

**LINATEX®**  
Vibrating Screens

Excellent  
Minerals  
Solutions



## Sizing and Dewatering Screens



## Linatex® 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.

Linatex® vibrating screens have a reputation of being quality machines providing exceptional screen process performance for our customers in a wide range of applications. All Linatex vibrating screens are supplied as linear motion units. Linear motion allows for screens with a 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 screening efficiency.

### **Custom design**

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

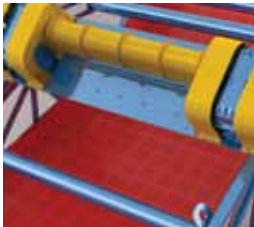
### **Integral part of our process equipment range**

Our dewatering, horizontal and multislope 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 are also able to provide on-site and off-site maintenance training. We stock replacement parts in our numerous locations around the globe, and have field service crews readily available to help.

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



Our range of linear motion vibrating screens offer 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. Linatex® 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 Linatex® 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 materials 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): Mmedium recovery for reuse in the process (e.g. ferro silicon 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 size ranges.
- Desliming: removal of -500 µm material

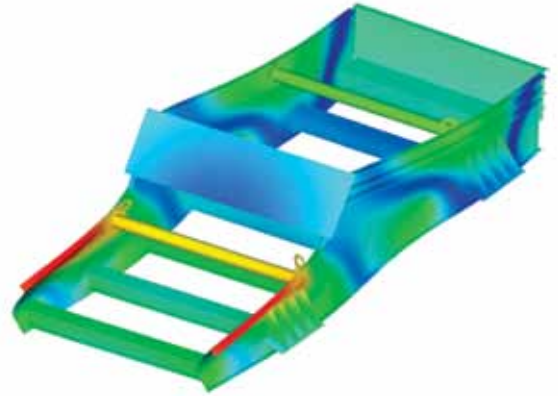
Application Guide Overview			
Application	Dewatering screens	Multislope screens	Horizontal screens
Dewatering of mineral concentrates	•		
Tailings dewatering	•		
Sand dewatering	•		
Coal fines recovery	•		
Replacement of rake classifiers and sand screw equipment	•		
Primary sizing		•	•
Secondary sizing		•	•
Stockpile sizing		•	•
Mill discharge		•	•
Feed preparation			•
Drain and rinse	•		•
De-sliming	•		•
Pre-wetting			•
Trash removal			•

# Advanced Computer Aided Design - an integral part of Linatex® vibrating screens.

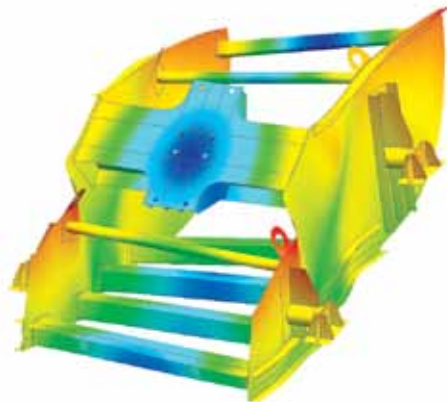
## Finite Element Analysis

While screen design has evolved and improved from many years of operational experience and industry know-how, Weir Minerals has taken these improvements a step further. In 1992 we introduced the Finite Element Analysis (FEA) method of design to our development methodology.

Our FEA capabilities have assisted in optimising the mass and strength of the screens, assisting in providing lower cost solutions in terms of capital, as well as operational costs.



*Linatex® horizontal screen FEA output example*

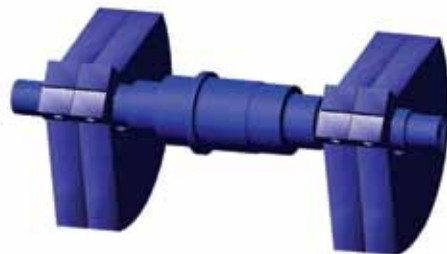


*Linatex® DW screen FEA output example*

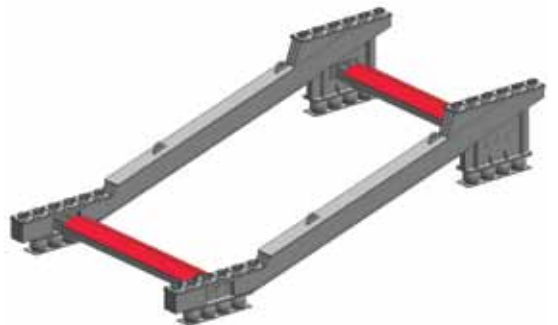
## Sub-frames (isolation frames)

Sub-frames (isolation frames) are used to reduce the vibrating force transmitted to the support structure. Linatex® vibrating screen sub-frames (isolation frames) are able to reduce the vibration force transmitted by approximately 75-80 percent.

Under certain circumstances, it is possible to engineer the sub-frame to reduce the transmitted force by as much as 95 per cent. Sub-frames are highly recommended for larger screens, namely those 2.4m (8") and wider, or 6m (19' 11/16") and longer in length.



*Computer simulated exciter counter mass*



*Linatex® vibrating screen sub-frame*



### Linatex® multislope screens

The Linatex® 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 any number of deck slopes from two to as many as seven, varying from 45° through to horizontal on the last slope.

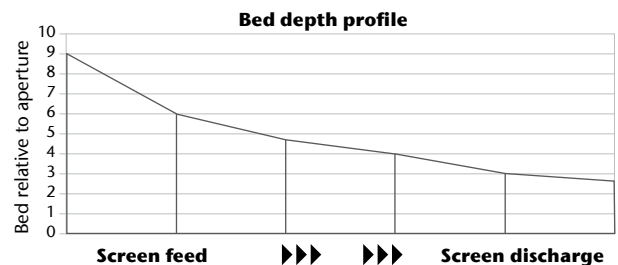
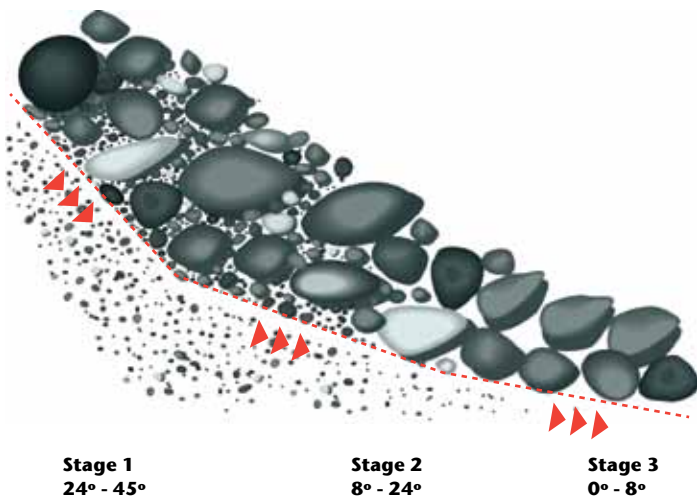
The various slopes may also incorporate deck media with different apertures to meet the particular process requirements. The screens are commonly designed to fit modular polyurethane deck panels. However, woven wire or punched plates may also be used, depending on requirements.

Linatex® multislope screens are also available in a double deck arrangement which reduces the number of equivalent horizontal single deck units installed. Linatex® multislope screens vary in size from as small as 1.8m (6") 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 multislope screening



#### Stage 1: High velocity

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

#### Stage 2: Medium velocity

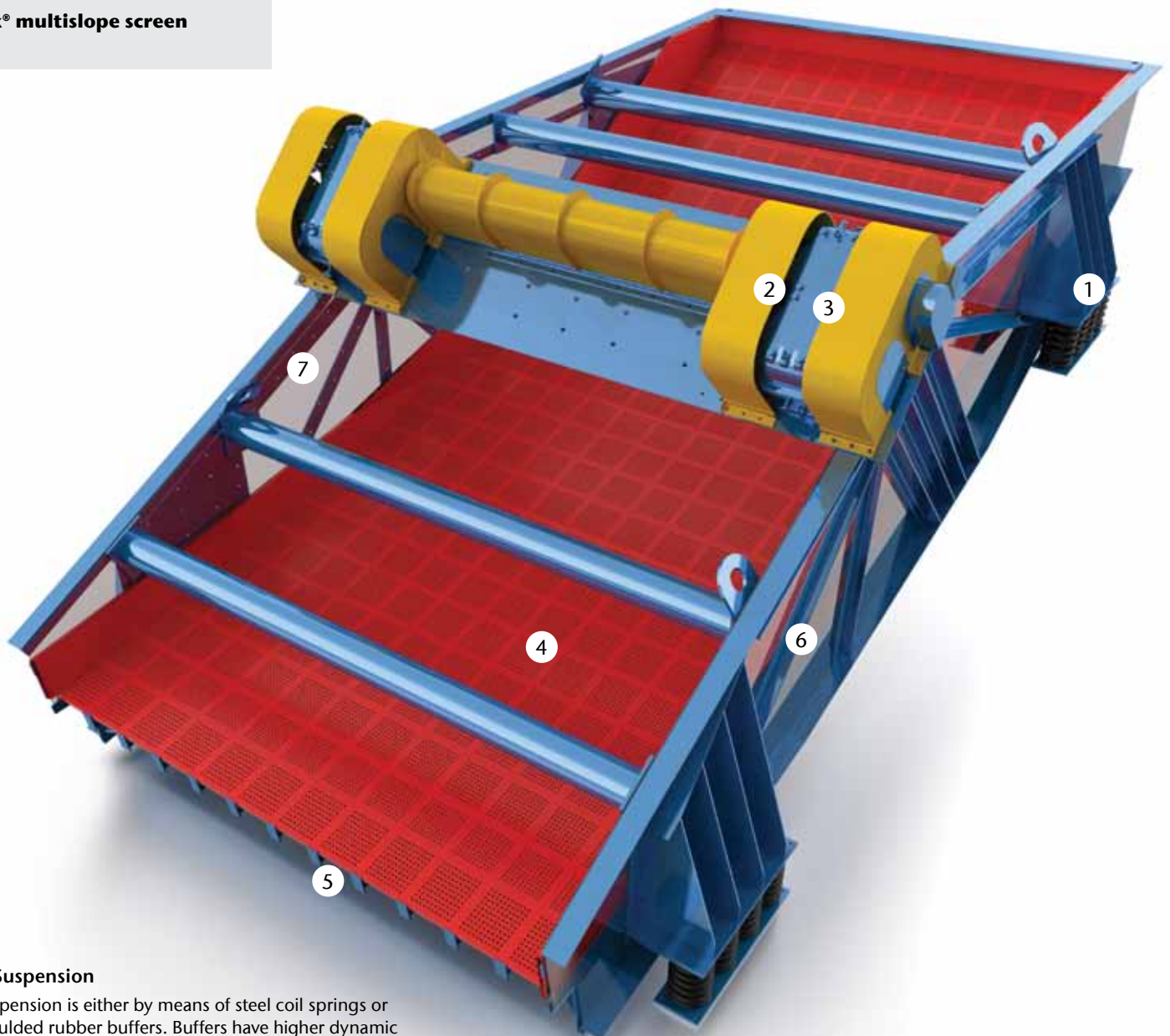
Midway along a multislope screen, the resultant thinner bed stratifies quickly. The remaining fine material (below the cut point) is screened out more effectively than would be possible on a slower, thicker bed.

#### 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 multislope screen shape imparts.

## Linatex® multislope screen



### 1. Suspension

Suspension is either by means of steel coil springs or moulded 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, 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 polyurethane foot modular panels. 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 'huck' or threaded fasteners. Minimal welding is used, but only in low stress areas. All joints incorporate an epoxy adhesive between the mating faces to eliminate the ingress of moisture thus preventing deterioration of the joint through corrosion. The epoxy also assists in strengthening the joint.



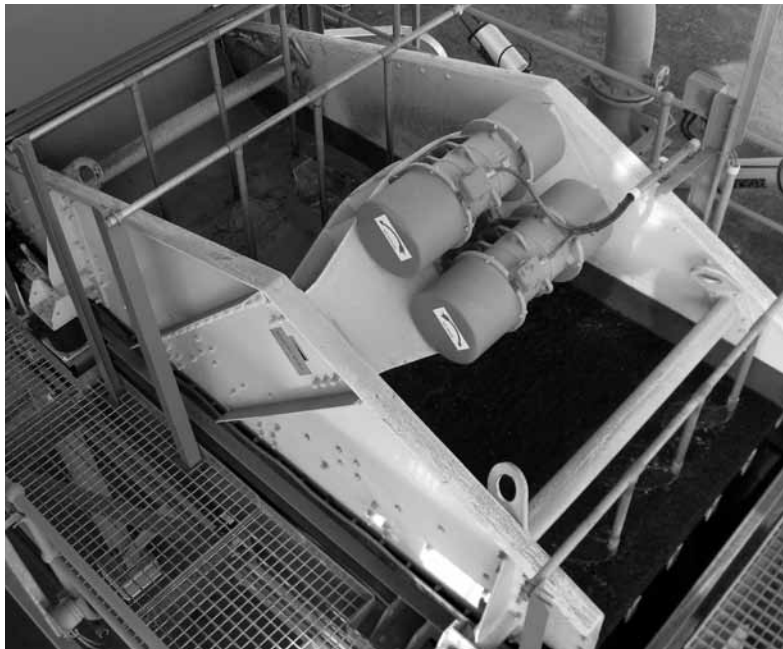
### **Horizontal screens**

Having been manufactured since the 1970's, Linatex® horizontal screens have proven extremely successful in highly demanding and competitive mining industries throughout the world.

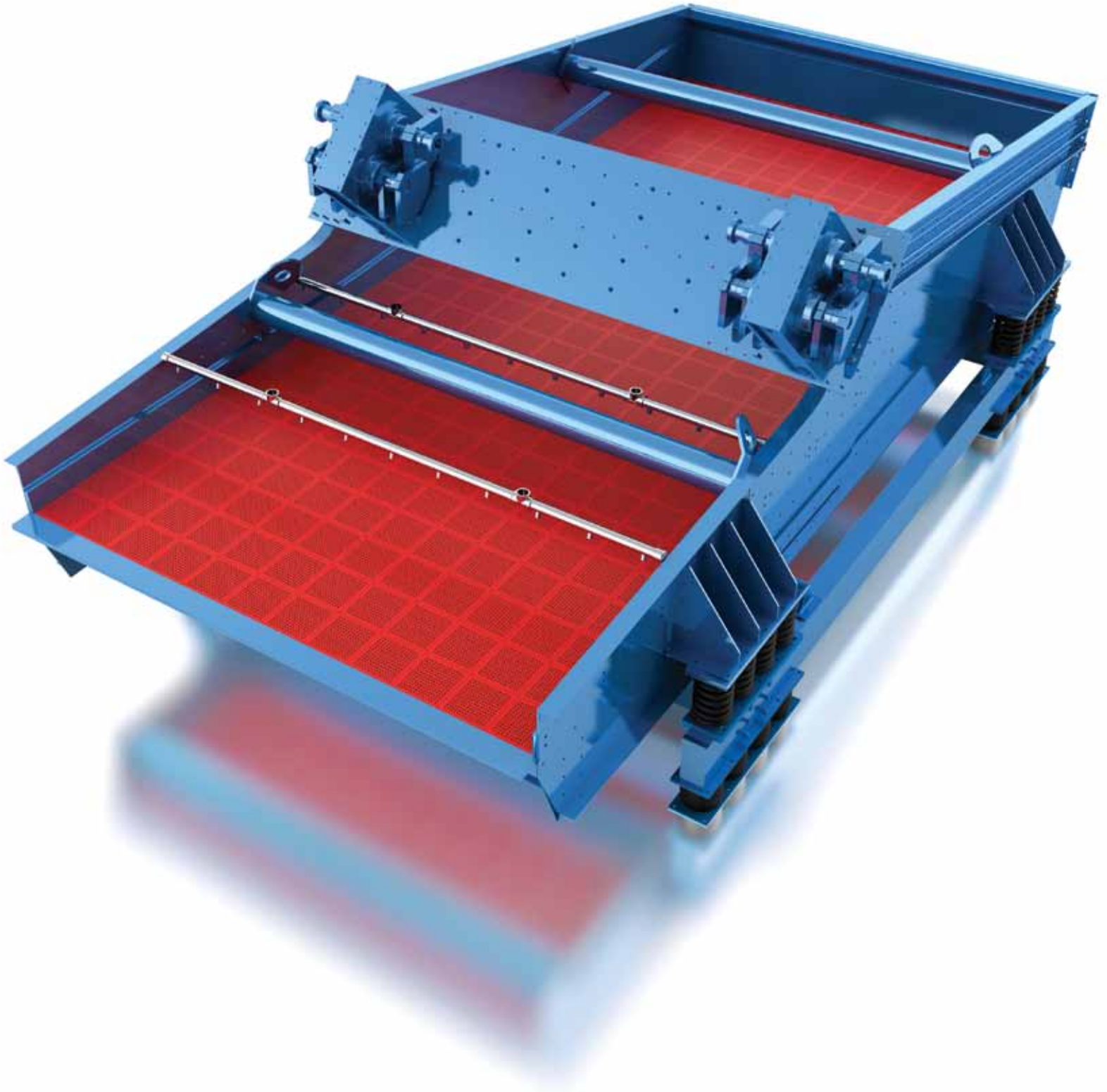
The large screen concept has met the needs of modern high capacity production plants by reducing the number of machines installed or production modules required. The introduction of our screens leads to improved plant availability, space savings, energy savings and greatly improved materials handling.

### **Benefits:**

- Low maintenance.
- Proven reliability.
- Robust construction for improved product life.
- Elimination of stress concentrations as a result of the use of Finite Element Analysis (FEA).



**Linatex® horizontal screen**







### **Linatex® dewatering screens**

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

#### **Design features**

Vibration on Linatex® 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 weir plate is a feature incorporated to suit the process requirements.

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 through ISO 9001:2010 certifications.

### **Linatex® VD dewatering screen**

The 45° sloping back deck section was pioneered on the Linatex® dewatering screen. It is fitted with slotted apertures across the direction of flow. Incoming slurry is fed uniformly along the top of this back section. This acts as a vibrating drainage panel, where a pool of partially dewatered slurry forms. The solid particles bridge over the apertures and form a partially dewatered cake.

The Linatex® VD dewatering screen is well suited and proven for heavy duty applications in the sand and aggregates, and mining and minerals processing industries.

### **Linatex® DW dewatering screen**

The Linatex® DW dewatering screen range represents an innovation in dewatering screening equipment and has been designed to ensure that 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 Linatex® DW 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 maximise solids retention and dewater the cake bed.

The Linatex® DW dewatering screen is a lightweight 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 lightweight design.

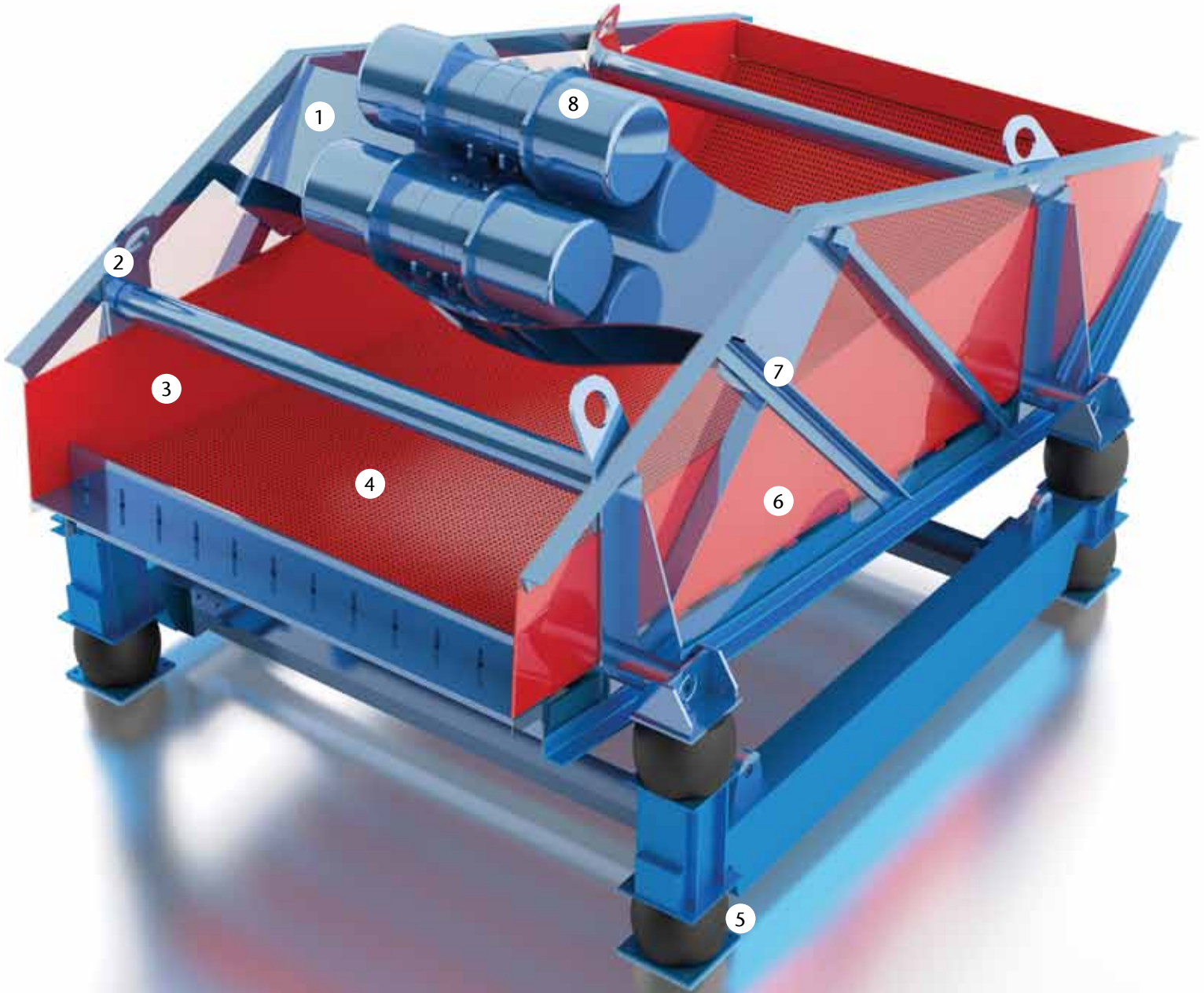
#### **Applications**

Whilst primarily applied to dewatering with retained fines, the Linatex® DW dewatering screen range is suitable for 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

Note: For detailed information refer to the Linatex® VD Screen Product Specification Sheet (insert).

## Linatex® DW dewatering screen



1. The fabricated main exciter bridge, the vital component in the transmission of the vibration from the vibrator motor to screen, is stress relieved. The surfaces mating with the screen side plates and the motors are machined to exacting tolerances to provide a precise fit for long trouble free life.
2. Epoxy adhesive is used between all mating surfaces of the screen frame, eliminating corrosion and uniformly distributing stresses in these areas.
3. The side plates of the machine are fitted with easily replaceable (bolt in) Linatex® premium rubber wear liners, affording protection to the structure of the machine and ensuring long service life.
4. The screen can be fitted with snap-in modular screen deck panels providing long life, easy handling and maintenance with the ability to replace small areas of localised wear.
5. Moulded rubber buffers are used on all four support points to isolate live frame vibrating loads. These provide longer life and less maintenance than coil springs in wet applications.
6. Standard surface protection is provided to ensure a high degree of corrosion resistance. This comprises abrasive blasting followed by two coats of vinyl etch primer and two coats of finishing epoxy polyamide paint.
7. The steel screen frame is predominantly of bolted construction, avoiding the stresses created by welding.
8. Both the linear motion low noise vibrating motors and the robust geared exciter have been designed specifically to ensure long life with minimum maintenance requirements.

## Glossary

- Aperture - The opening of the slots or squares on the screen panel through which the material passes.
- Amplitude - The distance travelled by a screen from the highest point to its mid point. Amplitude is equal to half the stroke length, which is the distance from the highest point to the lowest point of travel.
- Bed depth - The vertical depth (mm) of material on a screen deck, which should typically be 3-4 x the screen aperture.
- Blinding - Material that covers the screen apertures.
- Bulk density - Weight per unit volume of loose material expressed as weight/unit volume and typically refers to soil and powder materials that have air voids when allowed to experience natural settlement.
- Cut size - The particle size at which equal proportions of material report to the oversize and undersize.
- Deck - The part of the screen that supports the panels.
- Dewatering - Removal of process water.
- Desliming - Removal of -500µm material.
- Efficiency - The percentage of misplaced fines (undersize in oversize) calculated on a w/w (mass) basis.
- Frequency - The number of times the screen peaks or troughs during 1 second. Measured in Hz.
- G-force - Acceleration force of the screen, which should typically be 3 - 7G.
- Media - Can refer to density correction medium such as FeSi or type of panel (e.g. rubber, polyurethane) that is used on the screen deck.
- Multislope screen - A screen that has the deck divided along its length into a number of sections, with each section having a different angle of inclination. Commonly referred to as a 'banana screen'.
- Particle size distribution - The results from a lab analysis when material is put through a number of sieves of different mesh size and the weight percentage of each size is plotted on a curve in Cumulative Percent Passing.
- Pegging - Material that wedges into the screen apertures.
- Primary screening - Screen in the primary plant circuit e.g. primary crushing.
- Scalping - The separation of part of the total feed as coarse oversize by retention on openings more than 50 percent larger in diameter or width than the largest particle in undersize. Usually 10-20 percent of the feed.
- Secondary screening - Screening in the secondary part of the plant circuit e.g. secondary or tertiary crushing.
- Screen cloth - The medium used on the screen deck to effect the screening, same as screen media.
- Specific Solids Density - Also referred to as Relative Density (RD) or Specific Gravity (SG) and is the density of the solid material. This is an intrinsic property of the material and cannot change. Expressed as weight/unit volume (kg).
- Slurry density - Weight per unit volume of slurry calculated using the respective mass and volume of the solids and liquid in the slurry (volume lies between the solids and liquids density).
- Stratification - This occurs in a material bed when the finer material moves to the bottom and larger material to the top of the bed as it is vibrated.
- Throughput - The ore tonnage that is fed onto the screen.

## Screen range

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

### Dewatering screens

These screens incorporate a sloping back deck section, fitted with slotted aperture panels. 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.

### Single and double deck multislope 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. Multislope screens are a high capacity, high velocity machines with low bed depth resulting in greater efficiencies and throughput by allowing quicker stratification of the material bed.

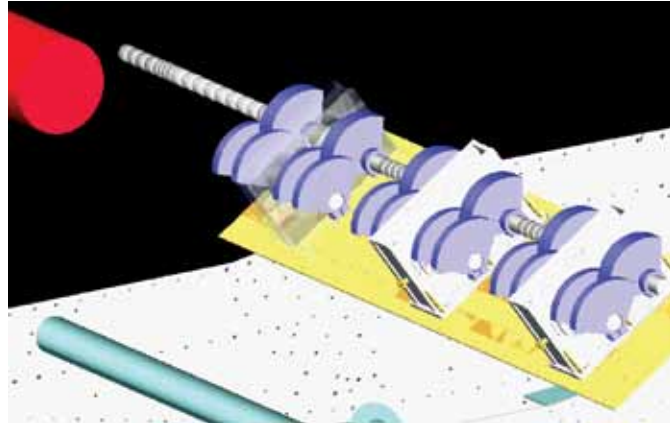
### Single and double deck horizontal screens

Ranging from 0.3m (1') to over 4m (13' 1/8") wide, and up to 10m (32' 7/8") in length, these single or double deck screens are popular in a variety of applications, including coal sizing and 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 (inserts) for product details.



Linatex® horizontal 'low profile' screen



Screen motion simulation illustrating the effect of the exciter

## Exciters

Vibrating motion for a screen is provided by means of out-of-balance motors or geared exciters. Linatex® vibrating screens use high G-force geared exciters for machines 2.4m (7' 7/8") and wider to provide the vibrating motion required.

The major part of the exciter drive is the housing, which is a cast metal enclosure that 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.

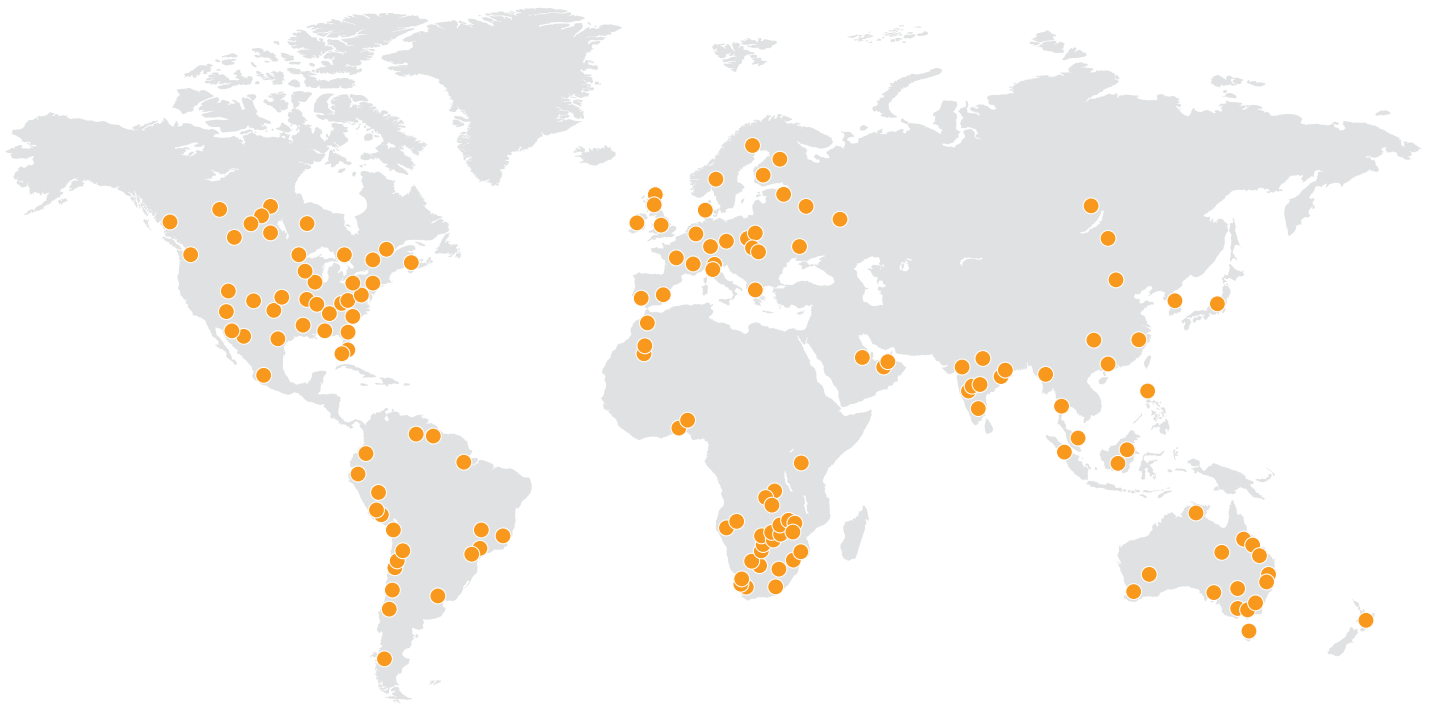
Eccentric weights, which provide the vibratory motion, are mounted onto both ends of the shaft and the excitation force can be varied by means of lead weights.

Screen technology resides in the design of the exciter and Linatex® screens are fitted with exciters specifically designed to provide the G-forces necessary to enable proper material stratification and screening.

Linatex® 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.

### Screen range overview

Screen type	Designation	Comments	Drive arrangement
<b>Single Deck Horizontal</b>	SD, HG	Sizing and dewatering. Light to heavy duty design suited to a wide range of applications, with the possibility to incline the screen.	Motor driven for sizes up to 2.4m (8") wide Exciter driven for sizes + 2.4m (8") wide Linear motion
<b>Double Deck Horizontal</b>	DHG	Sizing and dewatering. Light to heavy duty design suited to a wide range of applications, with the possibility to incline the screen.	Motor driven for sizes up to 2.4m (8") wide Exciter driven for sizes + 2.4m (8") wide Linear motion
<b>Single Deck Multislope</b>	BHG	Multislope inclined screen. Medium to heavy duty design.	Exciter driven Linear motion
<b>Double Deck Multislope</b>	DBHG	Multislope inclined screen. Medium to heavy duty design.	Exciter driven Linear motion
<b>Dewatering</b>	VD, DW	Suited to dewatering applications. Light to medium duty design.	Exciter and motor driven Linear motion



- WARMAN®** Centrifugal Slurry Pumps
- ENVIROTECH®** Centrifugal Slurry Pumps
- GEHO®** PD Slurry Pumps
- LINATEX®** Rubber Products
- VULCO®** Wear Resistant Linings
- CAVEX®** Hydrocyclones
- FLOWAY® PUMPS** Vertical Turbine Pumps
- ISOGATE®** Slurry Valves
- MULTIFLO®** Mine Dewatering Solutions
- LEWIS® PUMPS** Vertical Chemical Pumps
- WEIR MINERALS RENTALS™**

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

[www.weirminerals.com](http://www.weirminerals.com)

LINATEX® vibrating screens are 100% manufactured in South Africa.

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