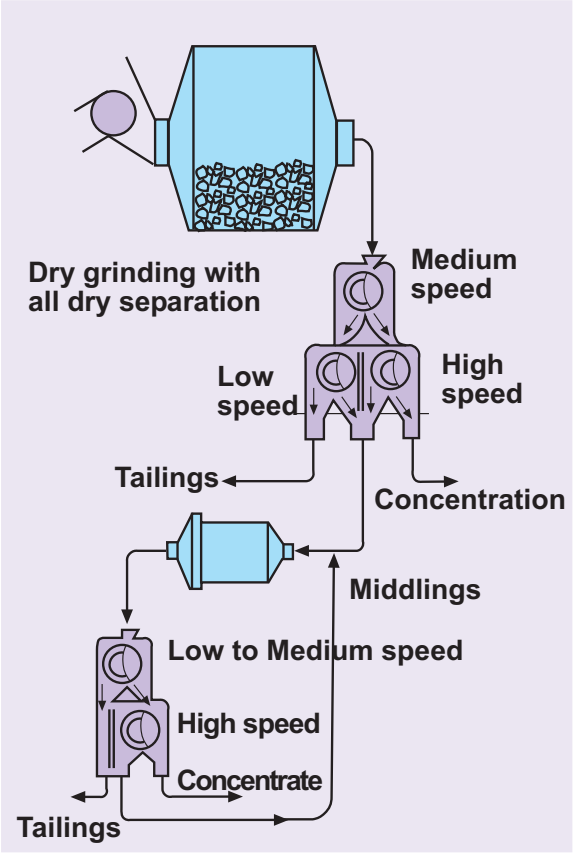
The graph does not show absolute limits which have to be determined by testing.

Flowsheet

If only a two product split is required, the separation is usually made on one drum. This is often the case in cobbing of magnetite, cleaning of feed to high intensity magneticseparators, and extracting metal from slag. Preconcentrate is cleaned on a second drum at higher speed where a final concentrate and middlings are obtained.

In a three-drum separator system, the first drum is run at medium speed to divide the feed material into low and medium grade products. The low grade product is retreated on a low speed drum to produce barren tailings and middlings. The medium grade product is cleaned on a high speed drum to produce high grade concentrate and middlings. The three drum arrangement is recommended whenever good control of all three products is required.

The typical flow-sheet is shown in the below figure, which also depicts a middlings processing stage.



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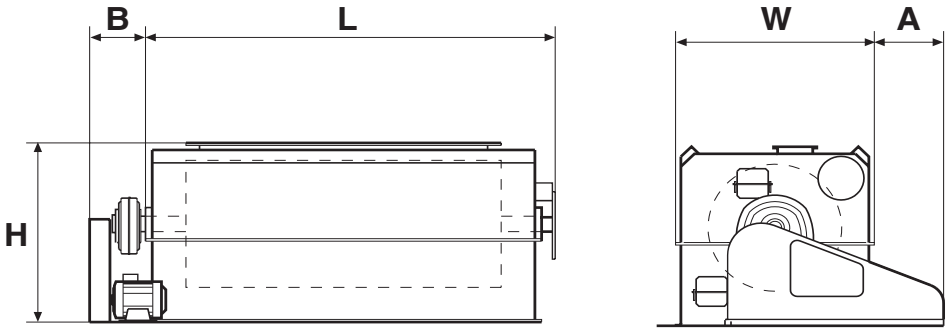
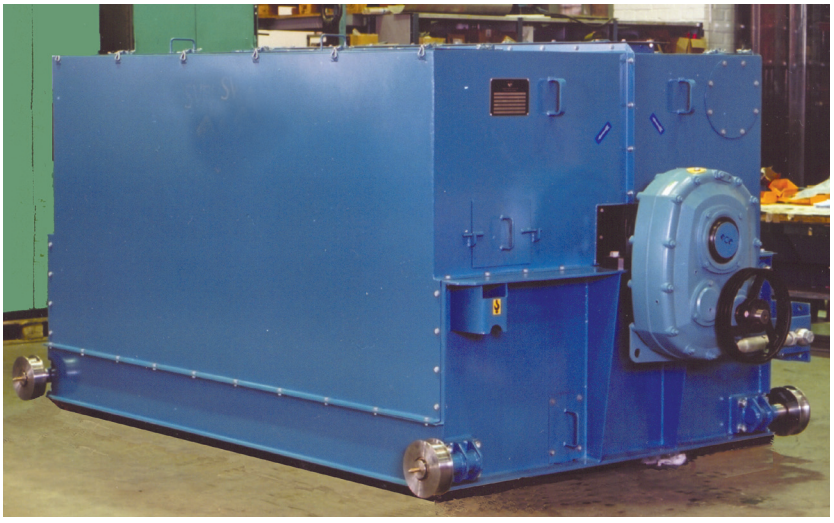
Dimensions



Model	Drum mm (ft) D x L	H mm (inch)	L mm (inch)	W mm (inch)	Power kW/hp	Weight ton
DS 903	916 x 300 (3 x 1)	1 400 (55)	1 242 (49)	1 360 (54)	4.0/5.5	1.2
DS 906	916 x 600 (3 x 2)	1 400 (55)	1 550 (61)	1 360 (54)	4.0/5.5	1.6
DS 912	916 x 1 200 (3 x 4)	1 400 (55)	2 166 (85)	1 360 (54)	5.5/7.5	2.5
DS 915*	916 x 1 500 (3 x 5)	1 400 (55)	2 474 (97)	1 360 (54)	5.5/7.5	2.9
DS 918	916 x 1 800 (3 x 6	1 400 (55)	2 782 (110)	1 360 (54)	7.5/10	3.2
DS 924	916 x 2 400 (3 x 8)	1 400 (55)	3 398 (134)	1 360 (54)	7.5/10	3.9
DS 1206	1 200 x 600 (4 x 2)	1 670 (66)	1 550 (61)	1 844 (73)	5.5/7.5	1.8
DS 1212	1 200 x 1 200 (4 x 4)	1 670 (66)	2 166 (85)	1 844 (73)	5.5/7.5	2.8
DS 1215*	1 200 x 1 500 (4 x 5)	1 670 (66)	2 474 (97)	1 844 (73)	7.5/10	3.2
DS 1218	1 200 x 1 800 (4 x 6)	1 670 (66)	2 782 (110)	1 844 (73)	7.5/10	3.5
DS 1224	1 200 x 2 400 (4 x 8)	1 670 (66)	3 398 (134)	1 844 (73)	11/15	3.9
DS 1230	1 200 x 3 000 (4 x 10)	1 670 (66)	4 014 (158)	1 844 (73)	11/15	5.0

*Max lenght – high speed plastic drum



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