Pan Feeders
Osborn Pan Feeders (Volumetric Feeders)

The main feature of this feeder is the low power consumption, low noise and little maintenance required.

Osborn Pan Feeders are generally installed at a 10 degree downslope to provide the best efficiency for the free flow of material. Fitted with replaceable liners and can be floor or suspension mounted.

Skirt boards should be fitted to give an approximate clearance of 30 mm minimum between the deck and the side plates when operating with 4 pole motors and 60 mm for feeders with 6 pole motors.

These recommended clearances are measured at the feed end of the deck and will increase to approximately double at the discharge end.

Of significant importance when installing an Osborn Pan Feeder is the design of the feed hopper. (see hopper/chute design)

Incorrect hopper design will cause the feeder to underperform to the specified duties. Osborn Pan Feeders are manufactured in many different widths and lengths from 300 mm wide up to a 2400 mm wide and up to 4000 mm long.

Vibrating Feeders – Types of Drive Mechanism

Twin Motor Type (OBEX)
Two vibrating motors fitted to the rear of the feeder rotate in opposite directions, synchronise and impart a vibrating force in a longitudinal direction to a desired stroke angle. This action lifts the material and carries it forward on each rotation providing a constant feed rate. The amplitude can be varied by adjusting the out-of-balance weights on the vibrating motors to a required stroke length.

Double Shift Type (Linear)
A three way motion, horizontal, vertical and elliptical is generated by mounting the eccentric shafts on a horizontal plane and by making use of the resulting moment arm effect caused by the spacing of the shaft centres. Thus the feed material is thrown upward and forward on an elliptical path with a turning action before it free falls back to the feeder pan bed. This motion provides higher capacity, faster conveying, more consistent feed rate and an even spread of product over the width of the feeder. Self-counterweighted shafts connected to wide faced helical gears and an oil splash lubrication system are the main components of this highly successful design.

Gearbox Driven (GBEX)
This extremely robust drive unit is designed for high performance in exciting large masses of material with a linear vibratory movement. A pair of matched low noise gears with splash lubrication transmit torque to the two unbalanced weights. Each weight also has 3 additional weights for adjustment of the out-of-balance moment. Shafts are supported by heavy duty roller bearings lubricated with an oil mist. Forces can be significantly increased for very large feeders by connecting multiple drives on a common beam with Cardan shaft connectors. This exciter drive offers outstanding reliability of operation and is designed for continuous operation.

Vibrating Feeders with 10 Tonnes/Hour to 3 500 Tonnes/Hour Capacity

Osborn feeders all work on the same principle, that being the extraction of materials from under crushers, bins, hoppers etc, or fed by a conveyor with a regulated flow to promote a steady supply to maximise production in the processing plant.

Sometimes fed by a dump truck or a front end loader, or directly from under a stockpile. Whatever type of feed is required and dependent upon the type of the feeder installed, the feed rate is controlled by the machines vibration frequency and often the controls, which can be manual or automatic and can be programmed to receive a signal from a PLC.

Osborn OBEX Pan Feeder

Osborn OBEX H.D. Pan Feeder

Osborn Linear Pan Feeder
Recommended Hopper Design

For optimum performance from an Osborn feeder it is important to pay attention to the design of the feed hopper. Incorrectly designed hoppers will result in substantially reduced feeder capacities by as much as 30%. The hopper opening must be large enough to allow the maximum size piece of material to flow through.

- The rear face of the hopper should be at approximately 60 degrees to ensure flow from the rear of the hopper.
- The front wall should be sloped at 5 degrees less than rear wall and typically set at 55 degrees. If the slope is too shallow a build up of material above the gate opening could occur whilst too steep a slope may cause irregular flow patterns within the hopper.
- The gate height \( H \) should be a minimum of twice the diameter of the largest particle of material.
- The hopper throat opening \( T \) should be approximately half the gate height. A ratio of throat \( T \) to gate height \( H \) should ideally be 0.6 to provide a uniform flow of material to the feeder deck. With these parameters, the material at the front and rear ends of the hopper should move at the same velocity and the discharge depth \( D \) is closely equal to the hopper gate height.
- Skirt boards should be vertically clear of the feeder pan by a minimum of 50 mm and horizontally by 75 mm when the feeder is in a no load condition. Side skirts should be tapered away from the feeder trough and be clear of the feeder sidewalls by a minimum of 12 mm, this is to minimise material being wedged between the skirts and the trough deck.
- The length of the feeder is determined by the angle of repose of the material from the gate point to the feeder pan plus approximately 150 mm.
- The feeder must be free to vibrate and must not be in any contact with any stationary structure.

Osborn Spreader Feeder

Designed to accept a fast material flow from a relatively narrow feed and convert this into a low velocity and uniform flow across the width of the machine. The Osborn spreader feeder is highly recommended for this.

These feeders are capable of handling a wide range of products including materials such as damp clay and limestone and are ruggedly built for arduous trouble free service. There are two types of Osborn spreader feeders. These are:

Transverse Feeder
The transverse feeder is available in four sizes being suitable for feeding the 1.0, 1.5, 2.0 and 3 meter wide sizers and screens. They are suitable for accepting a feed and turning through 90 degrees into a steady and continuous flow across the width of the screen feed plate. Occasionally they can be supplied to feed two machines mounted in parallel.

Central Feeder
The central feeder again is available in four sizes suitable for feeding the four widths of the sizer and screens. They accept a central feed and spread the material sideways in two directions across the width of the screen feed plate.

All feeders are powered by twin vibrators attached to the machine frame. These will be either 1440 RPM or 960 RPM.
**Vibrating feeders – Trough Liners**

Depending on the abrasiveness and flowability of materials to be handled by the vibrating feeder, a selection of different liners is available to suit these applications.

**VARN L500 LINER**
Often used as it is easily replaceable and has good AR (abrasion resistant qualities). A very cost effective choice of liner.

**CERAMIC LINER**
Has approximately a 92% Alumina content which delivers long life and reduced wear. Often selected for handling extremely abrasive materials.

**RUBBER LINER**
Can be used for handling wet sticky materials such as wet coal and due to the nature of the rubber it has a self-cleaning effect.

**POLYURETHANE LINER**
Very similar application to rubber. Good for wet materials and where less impact is present.

**POLY-HISOLIDUR LINER**
Used to handle very sticky materials and has a low co-efficient of friction.

**STAINLESS STEEL 304 OR 3CR12 LINER**
Not often used due to high cost but would suit the food industry.

**Reciprocating Plate Feeder (Push-pull Feeder)**

The reciprocating plate feeder is generally installed at a primary crushing site and receives a positive feed of material from a bin or hopper. Its "push-pull" action is generated by a link arm that is connected to a crank shaft which in turn connected to a variable or fixed speed drive unit.

Plate feeders generally operate at low frequencies. Often used in the drawdown of a coal stockpile where large lumps and moisture in the coal is being handled as the flow characteristics of coal are perfect for a reciprocating plate feeder. The hopper or bin cannot be emptied by the plate feeder and feeding is discontinuous thus ensuring a cushion of material on the plate to protect the feeder. The feeding of the material takes place in the return stroke only due to the reciprocating action. The main advantages of a plate feeder over other feeding equipment are:

- Minimum damage from impact of large lumps due to cushion of material on the plates
- With no carry-back of material, plate feeders operate with minimum spillage
- Wedging damage is minimal
- Low maintenance and operating costs

**Vibrating Pan Feeders - Application Data Sheet**

Depending on the abrasiveness and flowability of materials to be handled by the vibrating feeder, a selection of different liners is available to suit these applications.

**TYPE OF MATERIAL**

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**DRY BULK DENSITY t/m³**

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**MAX FEED SIZE [mm]**

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**MOISTURE CONTENT %**

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**CAPACITY tph**

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**PARTICLE DISTRIBUTION**

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**APPLICATION**

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**QUESTIONS**

- Is the Feeder being fed?
  - Yes
  - No
  - Tick where applicable

**COMMENTS**