

Ask Orange™

Provides solutions
to process problems



How To

Choose & Use Vibratory Screen Separators

*Complete guide to
Industrial Screening Applications*



*World authority in advanced
technology for magnetic, vibratory
and metal detection applications.*

It's not magic...it's ERIEZ

HOW TO CHOOSE AND USE VIBRATORY SCREEN SEPARATORS

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Ask Orange™ is a collection of process solution case studies and how-to reference manuals designed to improve understanding and simplify specifying sophisticated magnetic, vibratory and metal detection equipment needed in most process industries. Most of this equipment requires an understanding of its intended use in order to determine proper application.

The "Professor" icon has been developed to help customers identify Ask Orange™ material in printed trade publications, company literature and on its web site. The Ask Orange concept and related images are a tribute to the company's founder, Orange F. Merwin, and his innovative ideas using magnets to remove metal contamination from various process flows.

HOW TO CHOOSE AND USE VIBRATORY SCREEN SEPARATORS

Screen separators are used to remove foreign or other unwanted material from product flows. They can classify dry bulk solids ranging from chunks to fine powders. Screen separators are used to separate solids and liquids in a variety of applications. Eriez provides a broad range of screeners for both wet and dry product separation. This book, "How to Choose and Use Vibratory Screen Separators" as written, is intended to help users select the correct vibratory screener for their particular process.

DEFINING EQUIPMENT TERMS

Circular Vibratory Screeners

Circular screeners feature a gyratory motion to move wet or dry product down and through a series of "decks", each with its own screen and with its own discharge spout. Depending on the end product, one, two, three or even four decks can be used to attain the desired degree of fineness. Generally, the gyratory motion is gentler and is ideal for more fragile product. A variety of mesh screens are available for each deck and to meet your specific need, decks are available in six sizes. Circular screeners are used for processing slurries, waste water, minerals, chemicals and other dry or dewatering applications. These popular screeners separate and size materials ranging in size from 1/4 inch (6mm) to 40 mesh.

Rectangular Vibratory Screeners

Rectangular vibratory screeners are available in a wide variety of sizes and shapes. Recommended screens range from 20 mesh up to 1/2 inch (12mm) size used for scalping. Rectangular vibratory screeners have a totally enclosed patented magnetic drive and can screen practically any bulk material from micro size to bulky chunks.

Mechanical Screeners

These screeners are relatively simple, rugged vibratory machines designed to handle a variety of bulk material. The screener is a tuned two-mass vibrating system excited by a motor driven eccentric weighted shaft. Corrosion resistant rubber springs transmit the exciting force and can "fine tune" the motion of the trough optimizing the flow rate for a specific application. Mechanical screeners are available in a wide variety of sizes, shapes and deck types.

These screeners will covered in more detail later.



Did you know?

The term "scalping" refers to the removal of large chunks from a typically smaller bulk material. Scalping removes these pieces early in the process flow to allow finer screening down stream.

CIRCULAR VIBRATORY SCREENERS

Eriez offers two types of circular vibratory screeners...Syncro-Sizer® and Syncro-Sieve®. These high capacity gyratory screeners are designed for high viscosity liquid/solid separation, and wet or dry classification. The separators are easy to use when tuning for specific feed rate, product and separation requirements. Both models are used with circular screens mounted in decks which can be used singularly or in multiples.

Syncro-Sizer®

Eriez' Syncro-Sizer® is a gyratory screen separator designed for high capacity separation by size of dry materials, and for wet separations when oversize material constitutes a large percentage of the feed.

The Syncro-Sizer separates and sizes materials from 1/4 inch (6mm) to 40 mesh in size. Because of its unique motion, the Syncro-Sizer provides outstanding accuracy, capacity and overall efficiency. It is ideal for food, chemical, metallic and nonmetallic mineral, pharmaceutical, abrasive, ceramic, plastic and other process industries.

The adjustable frequency of up to 1450 cycles per minute and a variable horizontal and vertical stroke are ideally suited for stratifying the material in seconds and directing it in a controlled pattern over the screen face and to the discharge. Adjusting the dual eccentric weights easily controls the flow pattern of material over the screen and the speed with which it is conveyed to the periphery.

The off-the-shelf motor that can be purchased anywhere and easily installed, is mounted on the stationary base of the screener. Motor life is increased because the motor is isolated from the motion generator.



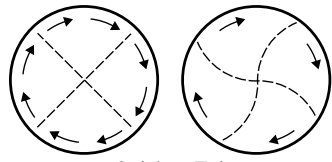
CIRCULAR VIBRATORY SCREENERS

Syncro-Sieve

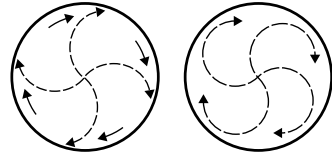
Eriez' Syncro-Sieve is an economical, quality fixed-rate separator. Powered by an "off-the-shelf" rotary motor with an adjustable weight system that can be varied to increase or decrease product retention time, the Syncro-Sieve is ideal for processing slurries, wastewater, minerals, chemicals and other dry or dewatering applications.

Under normal use, the Syncro-Sieve will provide years of trouble-free operation.

Typical Flow Patterns...depending on how the eccentric weights are positioned in your Syncro-Sieve, the flow pattern on the screen deck(s) may be varied to improve separation. The diagram below demonstrates these various patterns. The instruction manual which accompanies each Eriez Syncro-Sieve describes the method for making the appropriate adjustments.



Quickest Exit



Longest Retention

MATERIAL & PROCESS CONSIDERATIONS

As is the case with other types of process equipment, more than one type of screener can accomplish the same task. Each type of screener mentioned above has certain attributes making it the preferred equipment for certain applications.

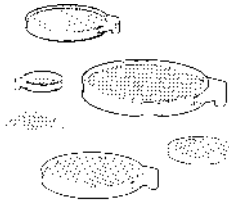
In similar applications, circular screeners are slightly more expensive than mechanical or rectangular vibratory screeners. However they tend to be more compact and thorough as the material is presented repeatedly to the same "hole" as it circles the screening medium. Circular screeners are limited by their total capacity and particle size being screened.

Rectangular vibratory screeners can effectively screen many of the same materials typically run through circular screeners. However these units also perform well in heavy-duty applications. Both rectangular vibratory and mechanical screeners offer greater screening surface area enabling them to process higher volumes and larger particle sizes.

Mechanical screeners are lower cost, simple units that provide effective screening of many bulk materials.

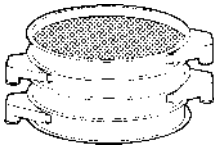
DECKS AND SCREENS FOR CIRCULAR VIBRATORY SCREENERS

Circular Screeners - Components



Circular screeners are available in six different sizes to meet process applications from a trickle of material or tons per hour.

Multiple Decks



Single or simultaneous multiple separations can be obtained by the use of one, two, three and sometimes four decks.

Straight Frame Decks



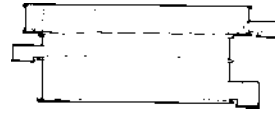
The straight frame is designed for use where normal volumes of material are to be discharged from the top of the screen.

Collector Frame Decks



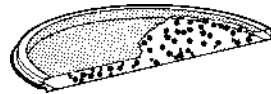
The trough-type design quickly gets large volumes of material off the top of the screen and conveys it to discharge points.

Deck Interchangeability



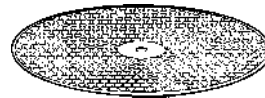
There is complete interchangeability between decks. You can use straight frame or collector frame decks as needed to suit your particular application.

Anti-blinding Ball Deck



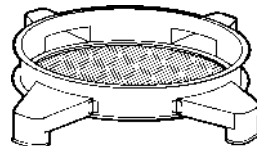
If ball decks are needed to prevent screen blinding, they are available. Slider discs are also available.

Perforated Screen Decks



Custom-made decks to meet the precise requirements of special applications can be quickly provided.

Discharge Spouts



Depending on the application, one to four discharge spouts can be mounted on a single frame. Each additional spout greatly increases capacity of the screener.

DECKS AND SCREENS FOR CIRCULAR VIBRATORY SCREENERS

Choice of Table Frames

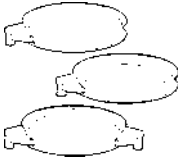
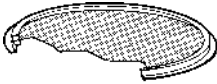


Table Frames Choice Standard dish bottom table frames are available for all size separators. Slant bottom and double-diverter frames are available for 36 inch through 60-inch units at no extra cost.

Maximum Screen Usage



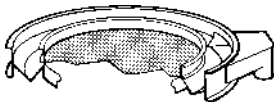
The special "Z" ring used on separator screens normally eliminates the center support ring. There is no guessing about whether or not your screen is properly tensioned, and there are no wires being pulled away from the center disc because of under or over tensioning. The "Z" rings are sturdy enough to be rescreened but inexpensive enough to be discarded.

Center Disc Screens



For extra heavy material where center screen support is occasionally necessary, center hold downs to keep the screen properly tensioned are available.

Buffer Ring



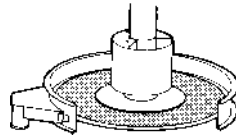
A buffer ring, used mostly in dewatering operations, is available if your material needs to be retained on the screen for a longer period of time before being circle.

Distribution Pan



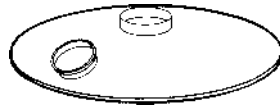
When your material needs to be channeled back to the center of the next screen down, a distribution pan is attached to the bottom of the existing overhead frame.

Wet Feed Distribution



The distribution for wet processes lets the liquid flow through while the solids are directed outward in a full circle.

Covers



Tight-fitting covers with a gasketed inspection port are available to keep product in the unit where it belongs.



Did you know?

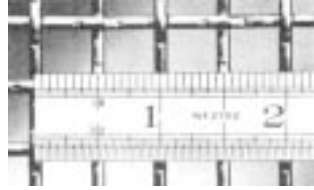
Eriez Magnetics maintains the world's most complete magnetic and vibratory testing laboratory. You eliminate guesswork when tests determine what particular problems may be involved with your products before a separator is installed in your plant.

SCREEN SELECTION GUIDE

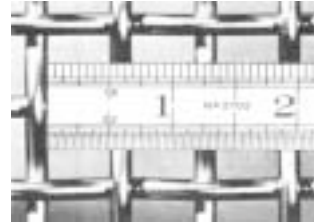
Screen wires both market grade and tensile bolt cloth are made of 300 series stainless steel. Screens finer than 6 mesh are made of 316 stainless steel and screens 6 mesh or larger are normally 304 stainless.

Screen mesh is defined as the number of openings per linear inch, counting the number of openings from the center of one wire to a point one inch distant (see illustration below).

Space cloth screen is defined in terms of actual opening size or space between wires. The term space cloth is used for more “open” weaves. When specifying space cloth state both the opening in inches and the desired wire diameter.



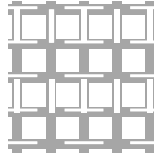
2 Mesh (Market Grade)
2 openings for 1” distance
from center to center of wires.



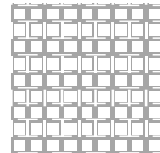
Tensile Bolt Cloth
1/2” opening clear space
between wires (.162” diameter wire).

Market Grade Screen			
Mesh	Wire Diameter (inches)	Opening (inches)	Open Area (%)
2	.063	.437	76.4
3	.054	.279	70.1
4	.0475	.2023	65.9
4	.063	.187	56.0
5	.041	.159	63.2
6	.0348	.1318	62.7
7	.035	.108	57.2
8	.0286	.0964	60.2
10	.0258	.0742	56.3
11	.018	.073	64.5
12	.0230	.0603	51.8
14	.0204	.0510	51.0
16	.0181	.0445	50.7
18	.0173	.0386	48.3
20	.0162	.0340	46.2
24	.0140	.0277	44.2
30	.0128	.0203	37.1
35	.0118	.0176	37.9
40	.0104	.0150	36.0
50	.0090	.0110	30.3
60	.0075	.0092	30.5
80	.0055	.0070	31.4
100	.0045	.0050	30.3
120	.0037	.0046	30.5
150	.0026	.0041	37.9
200	.0021	.0029	33.6
250	.0016	.0024	36.0
325	.0014	.0017	30.5
400	.0010	.0015	36.0

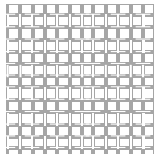
Market Grade Screen



Market Grade – 4 Mesh



Market Grade – 8 Mesh



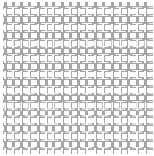
Market Grade – 11 Mesh



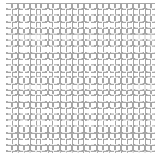
Market Grade – 80 Mesh

SCREEN SELECTION GUIDE

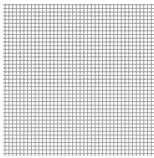
Tensil Bolt Cloth



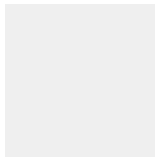
Tensil Bolt – 16 Mesh



Tensil Bolt – 22 Mesh



Tensil Bolt – 36 Mesh



Tensil Bolt – 120 Mesh

Did you know?

Screens with the same size openings may not have the same amount of total “open” area. In some cases Tensil Bolting Cloth Screens can provide up to 30% more open area than Market Grade Screens. The more open screen area the more volume can be processed. For help selecting the proper screen type, contact Eriez' Vibratory Sales Department.



Tensil Bolt Cloth Screen			
Mesh	Wire Diameter (inches)	Opening (inches)	Open Area (%)
14	.009	.0620	76.4
16	.009	.0535	73.3
18	.009	.0466	70.2
20	.009	.0410	67.2
22	.0075	.0380	69.7
24	.0075	.0342	67.2
26	.0075	.0310	64.8
28	.0075	.0282	62.4
30	.0065	.0268	64.8
32	.0065	.0248	62.7
34	.0065	.0229	60.7
36	.0065	.0213	58.7
38	.0065	.0198	56.7
40	.0065	.0185	54.8
42	.0055	.0183	59.1
44	.0055	.0172	57.4
46	.0055	.0162	55.8
48	.0055	.0153	54.2
50	.0055	.0145	52.6
52	.0055	.0137	51.0
54	.0055	.0130	49.4
58	.0045	.0127	54.6
60	.0045	.0122	53.3
62	.0045	.0116	51.7
64	.0045	.0111	50.7
70	.0037	.0106	54.9
72	.0037	.0102	53.8
74	.0037	.0098	52.7
76	.0037	.0095	51.7
78	.0037	.0091	50.6
80	.0037	.0088	49.6
84	.0035	.0084	49.8
88	.0035	.0079	47.9
90	.0035	.0076	47.8
94	.0035	.0071	45.0
105	.0030	.0065	46.9
120	.0025	.0058	47.3
145	.0022	.0047	46.4
165	.0019	.0042	47.1
200	.0016	.0034	46.2
230	.0014	.0029	46.0

RECTANGULAR (LINEAR) VIBRATORY SCREEN SEPARATORS

Eriez' rectangular screeners are power by a patented AC electromagnetic drive that provides a simple yet powerful solution to difficult material screening applications. All of these drives and their operation are covered in detail in Eriez' "How to Choose and Use Vibratory Feeders and Conveyors" manual...download a copy at eriez.com.

Rectangular vibratory screeners efficiently screen and separate a variety of materials. Eriez recommends screens from 20 mesh to 1/2 inch (12mm) size typically used for scalping.

These screeners, with their totally enclosed patented magnetic drive, can screen practically any bulk material from micron size to bulky chunks. Simple AC controls operate the screeners with "watch-like" precision. In addition, you get all the features that for years have made Eriez screeners the leaders in quality and dependability.

Eriez has standard and heavy-duty models for most screening applications. Special units can be ordered with multiple drives for greater capacities. A wide variety of standard and special trays are also available.

Grizzlies and Special Trays

Vibratory screeners with grizzly trays are used in scalping or coarse screening operations. Screened trays provide greater control than grizzly trays. Screened trays separate material by size, dedusting or dewatering. Either tray choice coupled with Eriez' AC drives retains the advantages offer gentle material handling and accurate control of feed rates.



Model 85B Grizzly to de-lump iron ore.



Model 75B Grizzly to de-dust limestone.



Model 85B Screening Tray with perforated deck to remove oversize lumps.



Did you know?

Eriez' experience in designing trays for special applications, along with the computerization of vibratory screener variables, means that unusual application requirements can be met quickly and economically.

RECTANGULAR (LINEAR) VIBRATORY SCREEN SEPARATORS



Model 65B Two-deck Screener for separating clumps and fines from plastic pellets.



A two-deck screening feeder discharges oversize and undersize products to one side while the desired material flows off the end.

Model 52A with a stepped screen mounted on a portable cart.



Model 70B Vibratory Sand Classifier used in conjunction with wood-fired boiler, to reclaim unburned wood for recirculation through boiler. Screens are used to sift out ash and sand.

MECHANICAL SCREENERS

Eriez' Model HVS Mechanical Screeners are simple, rugged vibrating machines designed to handle a variety of high volume bulk materials screening.

The screener is a turned two-mass vibrating system excited by a motor-driven eccentric weighted shaft. Corrosion resistant rubber springs transmit the exciting force and can "fine tune" the motion of the trough to optimize the flow rate for a specific application.

Features

- Adjustable-angle rubber springs
- Low profile - minimum headroom
- Flow rates to 100 ft./min. (30 mpm)
- Simple, stable variable controller
- Separately mounted components for easy maintenance
- Low power requirement
- Heavy duty construction

These mechanical screeners are well suited for handling high volumes of bulk materials reliably and economically.

This screener is two-mass vibrating system, spring coupled, excited by a motor-driven eccentric shaft. The adjustable-angle rubber springs - each of which can be removed and replaced in less than two minutes - can also fine tune the motion of the screen to optimize screening for specific applications.

The remarkably compact, straight-line design of the Model HVS screener presents an extremely low profile; minimum headroom is required for installation.

The ability of the specially designed rubber springs to amplify the trough stroke results in low power requirements. Power is provided by a standard three-phase, 230/460 TEFC 60 Hz motor. Explosion-proof motors are also available.

Accurate control of amplitude can be achieved with an adjustable variable speed pulley (see Figure 1) or variable frequency controller. Both are available as options.

A wide variety of trough sizes and types are available to match the screener to specific application requirements. Included are troughs and screens of mild steel and stainless steel; liners of abrasion-resistant steel, stainless steel, polyethylene, rubber or other materials as well as grizzly screen decks.



Model HVS
High Volume
Screener

MECHANICAL SCREENERS

Model HVS 18 x 48 for sizing rock salt.



Model HVS 36 x 96 with overhead drive for screening chopped fiberglass.



Model HVS 42 x 96 for screening glass cullet.



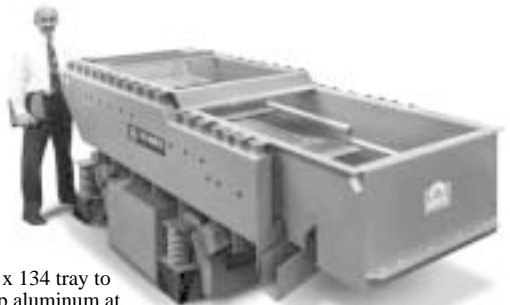
Model EMS2 with 24 x 60 tray to screen contamination from coffee.



This Model TMS 30 x 60 screens oversize clumps of ore.



Model EMS2 with 36 x 134 tray to screen sand from scrap aluminum at 1100°F.



Eriez and Syncro-Sizer are registered trademarks of Eriez Manufacturing Co.

CUSTOM EQUIPMENT & APPLICATIONS

Eriez operates the largest Test and Research facility of its kind for developing custom equipment to meet the most demanding applications. Contact a product manager to design the perfect vibratory solution for your specific needs.

FOR MORE INFORMATION on circular, rectangular or any mechanical vibratory separator or system available for automation, material movement, separation, purification, beneficiation, reclamation and pollution control, write or call:

ERIEZ MAGNETICS WORLD HEADQUARTERS

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800/345-4946 or 814/835-6000

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Ferrous Traps

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Magnetic Pulleys

Magnetic Sweepers

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Electrostatic Separators

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Metal Detectors

Tube Magnets

Eddy Current Separators

Magnetic Rails

Magnetic Rolls

Sheet Fanners

Lifting Magnets

Holding Magnets

Coolant Cleaners

Magnetic Conveyors

Vibrating Conveyors

Mechanical Conveyors

Vibratory Feeders

Volumatic Feeders

Bin Vibrators

Precipitator Vibrators

Screen Separators

NOTES:

***For solutions to
your process problems
contact your nearest
Eriez representative
and just: Ask Orange.***



CONTACT ERIEZ

With manufacturing plants on five continents and a global network of factory-trained representatives, getting professional assistance is just a call away.

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*World authority in advanced technology for magnetic,
vibratory and metal detection applications*

Eriez manufactures magnetic lift and separation, metal detection, materials feeding, screening, conveying and controlling equipment for application in the process, metal working, packaging, recycling, mining, aggregate and textile industries among others. Eriez manufactures and markets these products through nine international facilities located on five continents... Australia, Brazil, Canada, China, England, India, Japan, Mexico, South Africa, as well as the United States.