ENDURON®
Comminution Equipment

Excellent
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Solutions

WEIR
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Vibrating Screens Overview

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Enduron® vibrating screens showcase a combination of innovative and proven screen technology.

Weir Minerals has been a global leader in the design, manufacture, installation and servicing of equipment and solutions for the mining, sand and aggregates industries for almost a century.

Enduron® vibrating screens are quality machines providing exceptional screen process performance in a wide range of applications. Enduron® linear motion screens offer a screening solution with low headroom requirement and less pegging of screen media when compared with circular or elliptical motion screens. Using linear motion screens results in a lower installed cost as well as the ability to better control the travel rate across the screen, resulting in improved screen efficiency.

Custom Design

The Enduron® screen range can be tailored to suit the unique needs of your specific application. Weir Minerals' expertise is spread across a wide variety of industries ranging from sand washing and classification plants, minerals and coal processing plants, and tailings dewatering applications. With thousands of satisfied customers around the globe, our engineers and support teams are confident that they can create a solution to ensure your project's objectives are met.

Integral Part of our Process Equipment Range

Enduron® dewatering, horizontal and banana screens form an integral part of process plants operating across many industries around the globe.

Global Support

Weir Minerals has a wide network of global professionals able to assist at every stage. Whether it is at the initial design stage, during commissioning, or after installation, you can be confident that a Weir Minerals professional is able to assist. We can provide on-site and off-site maintenance training as well as stock replacement parts in our numerous locations around the globe, with field service crews readily available to help.

Enduron® double deck horizontal screen

With screens ranging from light duty sizing and dewatering through to heavy duty banana screens, Enduron® vibrating screens can accommodate most minerals processing applications.

Enduron® linear motion vibrating screens offer an extremely robust design and construction. With the benefits of high efficiency, high capacity, low headroom and reduced operating and maintenance costs, these screens are ideally suited for heavy duty applications in the sand and minerals processing industries.

Features

Experience indicates that a g-force range of 3 - 7 is required to achieve good stratification, which is important for classification and dewatering. Enduron® screens typically operate at a g-force range of 4.5 - 5, thanks to our range of high g-force exciters and vibrating motors.

A unique feature of the Enduron® vibrating screen is the method of corrosion protection. Epoxy resin is applied to the mating faces before fastening to prevent ingress of liquid and solid material during operation, and to mitigate the risk of stress corrosion cracking. Side plates are lined with Linatex® premium rubber for abrasion and corrosion protection.

Typical Screen Applications

- Classification (sizing): Material is separated based on size
- Dewatering: Removal of process water from the ore
- Heavy Media Recovery (drain and rinse): Medium recovery for reuse in the process (e.g. Ferrosilicon or Magnetite)
- Scalping: Removing coarse material during primary and secondary crushing
- Trash Removal: Screening of grit, wood and oversize material
- Grading: Preparing of products with varying size ranges
- Desliming: Removal of -500 µm material

Application Guide Overview

Application	Dewatering Screens	Banana Screens	Horizontal Screens
Dewatering of Mineral Concentrates	•		
Tailings Dewatering	•		
Sand Dewatering	•		
Coal Fines Recovery	•		
Replacement of rake classifiers and sand screw equipment	•		
Primary Sizing		•	•
Secondary Sizing		•	•
Stockpile Sizing		•	•
Mill Discharge		•	•
Soda Ash Processing		•	
Potash Processing		•	
Uranium Processing		•	
Feed Preparation			•
Drain and Rinse			•
De-Sliming	•		•
Pre-Wetting			•
Trash Removal			•
Salt Crystal Processing			•

Over 100 Enduron® vibrating screens sold in North America since introducing in 2010, and 1,600 screens sold worldwide.

Enduron® Screen Range**

Weir Minerals offers a wide range of vibrating screens that meet the needs of modern high capacity production plants in terms of plant availability, space and energy savings.

Enduron® Dewatering Screens

These screens incorporate a sloping, curved back deck section. Slurry is fed uniformly along the top of this back section, which acts as a vibrating drainage panel. The main deck slopes upward at 3°- 5° and is fitted with slotted apertures.

Enduron® Single and Double Deck Banana Screens

The development of the banana screen concept is a major innovation in screening technology, essentially because of its exceptionally high throughput per unit screening area. Banana screens are a high capacity, high velocity machine with low bed depth leading to greater efficiencies and throughput by allowing quicker stratification of the material bed.

Enduron® Single and Double Deck Horizontal Screens

Ranging from 0.6m (2.11') to over 4.2m (14') wide, and up to 10m (32') in length, these single or double deck screens are popular in a variety of applications including coal sizing, DMS drain and rinse applications. Excitation is via twin out-of-balance exciters and screens may be fitted with modular rubber/polyurethane or woven/wedge wire media.

** Refer to Product Specification Sheets for product details

Enduron® horizontal 'low profile' screen

Screen motion provided by linear exciters

Exciters

Vibrating motion for a screen is provided by means of out-of-balance motors or geared exciters. Enduron® vibrating screens use high g-force geared exciters for machines wider than 1.8m (6') to provide the vibration motion required.

The major part of the exciter drive is the housing, which is a cast metal enclosure and serves as an oil bath. Gears mounted on bearings reside in the oil bath. The gears are driven via an electric motor attached to a through shaft.

Eccentric weights, which provide the vibratory motion, are mounted onto both ends of the shaft and the excitation force can be varied by means of lead weights.

Enduron® screens are fitted with exciters specifically designed to provide the g-forces necessary to enable proper material stratification and screening.

Enduron® vibrating screen exciters are designed to enable our screens to cope with the high capacity demands of modern plants. Our exciter range is constantly under review with the latest manufacturing technology being considered to produce efficient and cost effective designs. We custom-make our exciters to exact specifications under strict tolerance and quality guidelines.

Our extensive field experience and use of advanced simulation methods ensure the correct screen is selected for your application.

Application Expertise

The Weir Minerals team offers years of experience in screens and screen media, combined with extensive field experience with the entire mill circuit process. We are well equipped to make recommendations on screen selection and the entire circuit.

To ensure proper screen sizing, we combine the team's global application knowledge base with advanced simulation software.

Commissioning and Service Support

All screens purchases include 2 days of commissioning and maintenance training with one of our skilled service engineers. This service includes:

- Hot and cold commissioning
- Operator and maintenance training
- Spare part review and recommendations

Weir Minerals also offers complete exciter rebuilds with our exciter refurbishment program, allowing customers to continue running without missing a beat. Our service engineers and field service crews are ready and available to be on-site for any service or support that is required.

Weir Minerals expertise available on-site

Weir Minerals exciter refurbishment

Enduron® Banana Screens

The Enduron® banana or multi-slope screen is capable of achieving exceptional throughput per screening area. The screen is a high capacity, low bed depth, high velocity machine and may include two to as many as six deck slopes varying from 45° through to horizontal on the last slope.

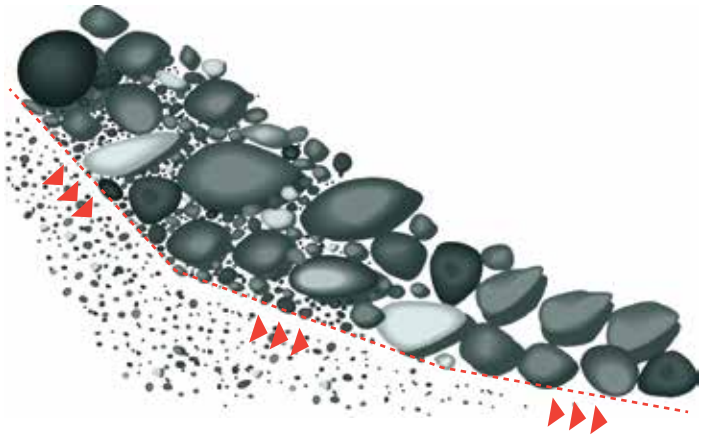
The various slopes may also incorporate deck media with different apertures to meet the particular process requirements. The screens are commonly designed to fit modular rubber or polyurethane deck panels, however woven wire or punched plates may also be used, depending on requirements.

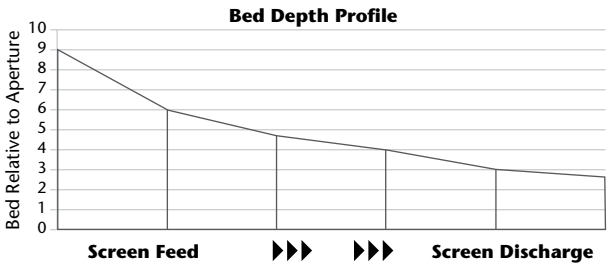
Enduron® banana screens are also available in a double deck arrangement which reduces the number of equivalent horizontal single deck units installed. Enduron® banana screens vary in size from as small as 1.8m (5'7/8") wide to over 4.3m (14') wide and are able to handle screen feeds with a higher proportion of fine materials than other screen designs.

Benefits

- Excellent sizing efficiency due to rapid stratification of material
- High specific capacity per unit area resulting in reduced screen (unit) size

Principle of Banana Screening





Stage 1: High velocity

The feed section (highly inclined) of a banana screen causes high velocity material flow which serves to quickly remove fine material.

Stage 2: Medium velocity

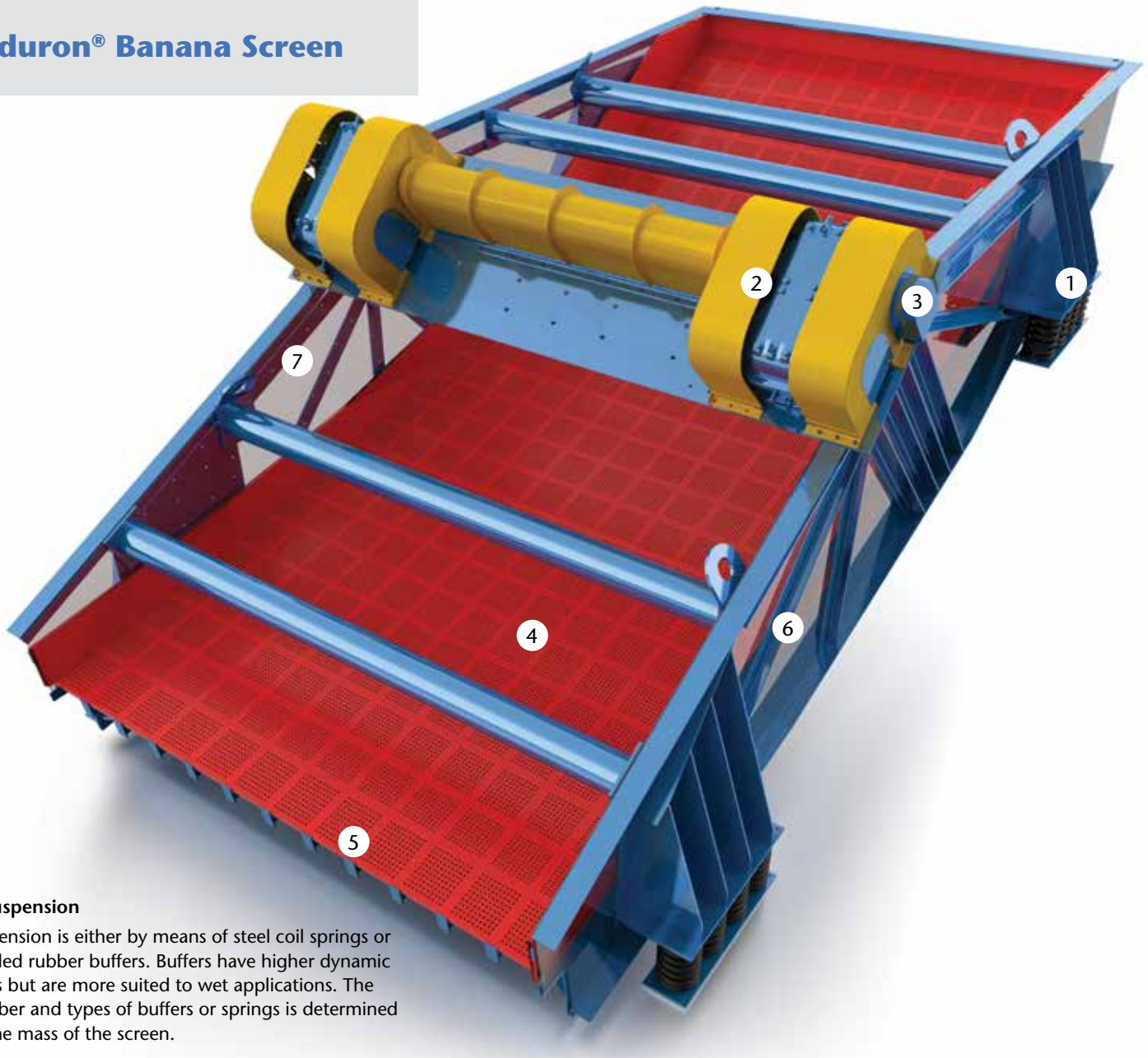
Midway along a banana screen, the resultant thinner bed stratifies quickly. The remaining fine material (below the cut point) is screened out more effectively than would be possible on a slower thicker bed.

Stage 3: Low velocity discharge

The lower screen slope (see diagram) slows the material down. More efficient screening of near size material occurs here.

The advantage is quicker stratification due to the high velocity that the banana screen shape imparts.

Enduron® Banana Screen



1. Suspension

Suspension is either by means of steel coil springs or molded rubber buffers. Buffers have higher dynamic loads but are more suited to wet applications. The number and types of buffers or springs is determined by the mass of the screen.

2. Vibrating Mechanism

Screens are vibrated in linear motion using geared exciters with contra-rotating out-of-balance masses. Different sizes of exciter units or multiples thereof are used for the various models of screens depending on the screen mass. The advantage of the geared exciter is the continuous splash oil lubrication, which ensures long life. Exciters are driven externally using cardan shafts via v-belt and pulleys, or direct drive for optimal performance. Line of action varies from 40° through to 65°, the most common being 45° or 50°.

3. Drive

Drive transmission is through cardan shaft, pulleys and v-belts, allowing simple adjustment of screen operating frequency.

4. Screen Deck

Most often the deck support structure is designed for the use of easily removable modular polyurethane or rubber screen media. Other types of screen media may be used, including woven wire and punched plate.

5. Deck Support Stringers and Beams

The use of stringers and beams as a deck support system not only gives longer life due to comprehensive rubber protection but also allows for the renewal of only those members that require replacement.

6. Surface Protection

High quality preparation and corrosion protection systems result in improved screen life.

7. Construction

The screen frame features bolted construction by means of high tensile or threaded fasteners. Welding is mainly done in low stress areas resulting in minimal welding throughout the machine. All joints incorporate an epoxy adhesive between the mating faces to eliminate the ingress of moisture and thus prevent deterioration of the joint through corrosion. The epoxy also assists in strengthening the joint.

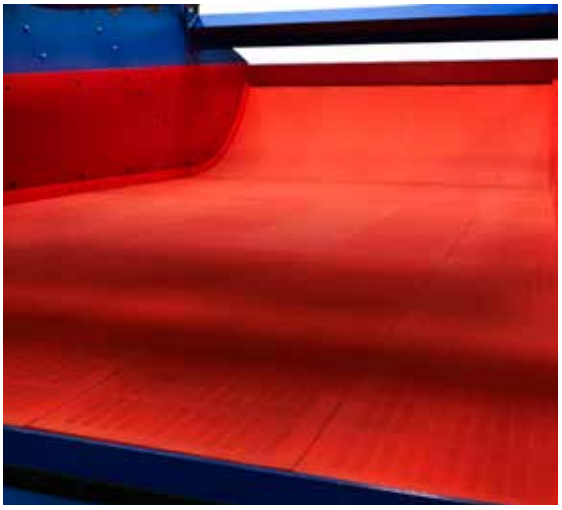
Enduron® Dewatering Screen

Linatex® Screen Media

The Enduron® dewatering screens are fitted with Linatex® Snapdeck® dewatering modular screen media as a standard. Consistent with Linatex® quality, the screen surface is long lasting and easy to maintain. Over the past decade, the Linatex® Snapdeck® system has proven to be a durable and reliable media system for high-load dewatering applications.

FusionCast™ Polyurethanes

Weir Minerals is pleased to announce the development of a range of new high performance polyurethane screen media materials. FusionCast™ polyurethane is a revolutionary material designed to maximize service life through superior abrasion resistance. Field trials conducted have confirmed wear life advantages of 50% or more when compared to injection molded PU. Additionally, FusionCast™ polyurethane screens can be supplied in a wide range of openings for separations as coarse as 25mm.



Enduron® Dewatering Screens

Enduron® dewatering screens have been operating successfully in a range of industries worldwide for more than 40 years.

The Enduron® dewatering screen range represents an innovation in dewatering screening equipment and has been designed to ensure maximum efficiency and lowest cost of ownership is achieved. Using the latest screen design technology and Finite Element Analysis, the range has been engineered to meet the most rigorous demands of the mining and minerals processing industries.

The Enduron® dewatering screen range has an innovative curved, sieve bend-like feed section. This curved profile increases the screening area and the dewatering capacities, using centrifugal force to aid in the dewatering process. The main deck of the screen slopes upwards to maximize solids retention and de-water the cake bed.

The Enduron® dewatering screen is a light weight dewatering screen, well suited for applications in the sand and aggregates, and mining and minerals processing industries. The screen's lower capital and operating cost is a result of its light weight design.

Design Features

Vibration on Enduron® dewatering screens is produced by vibrating motors which can be run at different speeds depending on the application. Alternatively geared exciters with an external drive motor can be fitted to the larger screens. Easy adjustment of the amplitude of vibration, deck inclination, as well as the discharge baffle plate is a feature incorporated to suit the process requirements with consult from a Weir Minerals engineer.

A high solids recovery is achieved when the screen underflow is kept in closed circuit with a hydrocyclone and the only solid losses occurring would be the very fine material exiting in the cyclone overflow.

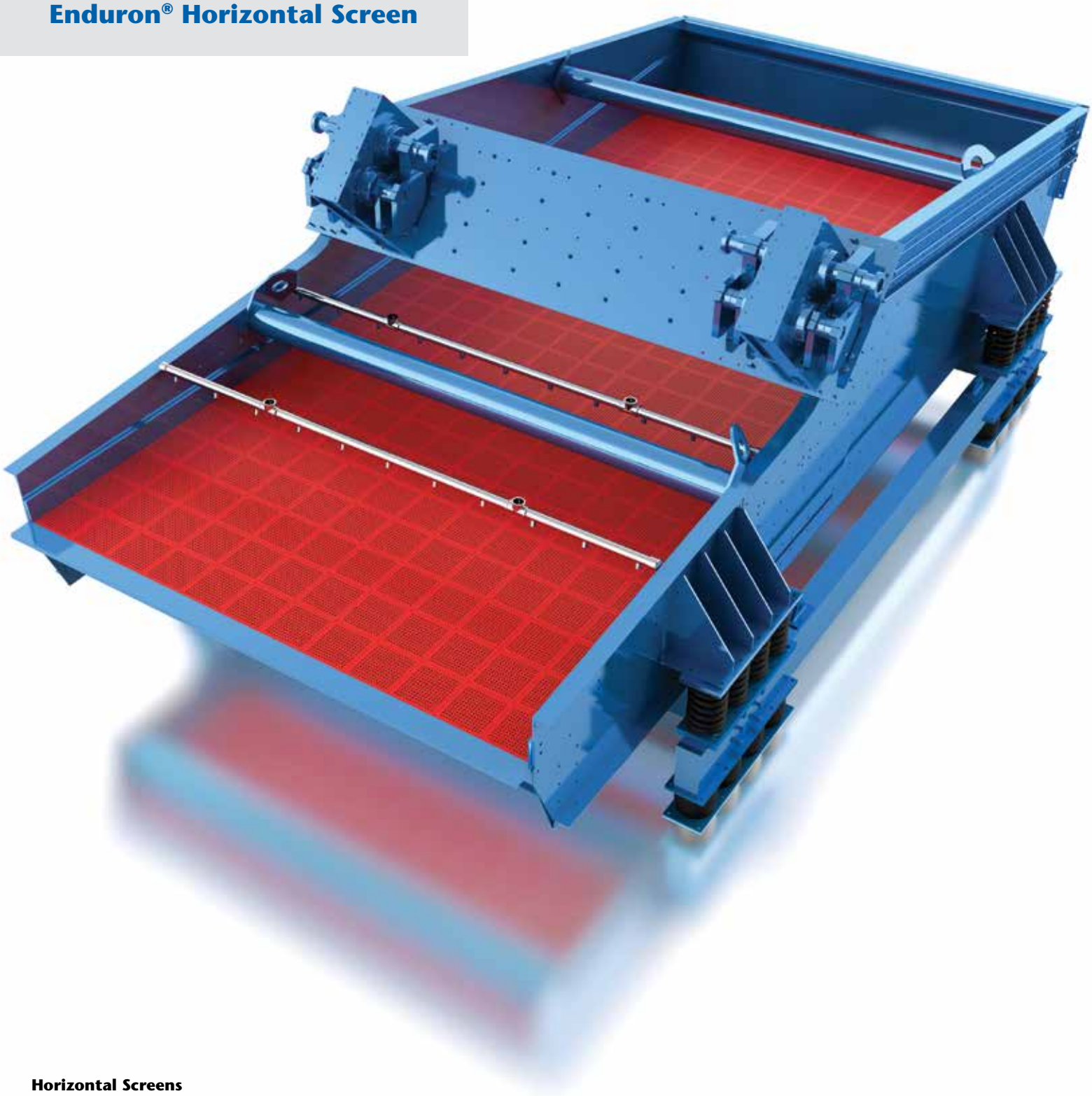
Quality control is ensured through ISO 9001:2010 certifications.

Applications

While primarily applied to dewatering with retained fines, the Enduron® dewatering screen range is capable of being used in a wide range of other applications including:

- Replacement of rake classifiers, rotary sand dewatering and sand screw equipment in dewatering applications
- Removal of tramp material - wood chips, etc., from gold ore pulp (CIP)
- Removal of oversize from pulp of beach sand cutting at 1mm
- Dewatering activated carbon in CIP circuits
- Dewatering of sand and aggregate
- Tailings dewatering
- Removal of fines from activated carbon (CIP)
- Dewatering - 0.5mm fine coal

Enduron® Horizontal Screen



Horizontal Screens

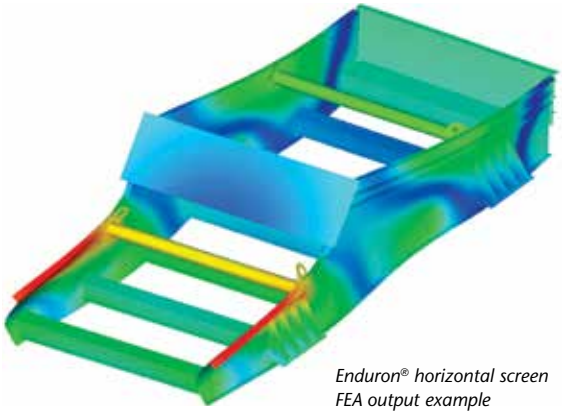
Enduron® horizontal screens have met with tremendous success in the highly demanding and competitive mining industries throughout the world.

The large screen concept has been able to meet the needs of modern high capacity production plants by reducing the number of machines installed or production modules required. The introduction of our screens leads to improved plant availability, space savings, energy savings and greatly improved materials handling.

Benefits:

- Low maintenance
- Proven reliability
- Robust construction for improved product life
- Stress concentrations eliminated by the use of Finite Element Analysis (FEA)

Advanced computer aided design and extensive testing are an integral part of Enduron® vibrating screens.



Enduron® horizontal screen FEA output example

Finite Element Analysis

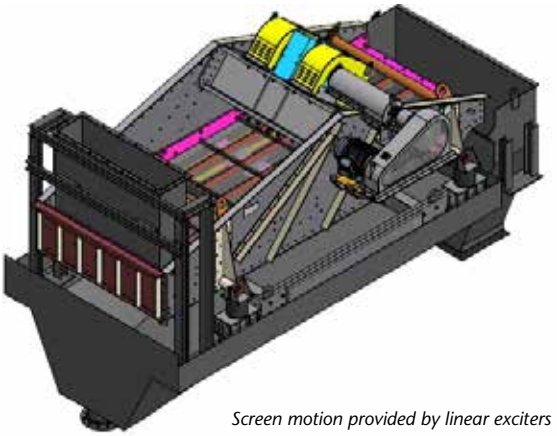
While screen design has evolved and improved from years of operational experience and industry know-how, Weir Minerals has taken these improvements a step further by incorporating Finite Element Analysis into every screen we manufacture. This analysis allows Weir Minerals to optimize the mass and strength of the screen along with determining dangerous and destructive natural frequency zones, ensuring we are providing the longest lasting screens possible.

Screen Testing

All screens are test run for a minimum of 8 hours prior to shipping. Testing ensures the screen is meeting the initial design parameters and meeting the highest quality standards prior to shipment.

On-site Testing

Weir Minerals offers on-site testing for customers interested in testing the screen on their process before purchasing.



Screen motion provided by linear exciters

Subframes (isolation frames)

Subframes (isolation frames) are used to reduce the vibrating force transmitted to the support structure. Enduron® vibrating screen subframes are able to reduce the vibration force transmitted by approximately 75 to 80 percent.

Feed/Discharge Chutes and Underpans

Weir Minerals has an inventory of chutes and underpans pre-designed and available for purchase. In addition, they can be modified to suit customer preference and plant layout. Chutes and underpans can be provided with a variety of liner options including polyurethane, vulcan rubber, ceramic, AR plate, and Linatex® premium rubber.

Other Ancillary Equipment Options

- Water spray manifold systems
- Dust containment systems
- Deck dividers
- Base frames

Enduron® Horizontal Single Deck Screen – Specifications

Width		Length		Length		Length		Motor Driven	Exciter Driven
m	ft	m	ft	m	ft	m	ft		
0.2	1	1.2	4	1.8	6	X	X	✓	X
0.9	3	1.8	6	2.4	8	3.0	10	✓	X
1.2	4	2.4	8	3.7	12	4.8	16	✓	X
1.5	5	3.0	10	3.6	12	4.8	16	X	X
1.8	6	3.6	12	4.8	16	5.4	18	X	✓
2.1	7	4.9	16	5.4	18	X	X	X	✓
2.4	8	4.8	16	5.4	18	X	X	X	✓
2.7	9	6.4	21	X	X	X	X	X	✓
3.1	10	6.4	21	7.0	23	X	X	X	✓
3.7	12	7.3	24	X	X	X	X	X	✓
4.3	14	8.5	28	X	X	X	X	X	✓

Enduron® Horizontal Double Deck Screen – Specifications

Width		Length		Length		Motor Driven	Exciter Driven
m	ft	m	ft	m	ft		
1.2	4	4.8	16	X	X	X	✓
1.5	5	3.6	12	X	X	X	✓
1.8	6	4.8	16	X	X	X	✓
2.4	8	4.8	16	6.7	22	X	✓
3.0	10	6.7	22	X	X	X	✓
3.7	12	7.3	24	8.5	28	X	✓
4.3	14	8.5	28	X	X	X	✓

Enduron® Dewatering Screen – Specifications

Type	Width		Length		Motor Driven	Exciter Driven
	m	ft	m	ft		
DW6	2.0	7	7.0	23	✓	X
DW9	3.0	10	8.0	26	✓	X
DW12	4.0	13	10	33	✓	X
DW15	5.0	16	13	43	✓	X
DW18	6.0	20	12	39	✓	X
DW21	7.0	23	16	52	✓	✓
DW24	8.0	26	16	52	X	✓

Enduron® Banana Single Deck Screen – Specifications

Width		Length		Length		Length		Motor Driven	Exciter Driven
m	ft	m	ft	m	ft	m	ft		
2.1	7	5.8	19	X	X	X	X	X	✓
2.4	8	6.7	22	7.3	24	X	X	X	✓
2.7	9	6.7	22	7.3	24	8.2	27	X	✓
3.1	10	8.5	28	8.8	29	9.8	32	X	✓
3.7	12	7.3	24	8.2	27	9.8	32	X	✓
4.3	14	8.5	28	X	X	X	X	X	✓

Enduron® Banana Double Deck Screen – Specifications

Width		Length		Length		Length		Length		Motor Driven	Exciter Driven
m	ft	m	ft	m	ft	m	ft	m	ft		
2.1	7	5.7	19	X	X	X	X	X	X	X	✓
2.4	8	6.7	22	7.3	24	X	X	X	X	X	✓
2.7	9	6.7	22	7.3	24	X	X	X	X	X	✓
3.1	10	6.7	22	7.3	24	8.5	28	9.8	32	X	✓
3.7	12	6.1	20	7.3	24	8.8	28	9.8	32	X	✓
4.3	14	8.5	28	X	X	X	X	X	X	X	✓

Enduron® vibrating screens are supplied as linear motion units and are able to be tailored to suit the unique needs of a specific application. Our current screen range consists of 5 core product lines: both single and double deck horizontal, multi-slope (banana) screens, and dewatering screens. Depending on machine size and application, the drive system is either exciters or vibrating motors. Development of our screen range is ongoing.

KEY:

X Not available

✓ Available

Additional sizes may be available, for more information please contact your local sales representative.

WARMAN®
Centrifugal Slurry Pumps

GEHO®
PD Slurry Pumps

LINATEX®
Rubber Products

VULCO®
Wear Resistant Linings

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FLOWAY® PUMPS
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Mine Dewatering Solutions

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LEWIS® PUMPS
Vertical Chemical Pumps

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For further information on any of these products or our support services contact your nearest sales office or visit:

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