THE SHIVRAX AN UNIQUE SIEVING MACHINE BRINGING REVOLUTION IN INDUSTRY

- This catalogue comprehensively presents detailed **descriptions** and specifications for the entire range of products within the **SHIVRAX** screener machine line.

SHIVRAX ENGINEERS
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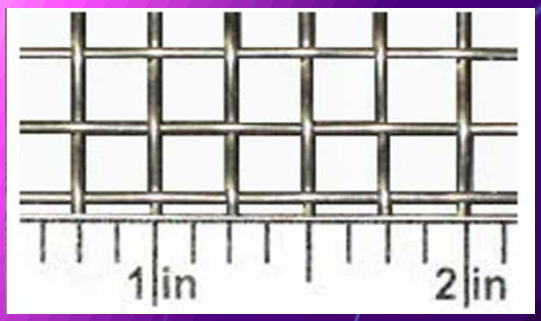
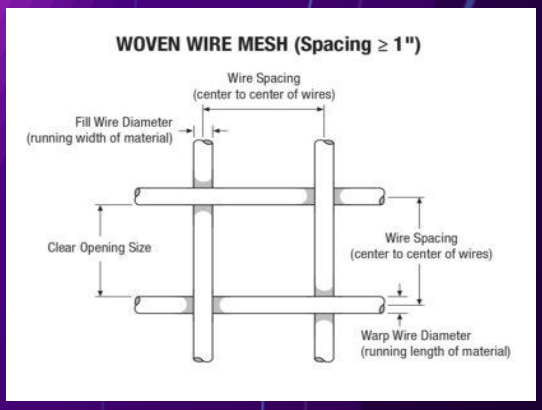
Terminology used in sieving process

- Feed Rate: The volume of material supplied to a screening machine for processing within a unit time ie. MT per Hour.
- Stratification: The phenomenon where particles form clusters resembling waves, causing them to roll over the screen cloth, thereby increasing the probability of passage for pass through.
- Fines: Particles smaller in size than the sieve with a high degree of separation accuracy.
- Stroke: The maximum horizontal distance traveled by the screen during a single cycle.
- Mesh: The number of openings or wires per linear inch on the screen cloth.
- Opening: The inside distance from one wire to another wire in a square holes wire mesh.
- Open Area: The ratio of the total area of the screen cloth openings to the entire screen surface area, also referred to as percent open area.
- Plugging: The occurrence of particles blocking the screen cloth openings, reducing the effective screen area and impacting screening efficiency.
- Retention Time: The duration a particle remains on the screen deck surface (sieve layer).
- Rate of Travel: The speed at which material moves across a sieve layer (screen surface), typically measured in feet per minute.
- Bed Depth: The thickness of the material layer as it moves across the screen surface.
- Deck: The structure comprising the screen cloth frame along with the ball tray.
- Deck Layer: The arrangement of multiple decks at varying heights within a screening machine, allowing for enhanced separation efficiency based on design specifications.

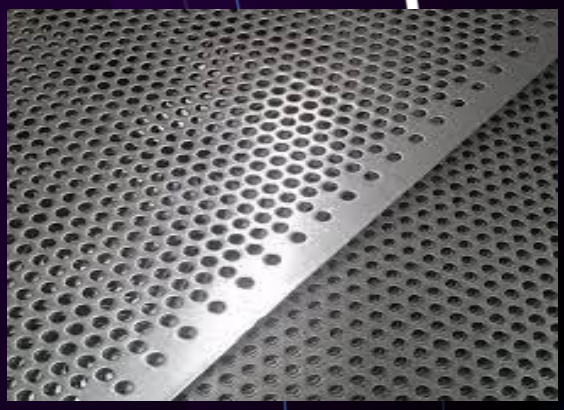


Mesh Counting

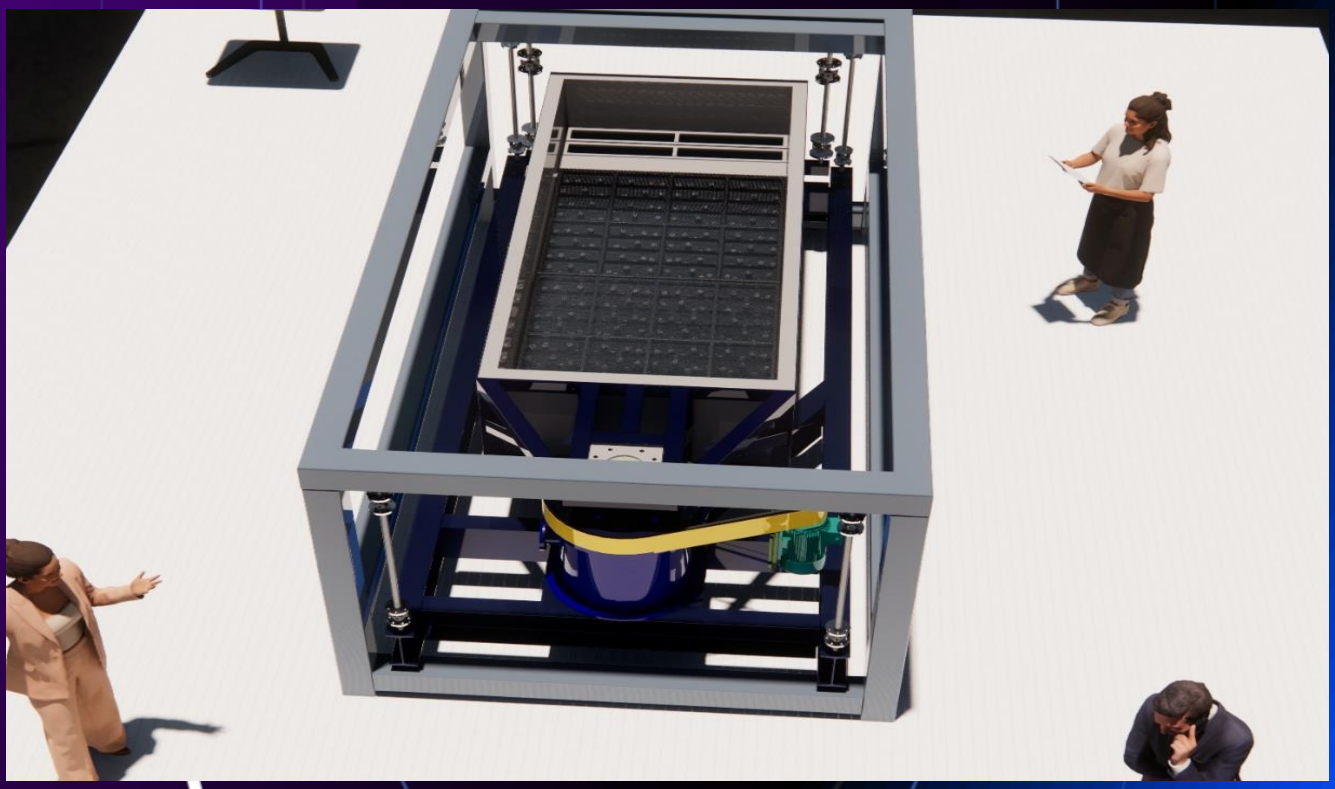
Plugging or Blinding



Opening



Perforated Sheet



The graphical view of **SHIVRAX** Screener Machine

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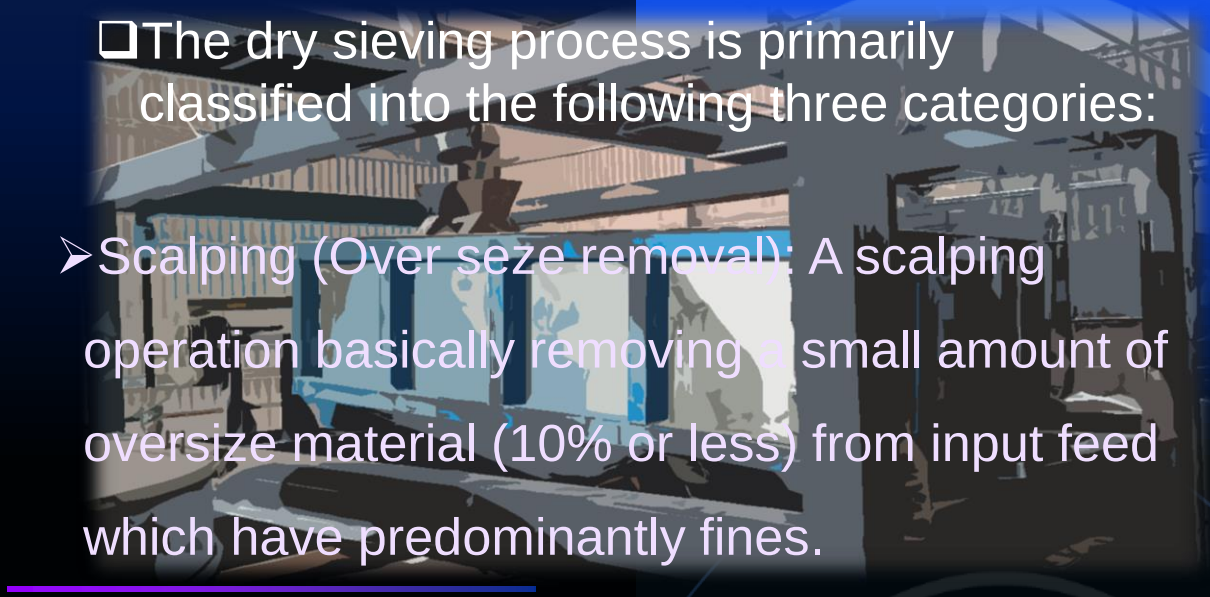
Classification of Dry Sieving process



- The dry sieving process is primarily classified into the following three categories:

- Scalping (Over seze removal): A scalping operation basically removing a small amount of oversize material (10% or less) from input feed which have predominantly fines.

- Fines Removal: The process involves removing a small amount of fines material (10% or less) from a feed which is predominantly oversize.

- Grading: Grading involves the classification of material based on size separations conducted on single or multiple sieve surfaces (Deck Layers). These separations typically categorize particles as coarse (approximately 5mm particles and larger), medium (ranging from approximately 5mm to 0.5mm particles), and fine (particles smaller than 0.5mm)

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Scalping (Over size removal):

Scalping in dry sieving involves removing a small amount of oversize material from predominantly fine input feeds, contributing to improved product quality, processing efficiency, and waste reduction.

- Scalping is a sieving operation focused on removing a small amount of oversize material from the input feed.
- Typically targets materials with predominantly fines, aiming to eliminate coarse particles to enhance downstream processing.

Key Characteristics

Minimal Oversize Removal: Scalping involves removing only a small percentage (usually 10% or less) of oversize material from the feed stream.

Predominantly Fines: The input feed consists mostly of fine particles, with a smaller proportion of larger particles that need to be separated out.

Preparation for Downstream Processing: Scalping is often employed as a preliminary step to prepare the material for further processing, such as refining or classification.

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Fines Removal:

Fines removal in dry sieving involves selectively extracting a small amount of fines material from a predominantly oversize feed stream, contributing to improved product quality, equipment efficiency, and waste reduction

- Fines removal in dry sieving focuses on eliminating a small amount of fines material (typically 10% or less) from a feed stream that is predominantly oversize.

Key Characteristics

Predominantly Oversize Feed: The input feed consists mostly of larger particles (oversize) with a smaller proportion of fines that need to be separated out.

Selective Removal of Fines: Fines removal targets the extraction of a specific percentage of fine particles while retaining the majority of the oversize material.

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Grading:

Grading in dry sieving involves the classification of material into coarse, medium, and fine fractions based on size separations conducted on single or multiple sieve surfaces, facilitating quality control and optimized material utilization.

- Grading in dry sieving involves the classification of material based on size separations conducted on single or multiple sieve surfaces (Deck Layers).

Key Characteristics

Multiple Sieve Surfaces (Deck Layers): Grading may utilize multiple sieve decks to achieve finer size separations and enhance classification accuracy.

Particle Size Categories:

- **Coarse**: Approximately 3mm particles and larger.
- **Medium**: Ranging from approximately 3mm to 0.5mm particles.
- **Fine**: Particles smaller than 0.5mm.

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KEY FACTORS AFFECTING SIEVING PERFORMANCE

- Material Characteristics.
- Plugging or Blinding.
- Screen Opening Selection.
- Types of Screen Motion.

➢Material Characteristics.

Understanding these material characteristics is crucial for optimizing sieving processes and achieving accurate and reliable results.

Particle Size Distribution:

- Refers to the range and distribution of particle sizes in the material being sieved.
- Influences the efficiency of separation and throughput of the sieve.

Bulk Density:

- The mass of particles per unit volume of the material.
- Higher bulk density may require more energy for sieving and affect the sieving efficiency.

Particle Shape:

- Describes the geometry of the particles (e.g., spherical, irregular).
- Irregular shapes can impede sieving efficiency compared to spherical particles.

Flow ability (Angle of Repose):

- Angle at which a pile of material will naturally form a cone shape.
- Affects the flow of material through the sieve and the tendency to form agglomerates.

Friability:

- Refers to the tendency of particles to break down into smaller fragments during handling or sieving.
- Highly friable particles can affect the accuracy of the sieving process.

Surface Moisture or Oil Content:

- The presence of moisture or oil on particle surfaces can affect their adhesion and flowability.
- May require adjustments in sieving parameters to achieve desired results.

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➢Material Characteristics.

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➢Blinding (Plugging).

Addressing blinding issues is essential for maintaining sieving performance and obtaining accurate results in particle size analysis. Implementing preventive measures can help mitigate blinding and ensure efficient sieving operations.

- Blinding occurs when particles plug or coat the surface of the sieve screen, impeding the passage of material through the openings.
- It can result from the accumulation of near-size particles, moisture, or oil on the surface of particles.

Causes of Blinding

Particle Plugging: Near-size particles become lodged in the screen openings, obstructing the passage of material.
Particle Coating: Fine particles adhere to the screen surface, forming a layer that blocks the sieve openings.
Moisture or Oil: Presence of moisture or oil on particle surfaces can lead to bridging, where particles stick together and form obstructions within the screen openings.

Impact on Performance

- Reduced sieving efficiency
- Lower throughput
- Inaccurate particle size distribution analysis

Preventive Measures

- **Screen Cleaning**: Regular cleaning of the sieve screen to remove accumulated particles and coatings.

Plugging or Blinding

➢Screen Opening Selection.

Careful consideration of screen opening size and cloth selection is crucial for achieving optimal sieving performance while maintaining durability and minimizing maintenance needs

Screen Opening

- The size of the openings in the sieve screen greatly influences sieving performance.
- Larger screen openings allow for greater throughput and faster sieving.
- However, achieving a larger open area often requires the use of thinner wire gauges, which can impact durability.

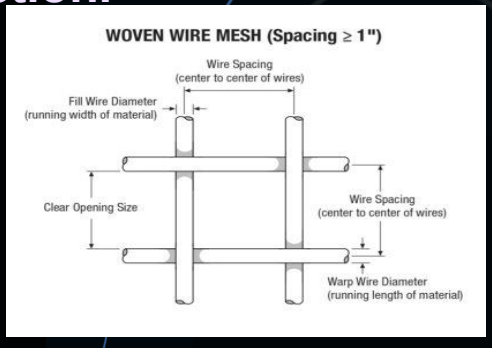
Screen Cloth Selection

- Choosing the right screen cloth is a strategic decision that directly impacts sieving performance.
- Increasing the open area of the screen cloth enhances output but may compromise durability due to thinner wire gauges.
- Balancing open area and wire gauge thickness is essential for optimizing both performance and longevity.

Considerations:

- **Open Area vs. Durability**: Striking a balance between maximizing open area for increased output and ensuring the durability of the screen cloth.
- **Material Compatibility**: Selecting screen cloth materials that are compatible with the characteristics of the material being sieved.
- **Maintenance Requirements**: Understanding the maintenance needs associated with different screen cloth selections to mitigate wear and tear.

Screen Opening Selection.



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➢Types of Screen Motion.

Each type of screen motion offers unique advantages and is suited for specific applications. Understanding the characteristics of each motion type is essential for selecting the most suitable sieving equipment for various processing requirements.

1. Vibratory Motion

- Utilizes vibratory motors or eccentric shafts to generate rapid, continuous vibrations.
- Effective for fine particle separation and efficient material conveyance across the screen surface.
- Commonly used in circular or linear vibrating screens.

Rectangle (linear) Vibratory Screeners

Circular Vibratory Screener

➢Types of Screen Motion.

2. Rotary Motion

- Rotary motion in a sieving machine typically involves a circular motion of the sieve screen or sieve assembly.
- The circular rotating motion of the sieve screen allows particles to move across the screen surface, while smaller particles pass through the openings and larger particles are retained on the screen.

Circular Motion: The sieve screen or assembly mounted on a central axis. As the machine operates, this central axis rotates, causing the sieve screen to move in a circular motion.

Particle Movement: As the sieve screen rotates, particles fed onto the screen surface experience centrifugal force, pushing them towards the outer edges of the screen.

Screening Action: The circular motion of the sieve screen allows particles to move across the screen surface, while smaller particles pass through the openings and larger particles are retained on the screen.

Uniform Distribution: The rotary motion helps in the uniform distribution of feed material across the screen surface, ensuring efficient screening and separation of particles.

Application: Rotary sieving machines are commonly used in industries such as food processing, pharmaceuticals, and agriculture for tasks like grading, separating, and de-dusting bulk materials.

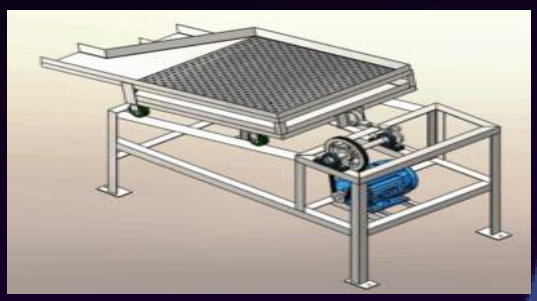
2. Rotary Motion

➢Types of Screen Motion.

3. Reciprocating Motion: Reciprocating motion in sieving involves a back-and-forth movement of the sieve screen, suitable for coarse screening and scalping applications. It offers high-capacity throughput and effective particle separation, making it a versatile choice for various sieving operations.

- Involves a back-and-forth motion of the sieve screen along a straight path.
- Suitable for coarse screening and scalping applications.
- Offers high-capacity throughput and effective particle separation.
- Reciprocating motion facilitates the stratification of feed material over the sieve screen surface.
- **Back-and-Forth Motion**: Reciprocating motion involves a back-and-forth movement of the sieve screen along a straight path. This motion alternates between moving towards and away from a fixed point.
- **Suitability for Coarse Screening and Scalping**: Reciprocating motion is particularly suitable for coarse screening and scalping applications. It efficiently separates larger particles from the feed material, helping to remove unwanted oversize material.
- **High-Capacity Throughput**: Despite its simplicity, reciprocating motion offers high-capacity throughput, allowing for the processing of large volumes of material within a relatively short time.
- **Effective Particle Separation**: Reciprocating motion facilitates effective particle separation by propelling particles across the sieve screen surface. This movement helps to stratify the material and achieve accurate size classification.

3. Reciprocating Motion



4. Gyratory Motion

- Characterized by a gyratory or circular motion of the sieve screen.
- Ideal for precise sizing and classification of materials.
- Provides excellent screening efficiency and uniform particle distribution
- **Gyratory Motion**: Gyratory motion is characterized by a circular or gyratory movement of the sieve screen. This motion involves rotation around a central axis, creating a circular path for the material on the screen surface.
- **Ideal for Precise Sizing and Classification**: Gyratory motion is particularly suitable for precise sizing and classification of materials. The consistent circular movement helps to evenly distribute the material across the screen surface, facilitating accurate separation based on particle size.
- **Excellent Screening Efficiency**: Gyratory motion provides excellent screening efficiency by ensuring thorough agitation and mixing of the material bed. This agitation helps to prevent particle entrapment and blinding, resulting in uninterrupted sieving and high throughput.
- **Uniform Particle Distribution**: The circular motion of gyratory sieving machines promotes uniform particle distribution on the screen surface. This leads to a more even distribution of particles across the various sieve openings, contributing to consistent and reliable particle separation.

Rectangle (linear) Gyratory Screeners

Circular Type Gyratory Screener

5. Gyratory with Reciprocating Motion

Gyratory with reciprocating motion in a screening machine combines the benefits of both types of motion to offer versatility, enhanced performance, and flexibility in handling a wide range of materials and particle sizes. This innovative approach represents a significant advancement in the field of sieving technology.

A. Combination of Gyratory and Reciprocating Motions: Gyratory with reciprocating motion combines the characteristics of both gyratory and reciprocating motions in a single screening machine. This innovative approach allows for a unique sieving action that incorporates both circular and back-and-forth movements.

B. Versatility in Handling Materials and Particle Sizes: This hybrid motion offers versatility in handling a wide range of materials and particle sizes. The combination of gyratory and reciprocating motions enables the machine to effectively process various types of materials, including coarse, fine, and difficult-to-screen particles.

C. Enhanced Sieving Performance: Gyratory with reciprocating motion provides enhanced sieving performance compared to machines utilizing only one type of motion. The combination of motions facilitates better particle stratification, resulting in improved separation efficiency and higher-quality end products.

D. Flexibility in Operation: The ability to switch between gyratory and reciprocating motions offers flexibility in operation. Operators can adjust the motion settings based on the specific characteristics of the material being processed, allowing for optimized sieving performance and adaptability to changing requirements.

Two **SHIVRAX** sieving machines installed in Gujarat, India

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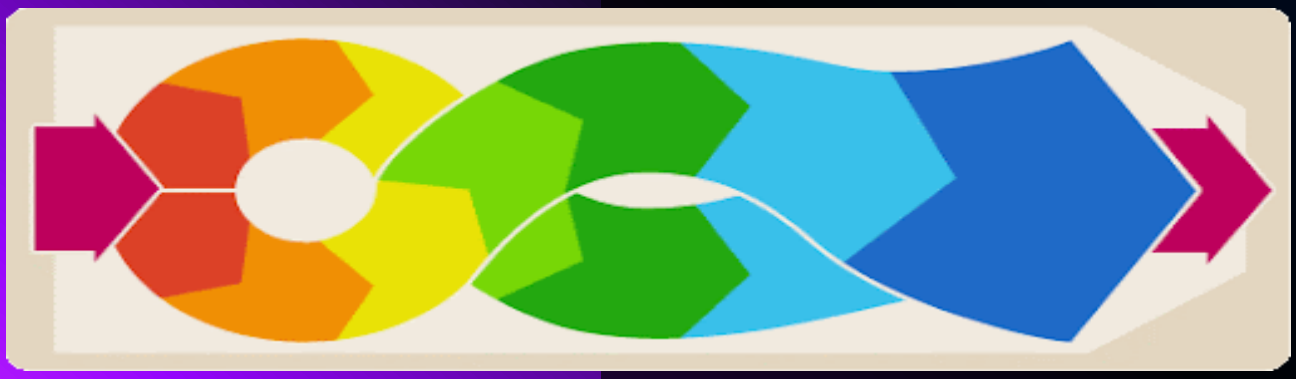
Gyratory action at feed end: The gyratory reciprocating motion at the feed end rapidly spreads the feed materials, facilitating stratification over the screen cloth, ensuring even distribution and efficient sieving.

Elliptical Motion at middle area: In the middle area of the screen surface, elliptical motion assists bouncing balls in bouncing into the ball tray, keeping the screen cloth lively and preventing blinding. This action enhances screening effectiveness by maintaining optimal screen surface conditions.

Straight-line motion (reciprocating action) at discharge end: Towards the end of the screener machine, straight-line motion (reciprocating action) gently conveys oversize material off the screen, ensuring smooth and efficient removal of larger particles, thus optimizing the sieving process.

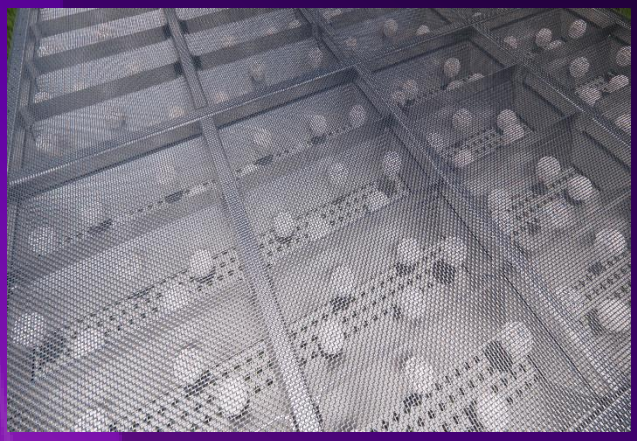


Graphical illustration for pathway of feed in **SHIVRAX** sieving machine

Blinding is Prevented by unique design

The **SHIVRAX** screener machine introduces a groundbreaking design that effectively eliminates blinding, setting it apart from conventional screening equipment. Its innovative approach involves separating the ball tray and screen cloth frame, forming a cohesive unit. This configuration allows for optimal bouncing within strategically positioned ball pockets, orchestrated by a combination of gyratory and reciprocating motion. This dynamic interaction ensures continuous and efficient cleaning of the screen mesh, preventing particle entrapment and maintaining uninterrupted screening operations.

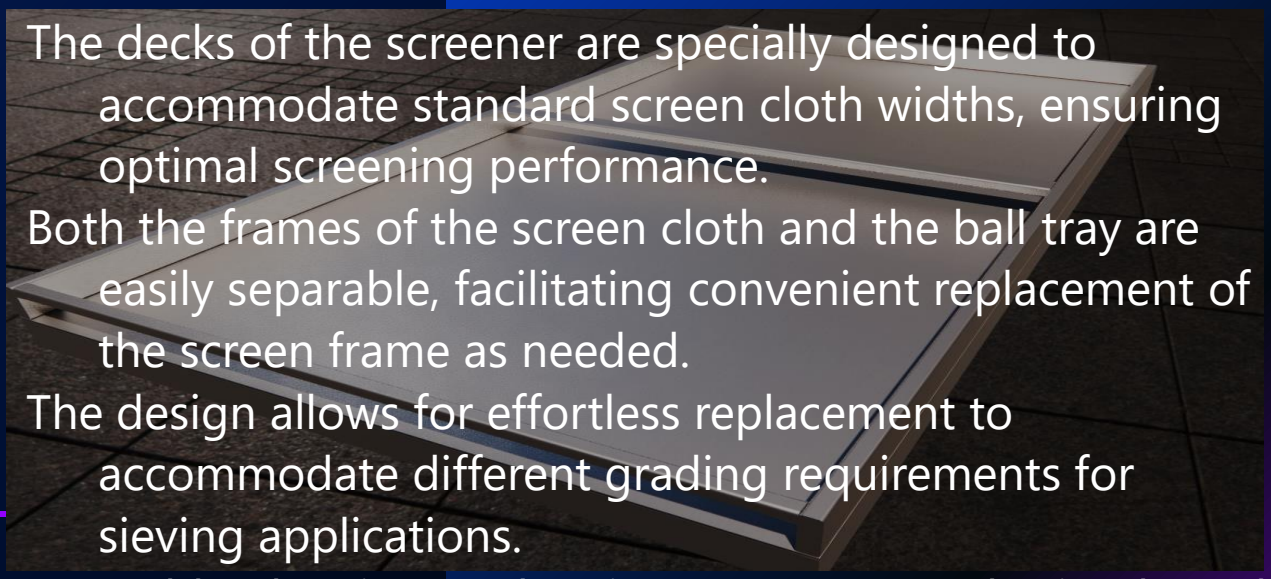
The screener's automatic screen mesh cleaning mechanism, powered by the rhythmic bouncing action of the balls, ensures a pristine surface for screening. Additionally, the gentle yet persistent hammering of the balls against the inner surface of the screen cloth rejuvenates it, enhancing longevity and sustained performance. Overall, the **SHIVRAX** screener's unique design not only prevents blinding but also guarantees the vitality and reliability of the screen surface, optimizing screening efficiency across a wide range of applications.



Bouncing balls in **SHIVRAX** sieving machine

Design and Construction of SHIVRAX Screener Machine

A. Decks and Framing:



The decks of the screener are specially designed to accommodate standard screen cloth widths, ensuring optimal screening performance.

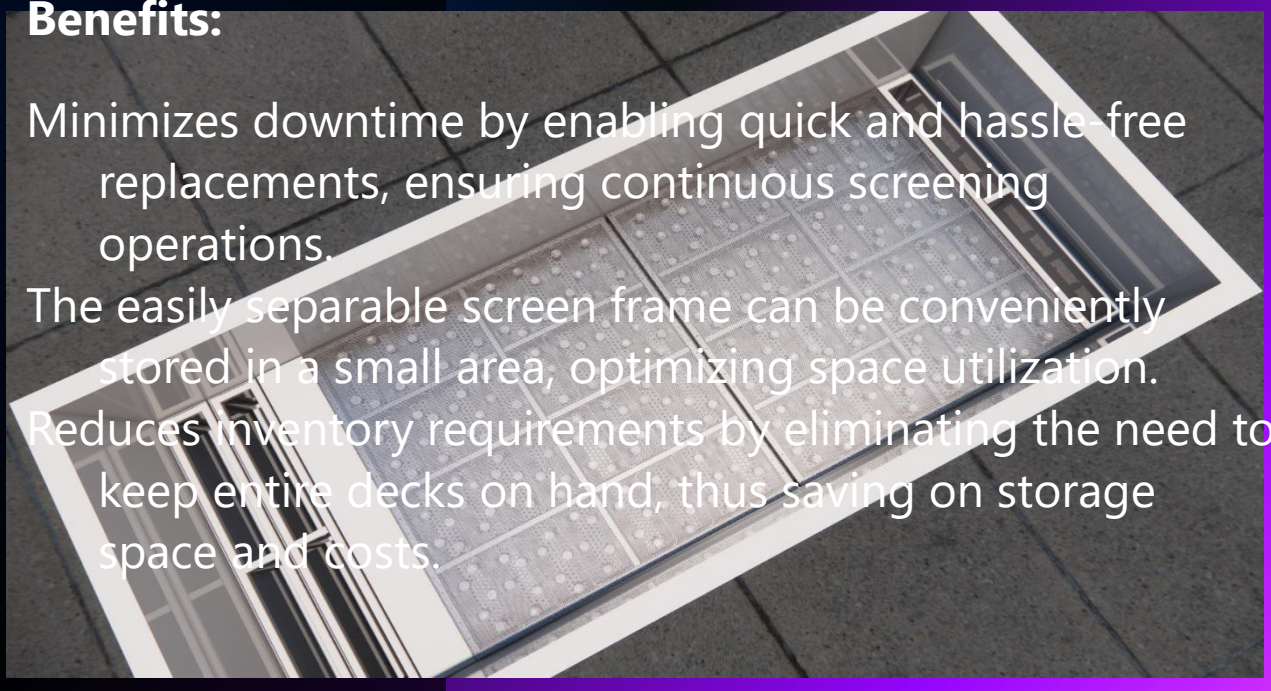
Both the frames of the screen cloth and the ball tray are easily separable, facilitating convenient replacement of the screen frame as needed.

The design allows for effortless replacement to accommodate different grading requirements for sieving applications.

Assembly, cleaning, and maintenance are made simple and straightforward, enhancing operational efficiency.

No complex tools are required for disassembly and assembly, streamlining maintenance procedures.

Benefits:



Minimizes downtime by enabling quick and hassle-free replacements, ensuring continuous screening operations.

The easily separable screen frame can be conveniently stored in a small area, optimizing space utilization.

Reduces inventory requirements by eliminating the need to keep entire decks on hand, thus saving on storage space and costs.

Framing designs of SHIVRAX Screening machine

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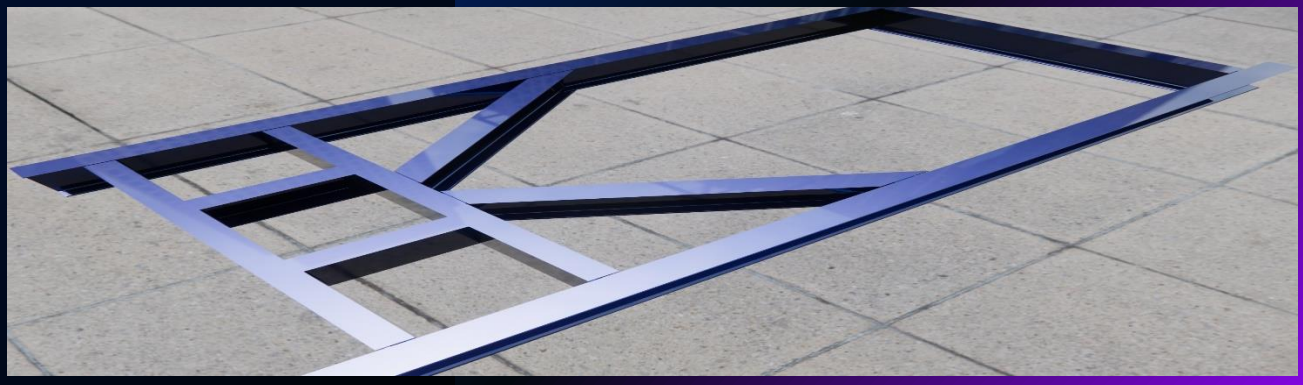
B. Machine Structural Holding Frame, Counterbalance Base Frame, and Swing Frame:

The structural components are crafted from heavy-duty and standard mild steel, ensuring robustness and durability.

Benefits:

- Provides stability and structural integrity to the machine, guaranteeing reliable performance over extended periods of operation.



Framing designs of SHIVRAX Screening machine

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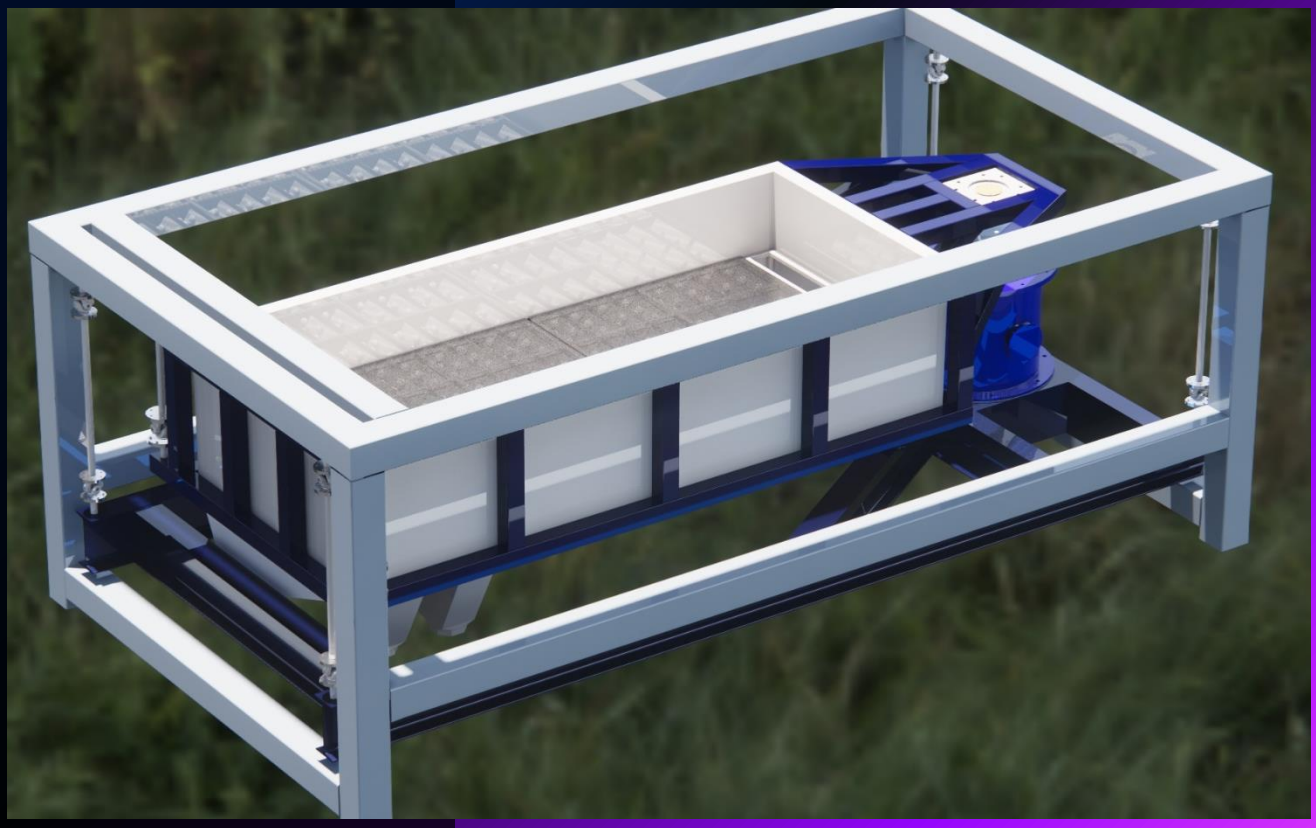
C. Drive Head with Counterbalancing:

- The body and bearing housing are constructed using standard mild steel, while shafting and attachments are made of EN8 or higher-grade steel.
- The drive head is meticulously designed, featuring counterweights attached to the main driving shaft, tailored to the machine's size and operational forces.

Benefits:

- Enhances operational efficiency and longevity by ensuring smooth and balanced rotation, reducing wear and tear on components.



The graphical 3D view of SHIVRAX Screener Machine

Design and Construction of SHIVRAX Screener Machine

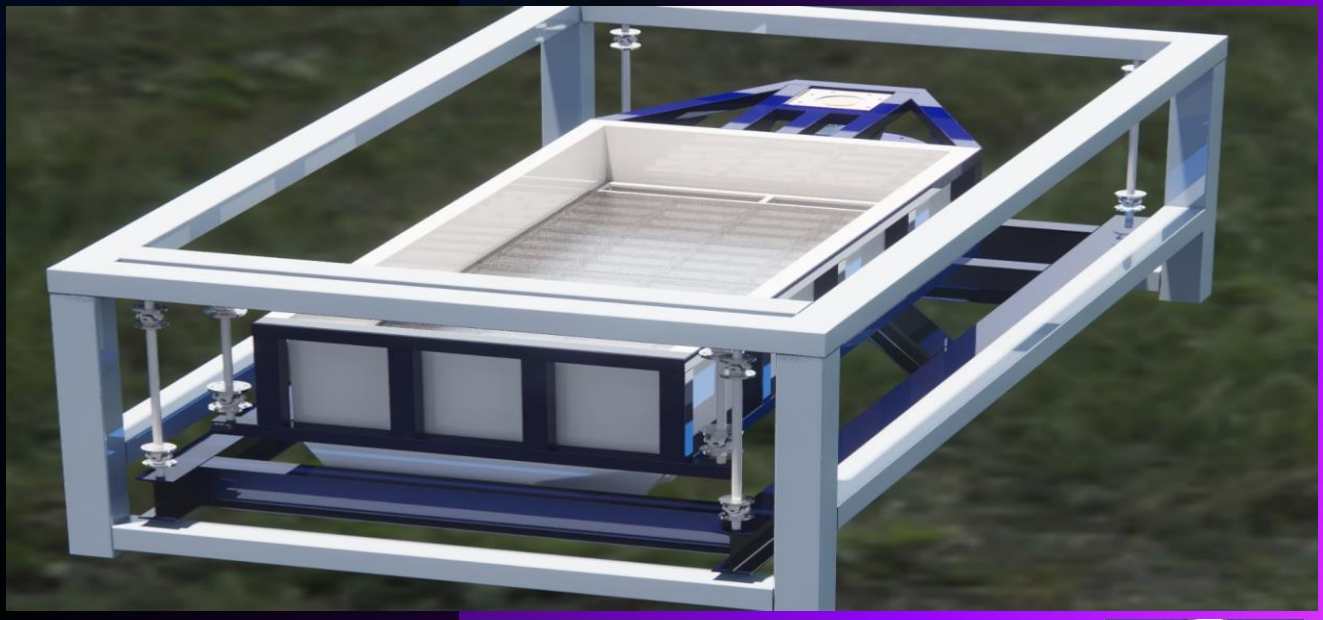
D. Enclosed Design and Positive Sealing:

All screen decks and spacer frames are securely housed within the screener box, maintaining a contained environment.

Continuous sealing strips are incorporated between all sections of decks and frames, preventing both cross-contamination between product fractions and leakages from the machine.

Benefits:

- Guarantees product purity and integrity by preventing contamination and spillage, ensuring compliance with stringent quality standards.
- Enhances workplace safety by containing materials within the machine, minimizing the risk of spills or accidents



The graphical 3D view of SHIVRAX Screener Machine

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Design and Construction of SHIVRAX Screener Machine

E. Heavy-Duty Universal Joints:

- Heavy-duty standard universal joints, fabricated from high-quality EN8 material, serve as the pivotal connection points for the machine, enabling free movement across all three dimensions with smooth motion.
- A specialized mechanism is integrated to facilitate the adjustment of the slope of the screener swing frame according to specific requirements.

Benefits:

- Ensures reliable and flexible operation by allowing the machine to pivot smoothly in multiple directions, accommodating variations in material flow and screening conditions.
- Provides versatility and customization options, allowing operators to fine-tune the angle of the swing frame to optimize screening efficiency and performance.

Framing designs of SHIVRAX Screening machine

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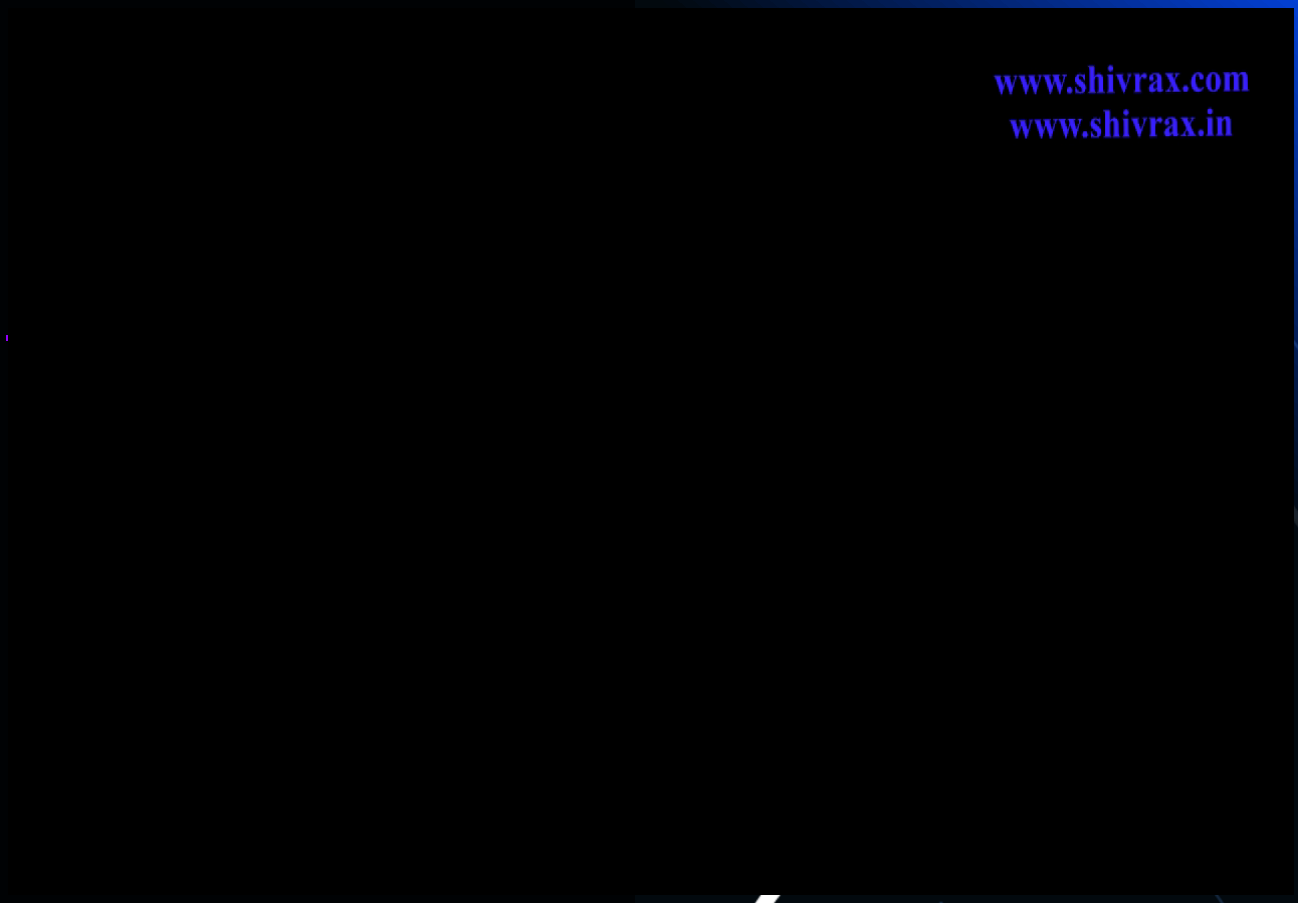
HOW DOES SHIVRAX Screener Machine WORK?



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HOW DOES **SHIVRAX** Screener Machine WORKS?

1. **The Unique Sieving Machine**: Introduce the **SHIVRAX** Screener Machine as the subject of discussion. This machine is designed for sieving applications and stands out due to its unique features.
2. **Gyratory Motion with Reciprocating Action**: The **SHIVRAX** Screener Machine utilizes a combination of gyratory motion and reciprocating action. Gyratory motion involves circular or elliptical movement, while reciprocating action refers to back-and-forth movement along a straight path.
3. **High Efficiency in Power Consumption**: One of the key features of **SHIVRAX** Screening Machines is their high efficiency in power consumption. This means that they are able to achieve effective sieving while using minimal energy.
4. **Capacity Four Times Greater**: The capacity of **SHIVRAX** Screening Machines is four times greater than that of conventional round-type vibrating screens. This indicates that they are capable of processing a significantly larger volume of material in the same amount of time.
5. **Comparison to Conventional Screens**: The **SHIVRAX** Screening Machines outperform conventional round-type vibrating screens in terms of both power consumption and capacity. This makes them a more efficient and cost-effective option for sieving applications.
6. **Proactive Screen Mesh Cleaning System**: The proactive screen mesh cleaning system integrated into **SHIVRAX** Screeners. This feature ensures that the screen surface remains free from clogging or blinding, enhancing the efficiency of the sieving process.

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HOW DOES SHIVRAX Screener Machine WORKS?

7. **Enhanced Efficiency and Capacity**: The combination of gyratory and reciprocating motion, along with the proactive screen mesh cleaning system, results in remarkably high efficiency and capacity.
8. **Distinguishing Features**: The unique features distinguish SHIVRAX Screeners from conventional sieving systems. The unique motion and automatic and continue mesh cleaning system contribute to improved performance and productivity.
9. **Superior Efficiency**: The scientificaly distinctive design attributes contribute to superior efficiency. The combination of gyratory motion with reciprocating action enables the machine to achieve thorough sieving with reduced energy consumption, outperforming alternative sieving machines.
10. **Spectrum of Options**: The SHIVRAX Screening Machines provide a spectrum of options, catering to diverse sieving requirements and preferences.
11. **Single-Screen Surface Models**: The SHIVRAX offers single-screen surface models capable of producing two grades (one separation). These models are suitable for applications where a basic separation into two distinct grades is sufficient.
12. **Three-Screen Surface Layer Models**: The SHIVRAX also offers three-screen surface layer models capable of yielding three grades (four separations). These advanced models provide additional flexibility, allowing for finer grading and more precise separations.

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HOW DOES SHIVRAX Screener Machine WORKS?

13. **Versatility and Customization**: The range of options provided by SHIVRAX allows users to select the most suitable model based on their specific needs and requirements. Whether it's basic two-grade separation or more complex four-separation processes, SHIVRAX offers solutions to accommodate various applications.
14. **Groundbreaking Innovation**: The SHIVRAX Screener Machine as a groundbreaking innovation in the sieving industry, signaling a departure from traditional screening processes.
15. **Revolutionizing Traditional Sieving**: The innovation in the particle separation (sieving process) is poised to revolutionize traditional screening processes by introducing new methods and techniques that enhance efficiency, accuracy, and reliability.
16. **Unparalleled Performance**: The SHIVRAX Screener Machine delivers unparalleled performance, setting new standards for sieving equipment in terms of throughput, precision, and dependability.
17. **Redefined Efficiency, Accuracy and Reliability**: The SHIVRAX Screener Machine promises to redefine efficiency, accuracy, and reliability in material separation applications, offering improved outcomes and greater consistency.
18. **New Era of Productivity and Quality Assurance**: In the field of sieving process this pioneering solution is poised to usher in a new era of productivity and quality assurance across a diverse range of industrial sectors, benefiting companies seeking to optimize their processes and enhance their competitiveness.

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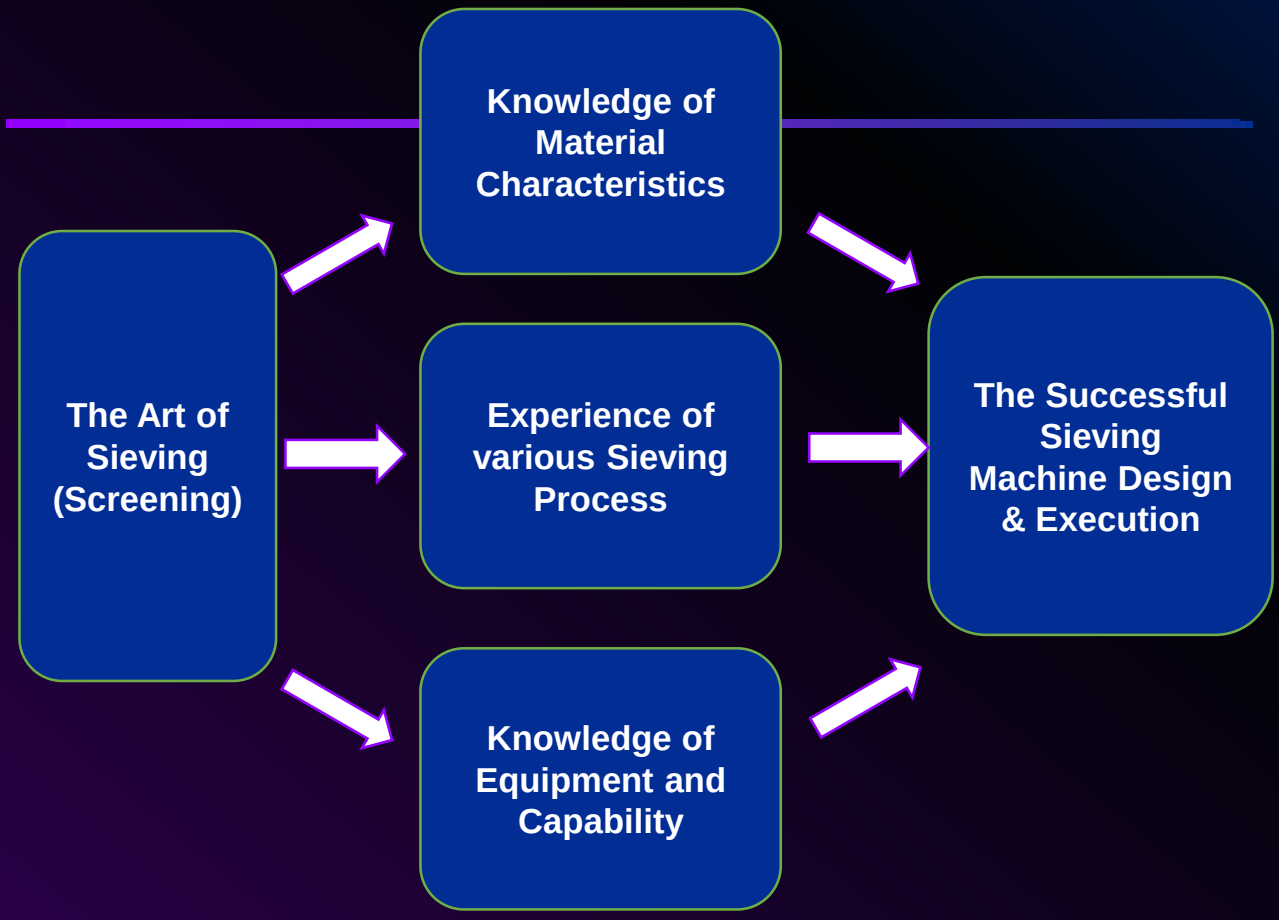
Screener Efficiency

Efficiency = Product size material recovered / Product size material available

Higher Efficiency measured by achieving the optimum Product quality (size) with optimum product outputs (Yield).



Thank You