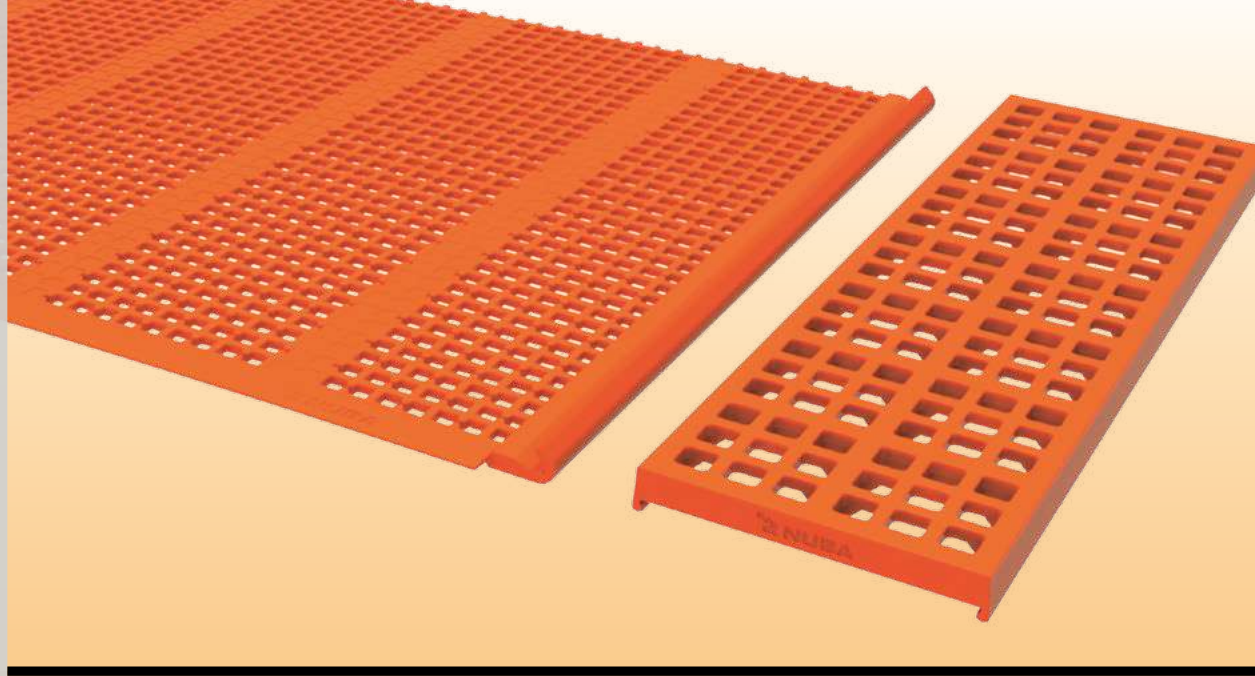
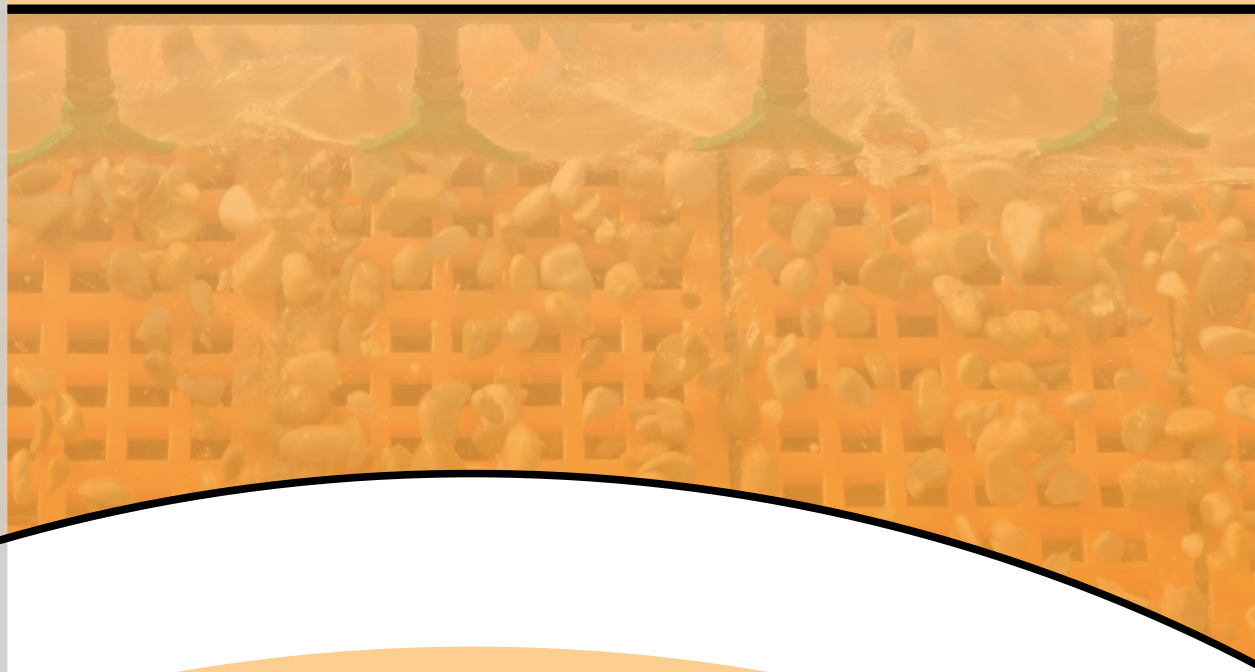
Polyurethane Screens





Screening Media

6

NUBA Screening Media & NUBA Technical Advice


NUBA
Screening Media
&
NUBA
Technical Advice

Polyurethane Screens

Polyurethane, due to its high anti-abrasiveness and great elastic properties, is advisable for screening abrasive materials and performs at its utmost under dry or humid conditions.

PU can be formulated in various hardnesses, formats, according to the application it is used for.

Characteristics

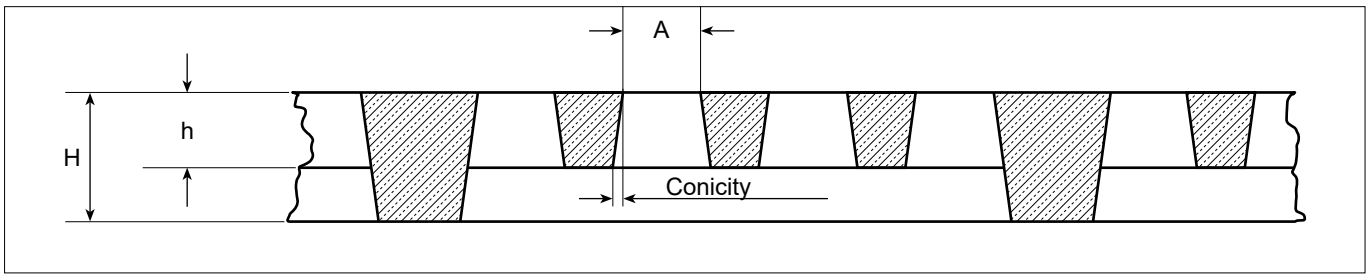
- Maximum duration compared with other screening materials.
- Minimum maintenance cost.
- Easy to install
- Low obstruction (conic perforations and elasticity).

Mechanical properties of NUBA's PU:

We have two different formulation systems: polyester, with high anti-abrasive properties, and polyether, indicated for hydrolysis / antibacterial situations.

Types of Polyurethane		
Properties	**Polyester** (Max value / Norm)	**Polyether** (Max Value / Norm)
Tensile Strength (Mpa)	60 / DIN 53504	37.8 / ISO 37-T1
Elongation at break (%)	670 / DIN 53504	680 / ISO 37-T1
Resilience (%)	65 / DIN 53512	75 / ISO 4662
Abrasion Loss (mm^3)	12 / ISO 4649	<35 / ISO 4649
Compressive Strength (%)	48 / ISO 815-1	40 / ISO 815-1

Broadly speaking, we consider the density as 1.210 Kg/m^3



A = Aperture (square and rectangular).

H = Total thickness.

h = Screening thickness.

The thicknesses depend on the aperture requested and the workload.

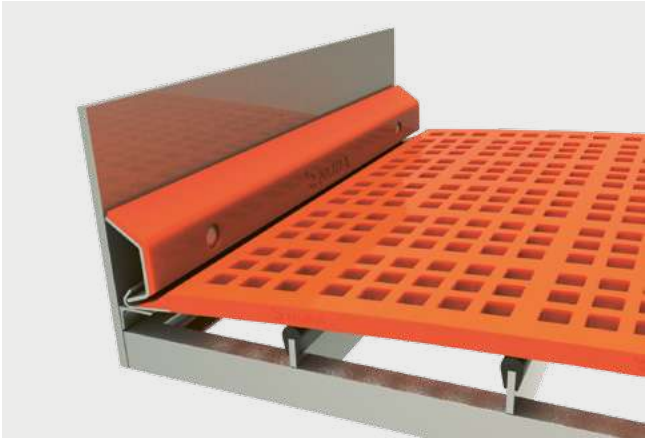
Possible hardness range: **55º - 95º Shore A**.

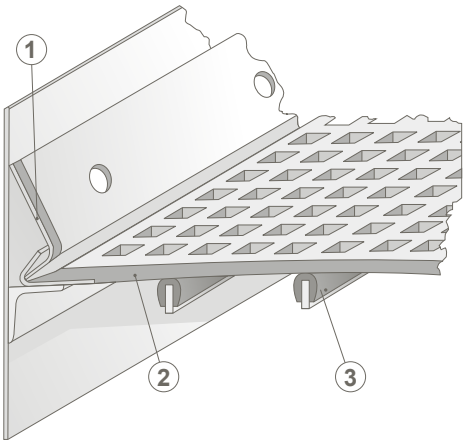
Polyurethane Tension Screens

PU Tension screens

Characteristics

Tension screens directly replace metallic meshes without having to modify or adapt the machine. They are built with metallic cable reinforcement to absorb the tension, increasing the polyurethane's resistance to strain and load.





1 Tension side plate 2 PU Panel

3 Rubber profile

Flexible polyurethane

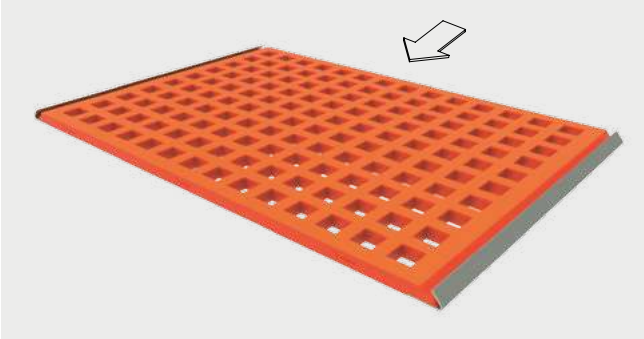
Polyurethane with a formulation that adds flexibility, essential attribute when screening materials that build-up on screen surface, peg or wedge.

Standard monolayer polyurethane (single layer)

For all basic needs in screening we use our standard monolayer polyurethane, this is the same hardness through-out the PU panel.

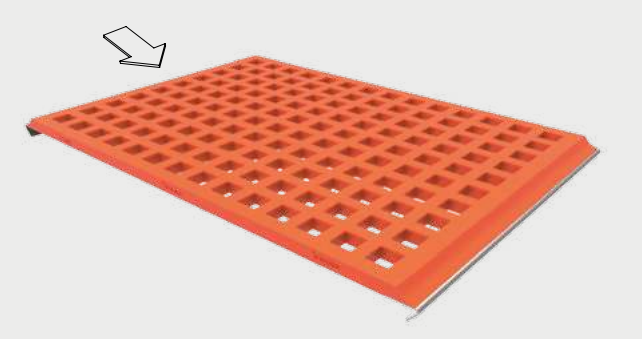
Bishore polyurethane (double layered)

For special applications where soft PU is used on screening surface, to withstand the abrasion and hard PU to with stand impact and load.



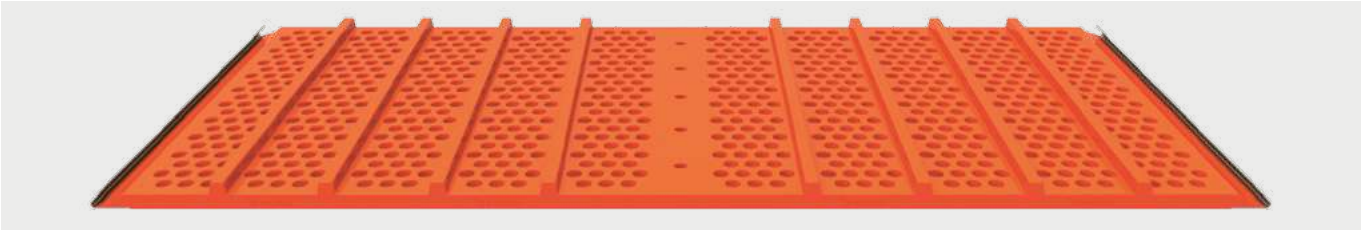
Side tension meshes

With metallic cable reinforcement to withstand the tension from the side tension hooks, perpendicular to the material flow.



End tension meshes

With metallic cable reinforcement to withstand the tension from the end tension hooks, parallel to the material flow.



Tension meshes with rider bars

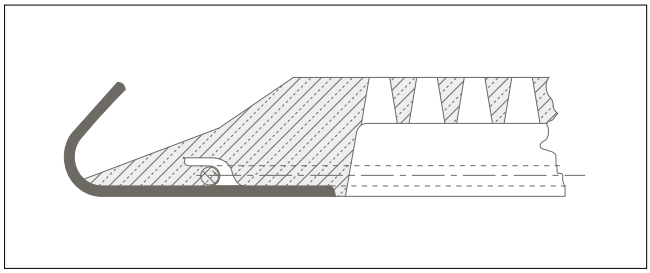
For certain applications, rider bars can be added to protect the screening surface and guide material into perforations.

Types of tension

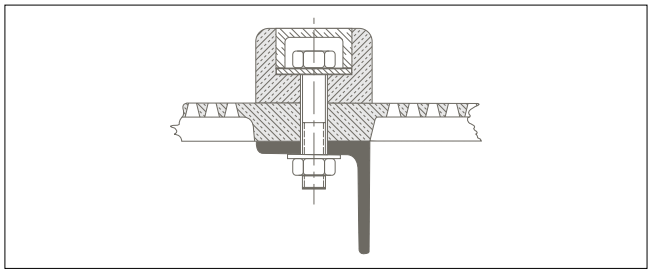
Longitudinal tension

The alternatives Type 1-BIS and Type 2-BIS are variants with total coating of the hook creating a 90º edge.

Side Tension



Polyurethane central hold-down bar



Polyurethane Tension Mesh

Poliuflex®

Properties

They have a high screening area, similar to metallic meshes, and their abrasion resistance is much superior.

Installation

The replacement of the metallic mesh by the Poliuflex® does not require any transformation in the screens deck; however, certain requirements should be taken into account:

- Each Poliuflex® Screen panel must be tensioned by individual tension plates.
- The Poliuflex® Screen must rest on all the screen decks supports, covered by their corresponding rubber profiles. There are blind areas on the screen that need to coincide with the screen decks supports.
- The tension produced by the side plates is similar to the tension used on metallic meshes; make sure that in no case the Poliuflex® hooks touch the interior walls of the screen.
- In the event that the Poliuflex® Screen needs a central hold-down bar, ensure that in no case will the tension cables inside the mesh be cut.

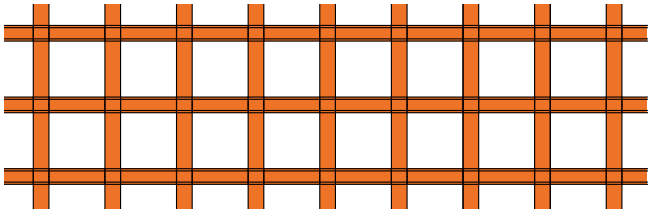
Maintenance

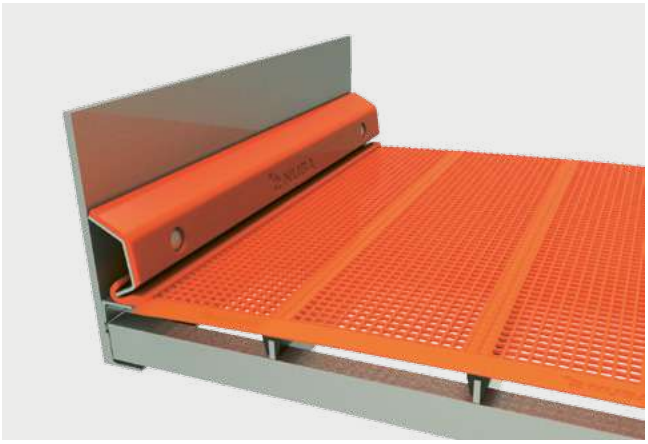
According to the production and working hours of the screen, it is highly recommended to periodically check the correct tension of the Poliuflex® Screen; it is advisable to retighten the screws of the Tension Plates frequently. In case of fine buildup or dirt on the Poliuflex® Screen, avoid cleaning it with metallic or sharp elements. Use a de-clogging rod. (See page 128).

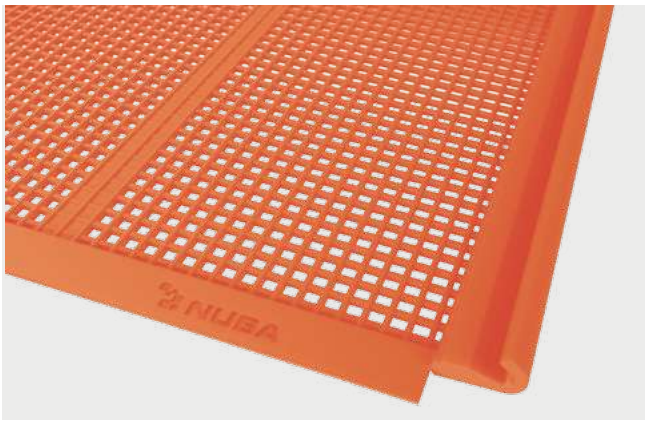
Positive results are obtained by having the screen idle for some time when panels are mounted for the first time.

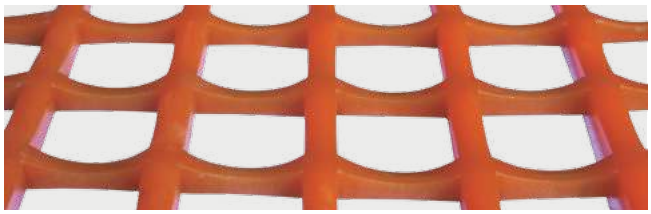
Range manufactured

Apertures are manufactured **from 5 mm to 25 mm**, although the range is continually being increased with a constant investment in new molds and manufacturing tools.

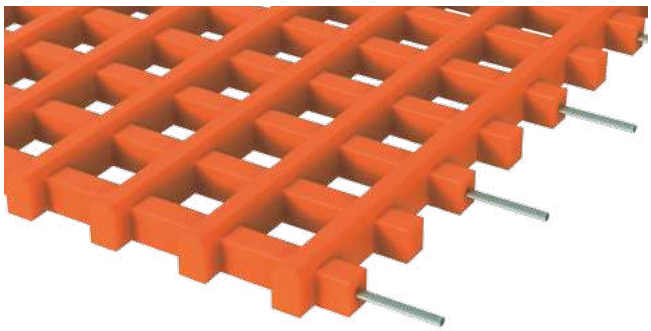








Poliuflex® screen Aperture 9 thread 4 mm after 1150 hours carrying out wet screening of quartzite material with 97% SiO_2



Polyurethane Tension Screens

TN Flex®

Characteristics

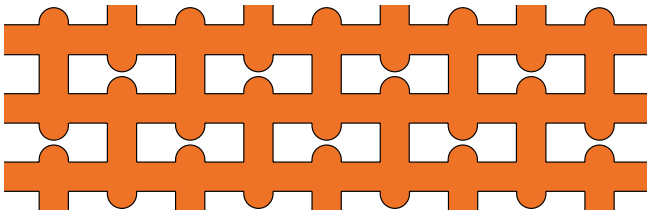
Polyurethane has great properties as a screening material. It is abrasion-resistant, works perfectly in dry or wet screening and has elastic properties to avoid material build-up, pegging and blinding. This is why there are many different screening systems made from PU.

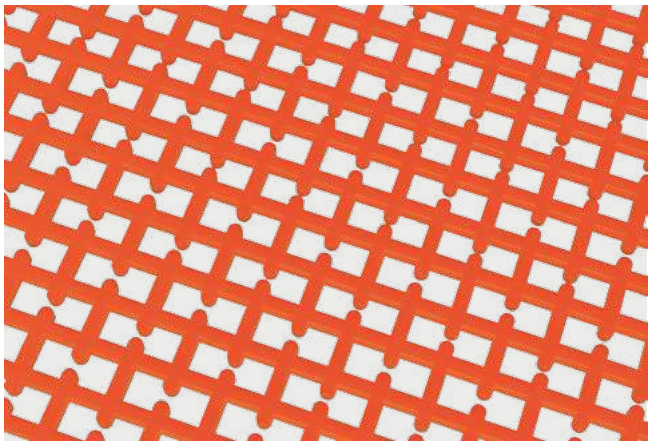
All these systems have to consider wear resistance, screening precision, production out-put, and ease of installation.

NUBA Screening Media's technical department and R+D+I department, in its continuous search for new advanced screening systems, have designed, developed and tested the TN Flex® system, which has almost the same screening capacity as metallic mesh, it is manufactured in PU making it wear resistant, it has metallic cables inside to withstand loads and impacts and it has great self-cleaning properties thanks to its flexible and elastic characteristics.

What brings the main novelty to the TN Flex® system is its special aperture geometry, until now square aperture has always been considered to obtain the most precision in screening. TN Flex's aperture has a square-like shape keeping its precision, but joining one side of this square to another making the hole perimeter a little more flexible to avoid even more the pegging and blinding that may occur.

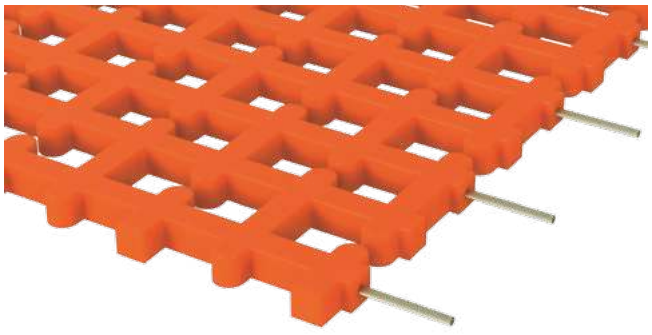
The square-like shape in this product is ensured by the position of the tension cables which avoid any deformation in the aperture when tensioned.



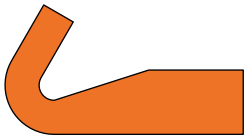


Range manufactured

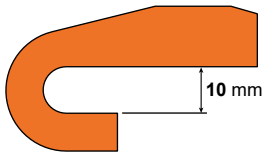
Apertures are manufactured **from 5 mm to 8 mm** (4mm under request), although the range is continually being increased with a constant investment in new molds and manufacturing tools.



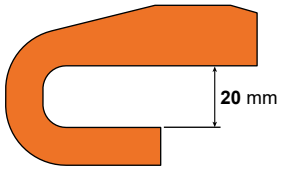
Types of hooks for Poliuflex® and TN Flex®



Side tension hook



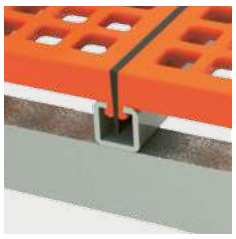
End tension hook 30



End tension hook 40

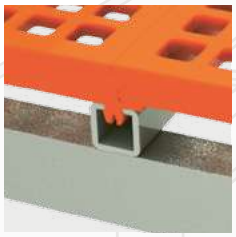
AZ hook

Polyurethane Modular Systems



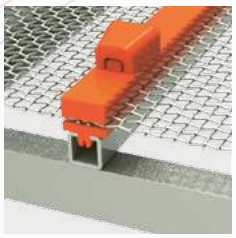
TN®

Multi Stub Fixing

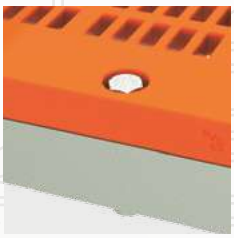


Indalo

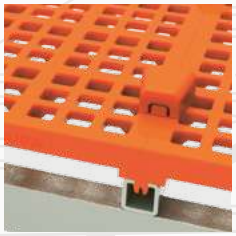
Pin Style



Mixed

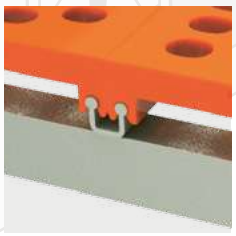


Flat Screen panel

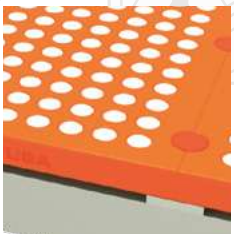


Three Point Fixing

Cascade



U-Shape Profile



With Ceramic Inserts

*For other systems please check availability.

Polyurethane Modular Systems

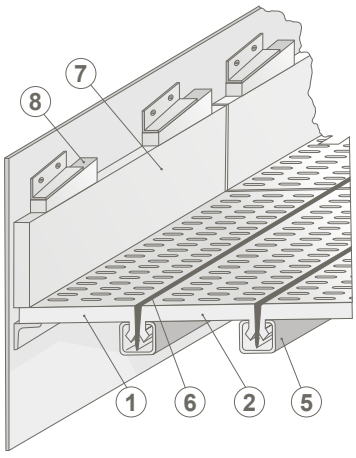
Through the years many screen manufacturers developed modular systems for fixing polyurethane screens on machine decks. The main benefit obtained is that if your screen surface breaks on a specific area, you are able to change only the modules that are affected. Each modular system will have its advantages and disadvantages mainly according to the ease of installation, the faster the module can be changed, the less downtime of the machine.

The way the modular system is fixed on the deck varies from one system to another, having to modify the deck if you want to change the system. Many systems in Europe use a grooved metallic profile (40x40mm or 40x80mm, see fig.5). NUBA Screening Media has its own patented system called TN® which uses this same profile, making it easy to switch to our system.

Polyurethane Modular System
TN®

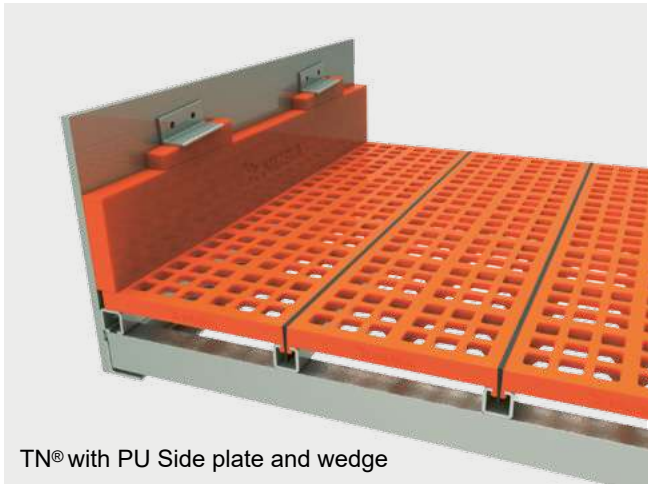
Characteristics

- The TN® modular system is completely interchangeable with other systems using the grooved metallic profile.
- It is designed to work in screening and dewatering applications.
- Panels can be replaced very fast without any specialized tools. The rubber wedge system fixes the panel tightly to the deck and the more load to be screened the tighter the wedge is fitted. To replace the panel just lift one side of the wedge and the rest comes out just as easy.

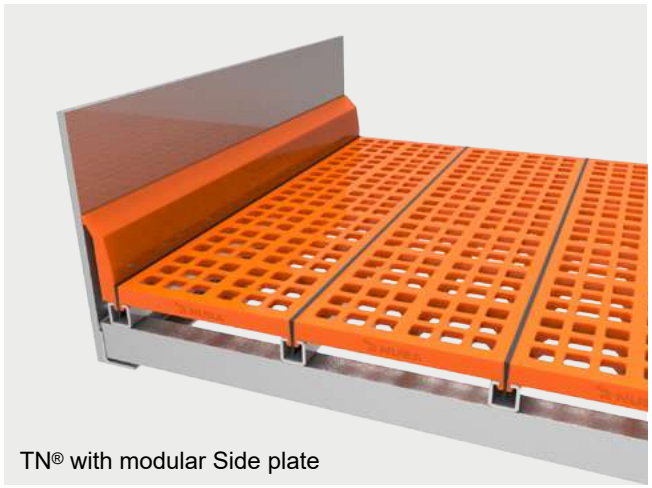


1 TN® Side Module
2 TN® Central Module
5 Grooved metallic profile
6 TN® Rubber Wedge
7 PU Side plate PU or PE
8 PU Side plate wedge

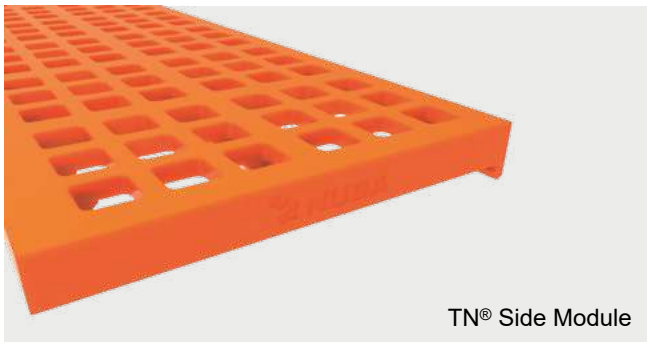
TN® Modular system



TN® with PU Side plate and wedge



TN® with modular Side plate



TN® Side Module

TN® Central Module

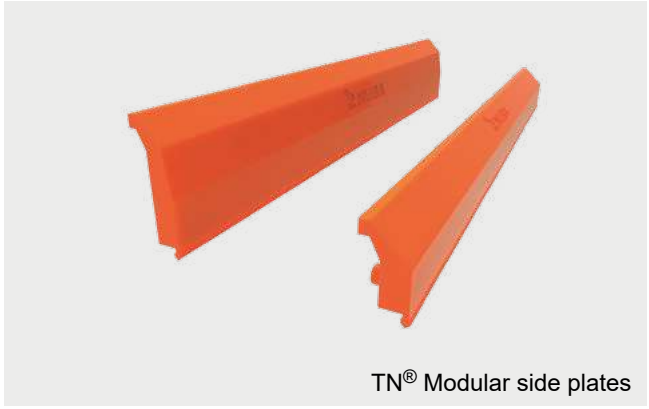
TN® with modular side plate

Characteristics

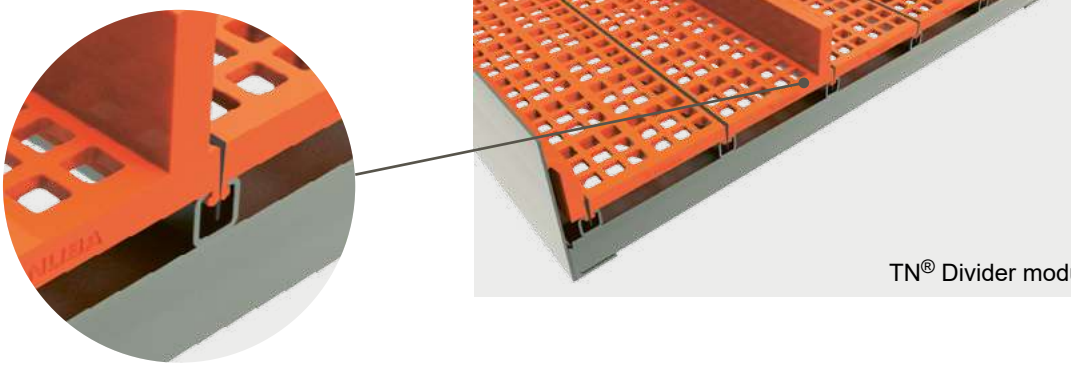
- The TN® Modular side plate, as an alternative to the normal PU Side plate and wedge system, is designed to avoid the use of welded metallic profiles on the screen decks' side walls. It is also logistically more convenient to stock and manage only central panels.

- These modular side plates are fitted in grooved metallic profiles positioned 45mm from the wall of the screen and are available in heights of 80 and 140mm.

- The TN® Divider module is another accessory designed to obtain two classification sizes on the same deck.



TN® Modular side plates



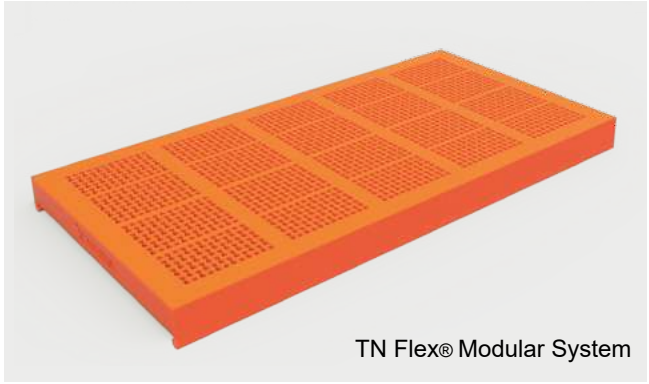
TN® Divider module

TN® Modular TN Flex®

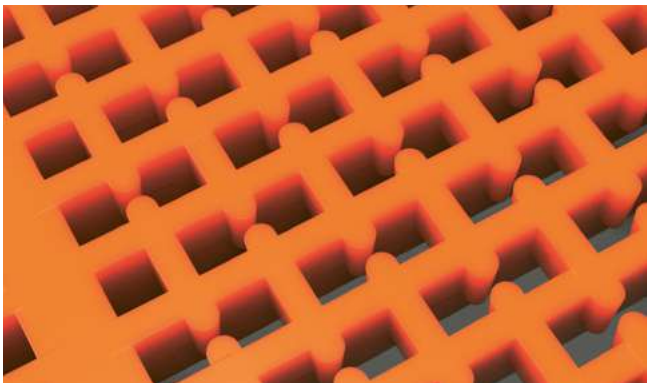
Characteristics

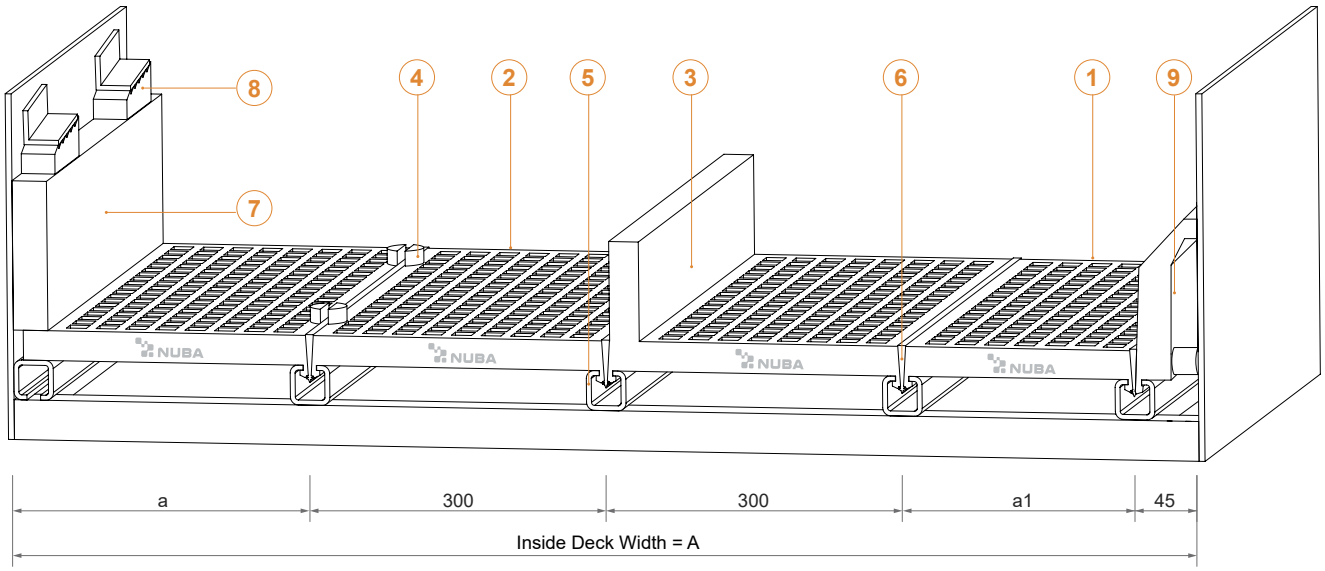
- The great results obtained with the TN Flex® side tension screens are now transferred to our modular systems. With its interrupted geometry on one side of the square opening and its elasticity it has a high self-cleaning effect. This combined with its high screening area; it increases the overall performance of the screen.

- Combining this solution with all current PU modular systems, NUBA develops the TN-Flex® Self-Cleaning Modular System.

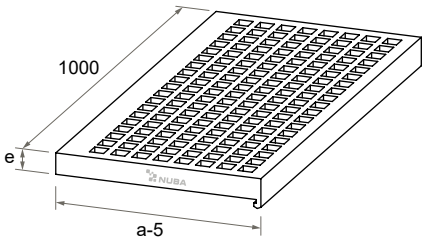


TN Flex® Modular System

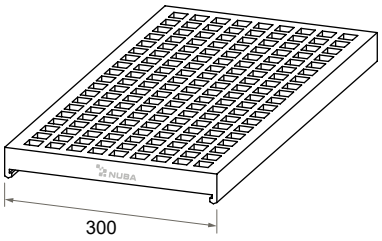




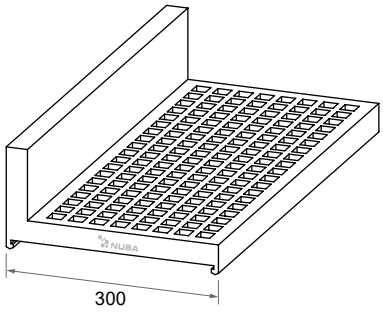
1 TN® Side Module



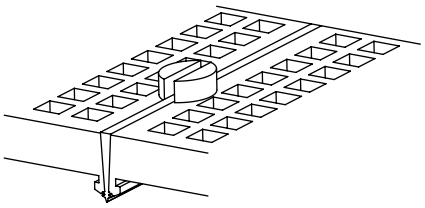
2 TN® Central Module



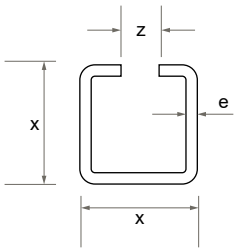
3 TN® Divider module



4 Module with Deflectors

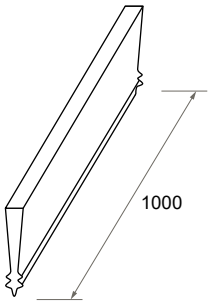


5 Grooved metallic profile (40x40)

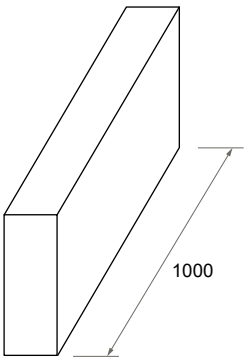


x = 40
z = 13,8
e = 5
Weight = 4,7Kg/m

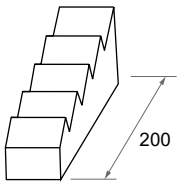
6 TN® Rubber Wedge



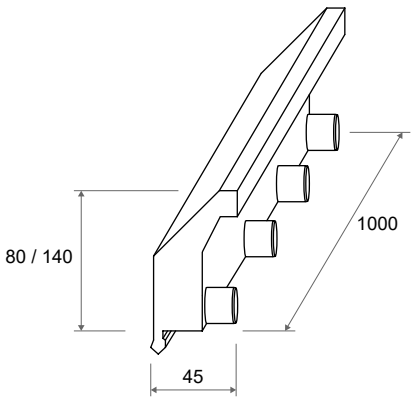
7 PU Side plate



8 PU Side plate Wedge



9 TN® Modular side plate



Polyurethane Modular System

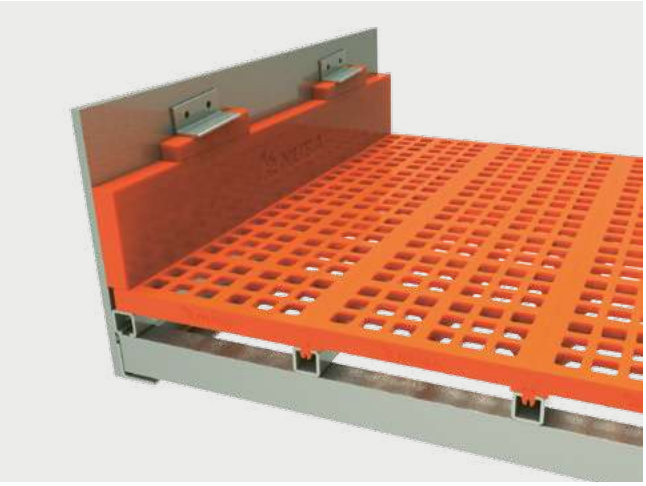
Indalo

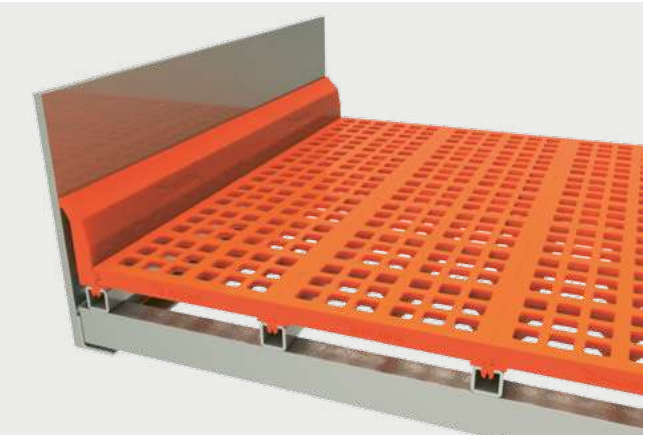
Characteristics

This modular system uses a special PU connector called INDALO to fix the panels on the grooved metallic profiles of the deck. The side panels can either have the connector incorporated **(type 2)** or not **(type 1)**.

Type 1

Type 2





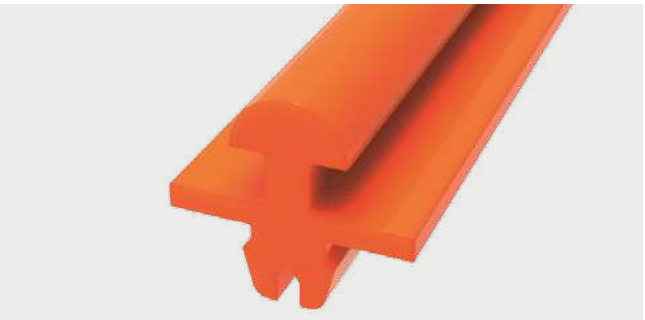
Indalo Modular Side plate

- The Indalo Modular Side plate, as an alternative to the normal PU Side plate and wedge system, is designed to avoid the use of welded metallic profiles on the screen decks' side walls. It is also logistically more convenient to stock and manage only central panels. **(Type 1)**.
- These modular side plates are fitted in grooved metallic profiles positioned 45mm from the wall of the screen and are available in heights of 80 and 140mm.
- We also offer different Side plate alternatives for this system.

Indalo modular side plates

Indalo connector

- The Indalo connector is the characteristic profile for this system; it's the union between the machine and the modular polyurethane panels.

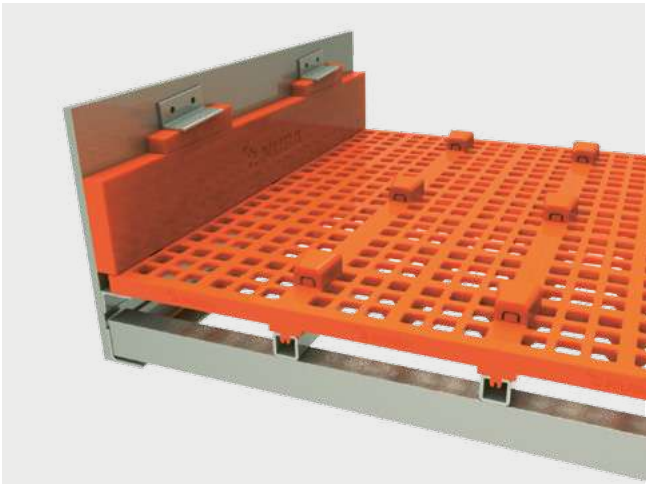


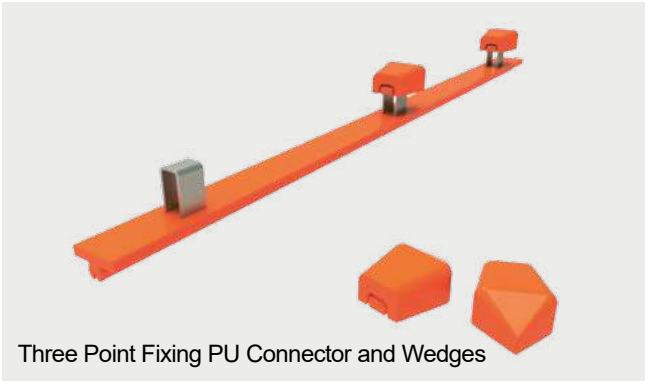
Indalo connector

Polyurethane Modular System
Three Point Fixing

Characteristics

In this system, the polyurethane panels are fixed to the grooved metallic profiles by means of a PU connector with 3 metallic bridges which hold the panels in place with special PU wedges.



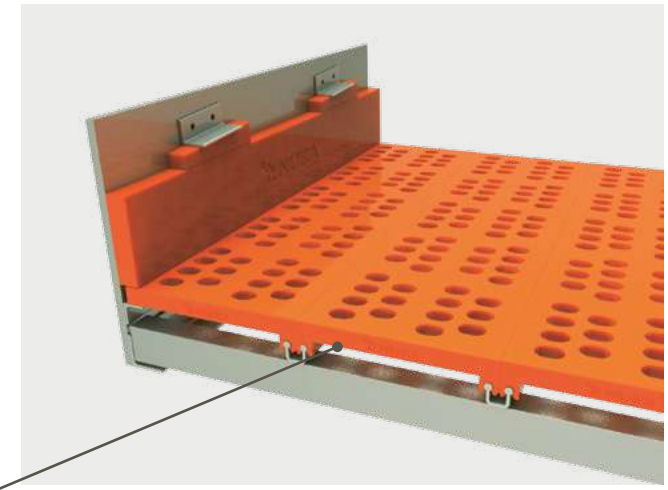


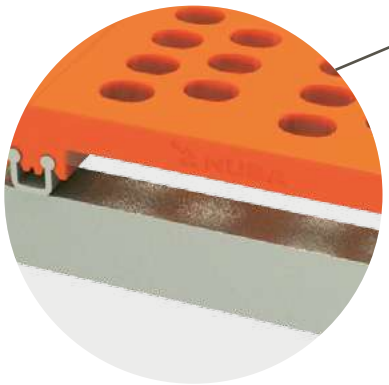
Three Point Fixing PU Connector and Wedges

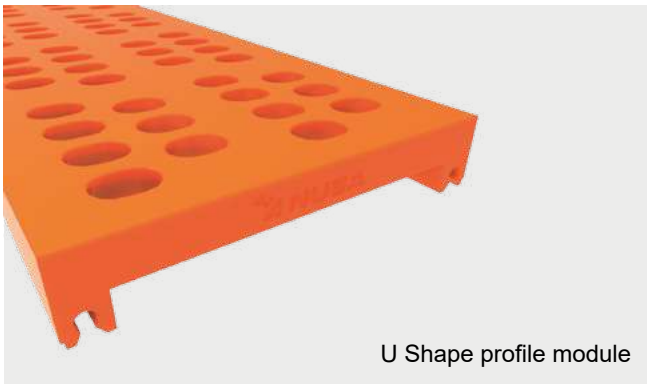
Polyurethane Modular System
U Shape Profile

Characteristics

In this modular system the deck is fitted with special U Shape profiles on to which panels are snapped into place.





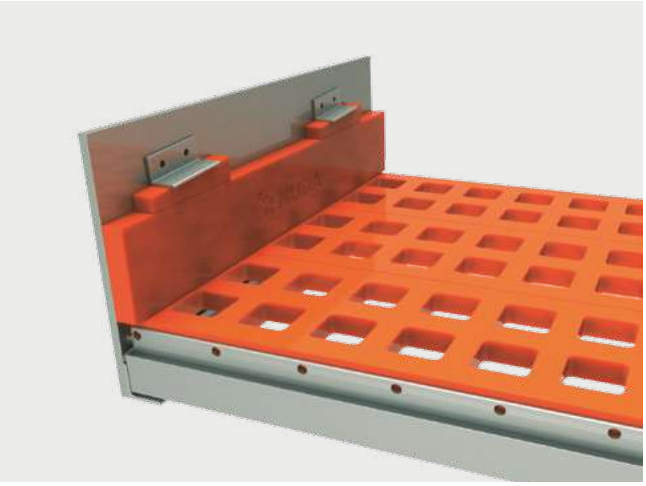


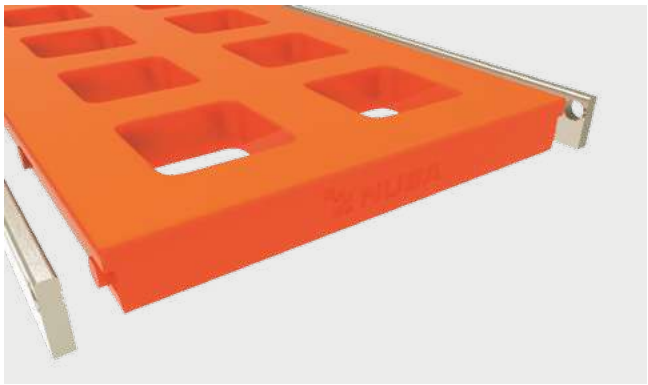
U Shape profile module

Polyurethane Modular System
Multi Stub Fixing

Characteristics

In this system the machine's deck is fitted with perforated metallic plates on to which small stubs on the sides of the PU panel snap into place.

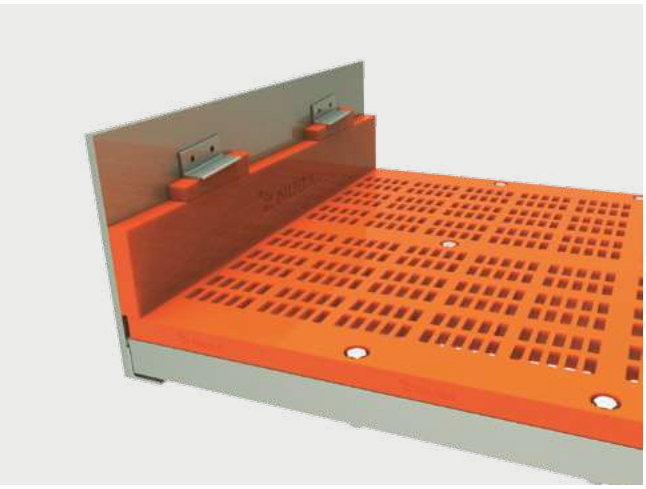


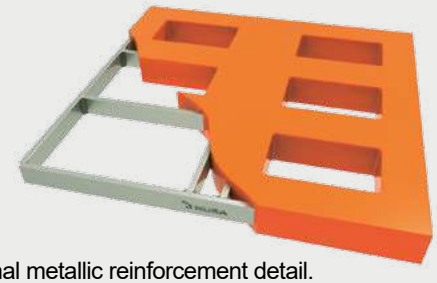


Polyurethane Modular System
Flat Screen Panels

Characteristics

Flat Screen Panels can be made to any size, shape, metallic reinforcement, etc. They are customized to fit any machine or client specification.





Internal metallic reinforcement detail.

Polyurethane Modular System

Pin Style

Characteristics

In this system the panels are fixed with polyurethane pins to the frame of the screens' deck.

There are two main differences in the dimensions of the panels:

1) Metric system: where we find panels of 300x300mm.

2) Anglo-Saxon system: where there are different formats such as 1'x1 '(304.8 x 304.8mm) or 2'x1' (609.6 x 304.8mm).

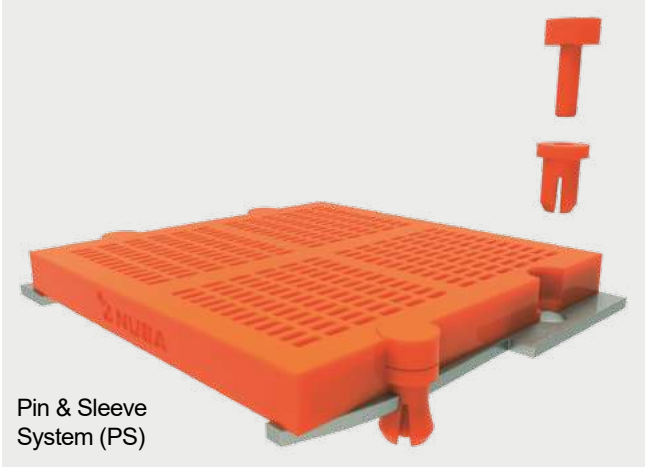
There are also two subsystems:

a) Pin & Sleeve (PS): the pin expands an independent sleeve creating the fixation.

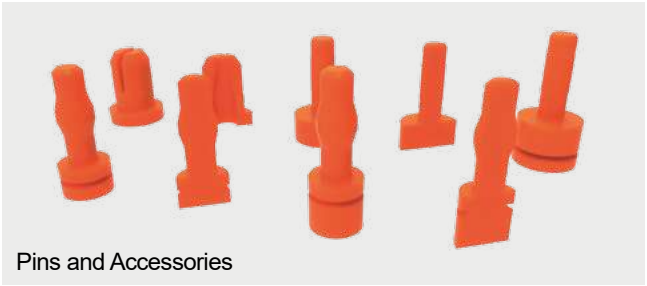
b) Pin & Leg (PL): the sleeves are molded into the module itself, these expand when the pin is inserted, fixing the module. These panels are classified according to the number of pins, the fixing sub-system, and their size.

Examples: 4PS1 (4 pins in Pin and Sleeve System, in 1' length), 6PS1, 6PS2, 8PL2, 12PL1, etc.

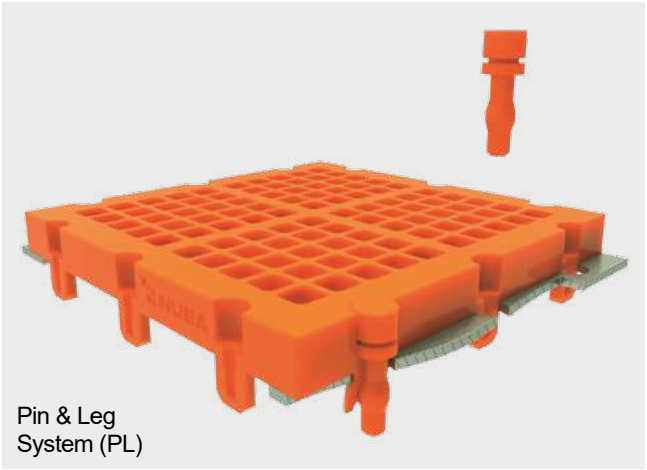
We have a wide range of screws for these systems according to the different thickness of the panels.



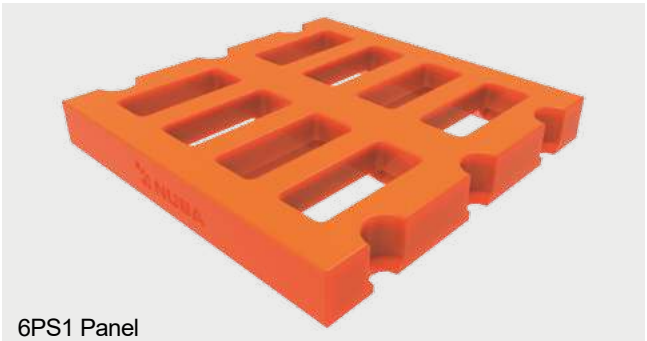
Pin & Sleeve System (PS)



Pins and Accessories



Pin & Leg System (PL)



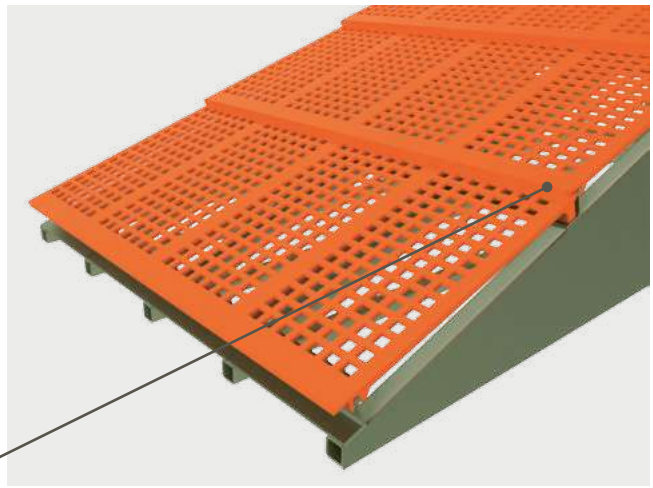
6PS1 Panel
(6 pins in Pin & Sleeve System, 1' length)

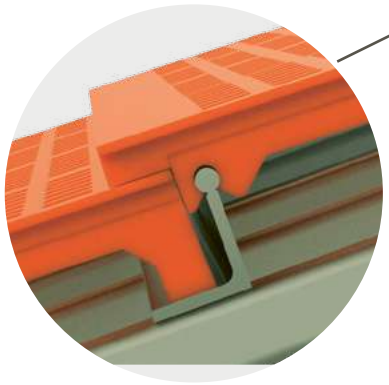
8PL2 Panel
(8 pins in Pin & Leg System, 2' length)

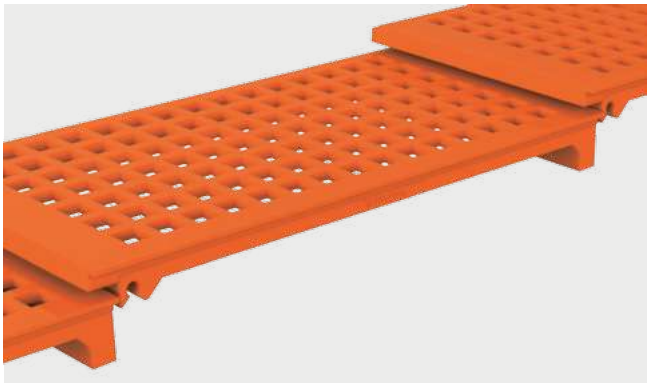
Polyurethane Modular System
Cascade

Characteristics

It is a Snap-On panel that fits on a special L shaped metallic profile. The panels are placed overlapping each other creating a cascade effect which rotates the material as it flows through the deck, to give the material particles more options to be screened.



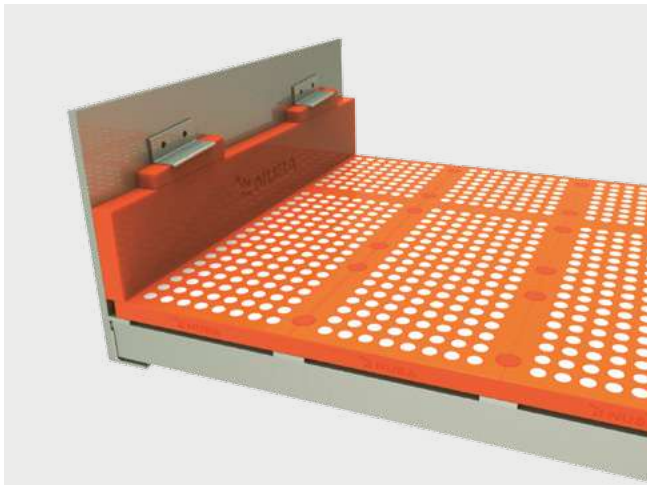




Polyurethane Modular System
With Ceramic Inserts

Characteristics

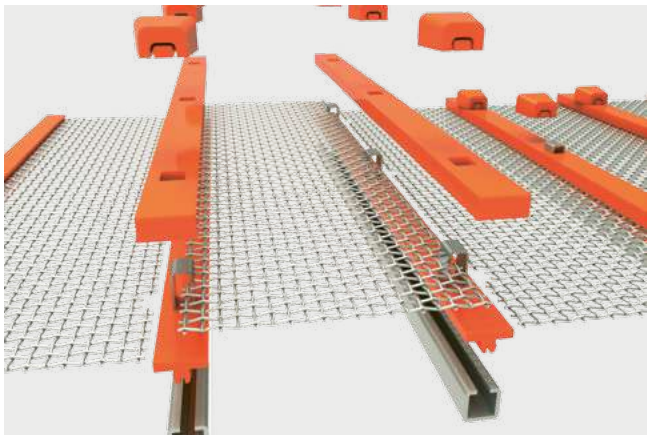
PU panels with ceramic inserts for different types of modular systems.
Ceramic inserts are used in areas with very high abrasiveness and can be fitted to any PU modular system or PU liner.



Polyurethane Modular System
Mixed

Characteristics

To combine PU modules with metallic meshes or to screen with metallic meshes on decks ready set for PU modules, the metallic mesh panel is simply clamped down with the PU profiles.



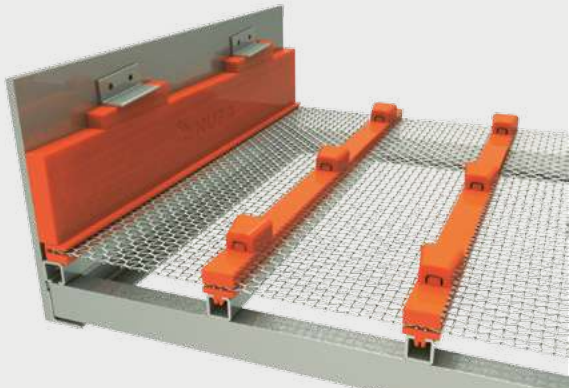
We have two different systems:

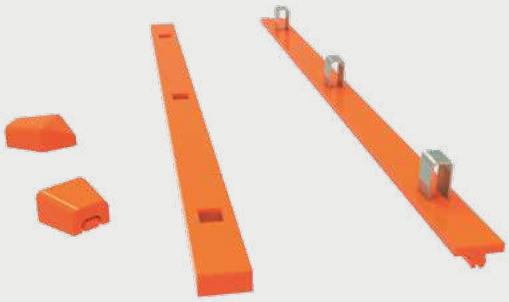
A) Three Point Fixing – Mixed panel: Using the three fixing point PU profile with a PU bar and PU Wedges.

B) PU Frames with metallic mesh inside: These panels are molded on the metallic mesh panel creating a tight bond between the metallic mesh and the PU frame; they can be manufactured in many of our most common PU modular systems and can be combined with metallic meshes with square, rectangular or Self-Cleaning apertures.

These systems are ideal for screening with metallic meshes on machines designed to work with PU modular systems or in combination with PU modular panels, boosting the screening area of the deck, avoiding contamination of unclassified particles.

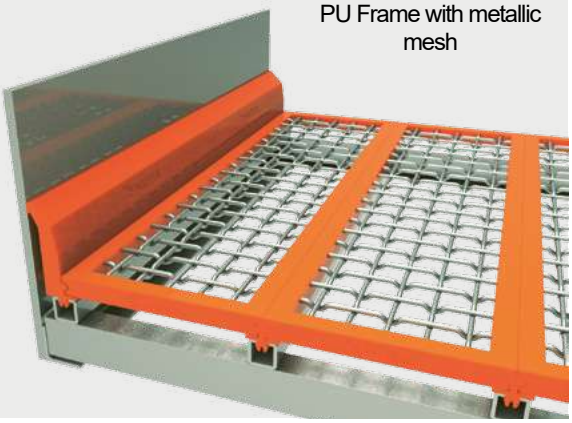
Three Point Fixing – Mixed panel





Three Point Fixing – Mixed PU Profiles and Wedge

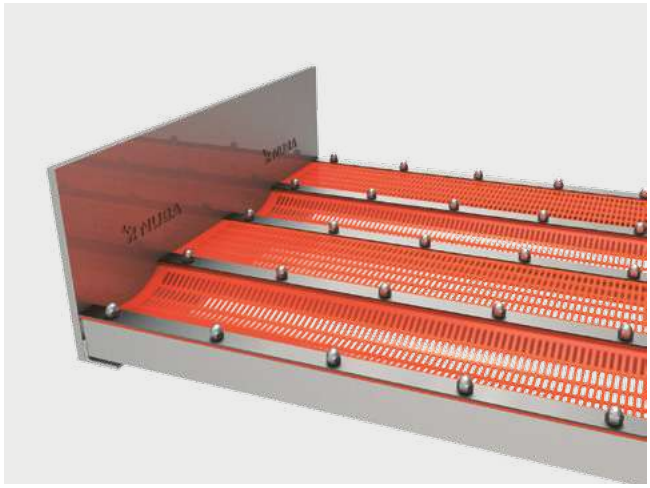
PU Frame with metallic mesh

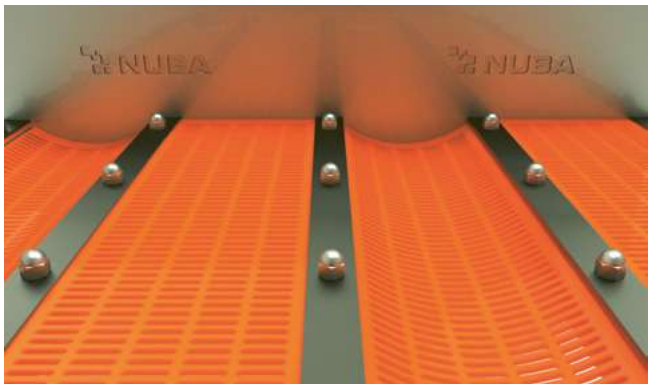


Polyurethane Modular System
TN-LW

Characteristics

These Flip-Flop or Flip-Flow screens are normally made of polyurethane with hardness of 90º Shore with thicknesses from 2mm; they are made to suit dual vibration screening machines, which shake the material to be screened freeing any adhered or pegged particles.

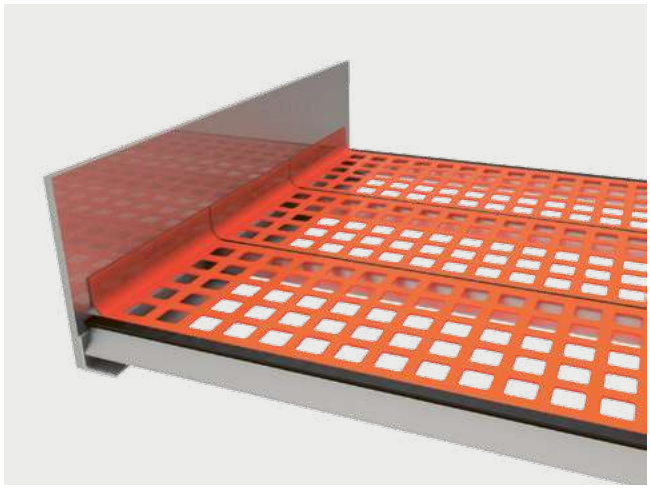


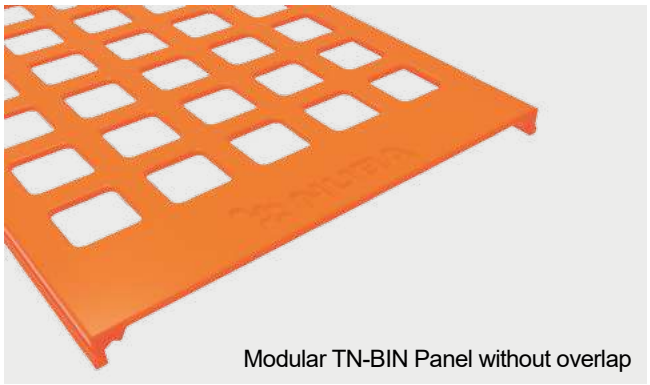


Polyurethane Modular System
TN-BIN

Characteristics

These Flip-Flop or Flip-Flow screens are normally made of polyurethane with hardness between 65º-85º Shore with thicknesses from 4mm; they are made to suit dual vibration screening machines that are equipped with a special metallic profile into which the panels are inserted and wedged into place with a rubber or PU wedge. These panels can be made with or without an overlap to cover the machines' side plates.



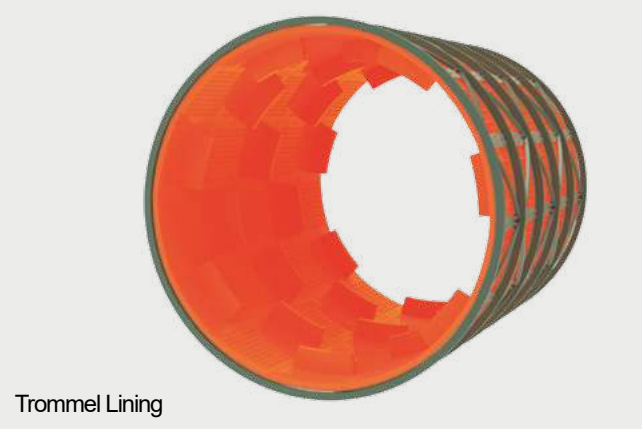


Modular TN-BIN Panel without overlap

Trommel Screens

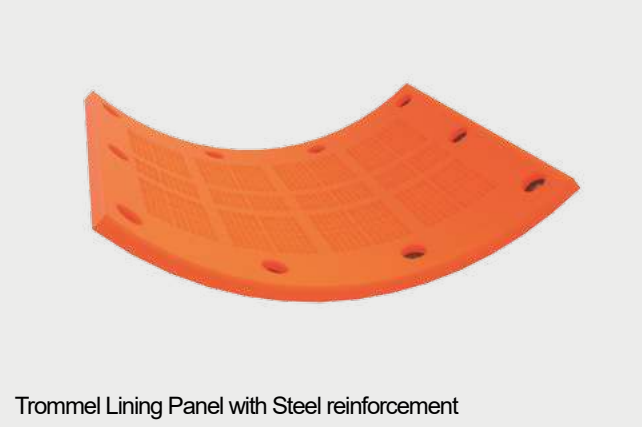
Trommel Screens are usually installed in plants that process a large flow of material. There is a variant of washing trommel, used when there's a high content of stone material left in the steriles that needs to be recovered.

These curved modular panels have a robust internal structure that allows them to be attached to the trommels' frame. Depending on the application, they can be manufactured in large thicknesses ensuring a long life ware. They can be manufactured with Scroll bars and Weir bars to increase or decrease the pulp flow.

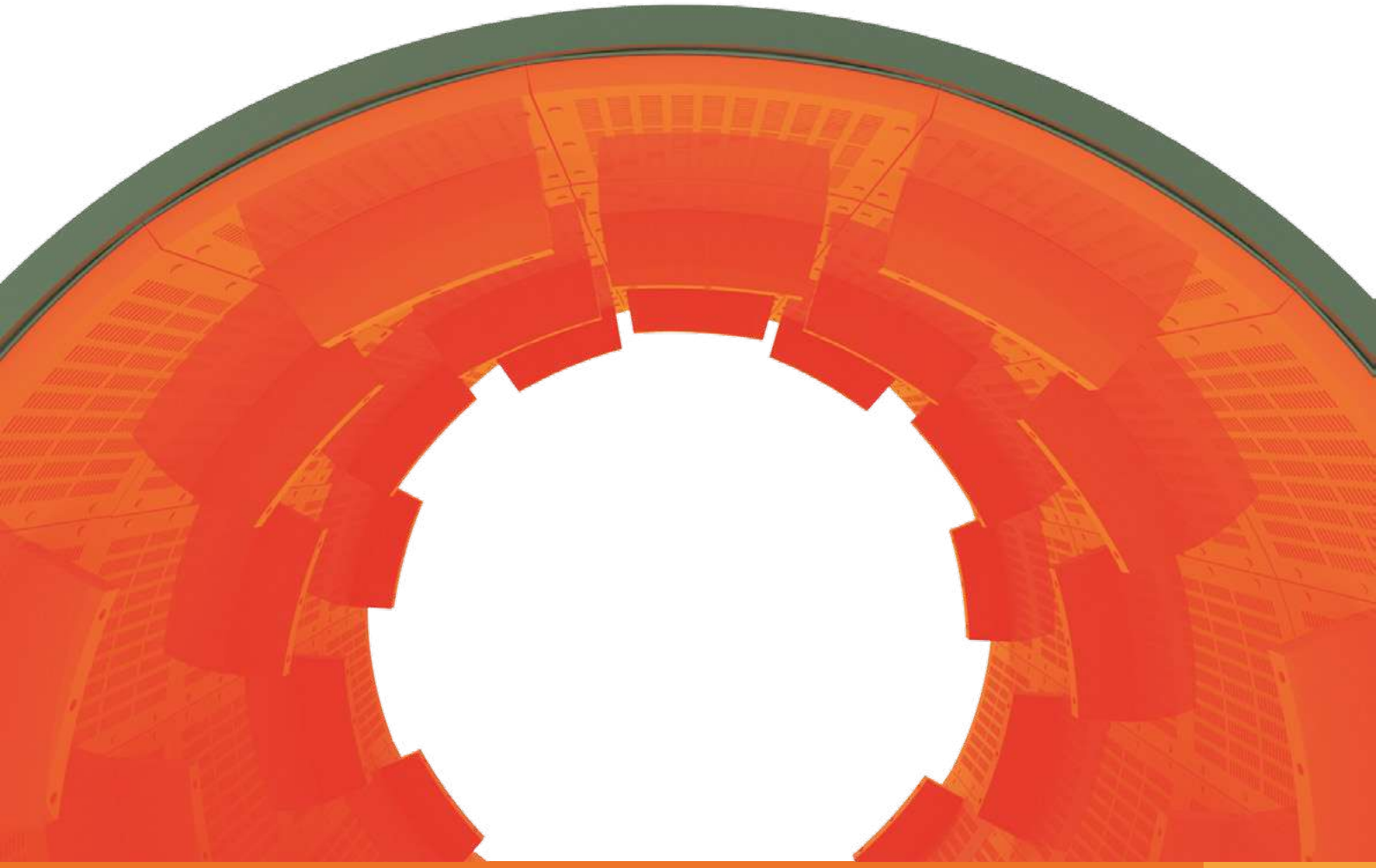


Trommel Lining

Trommel Lining Panel with Scroll Bars or Weir Bars



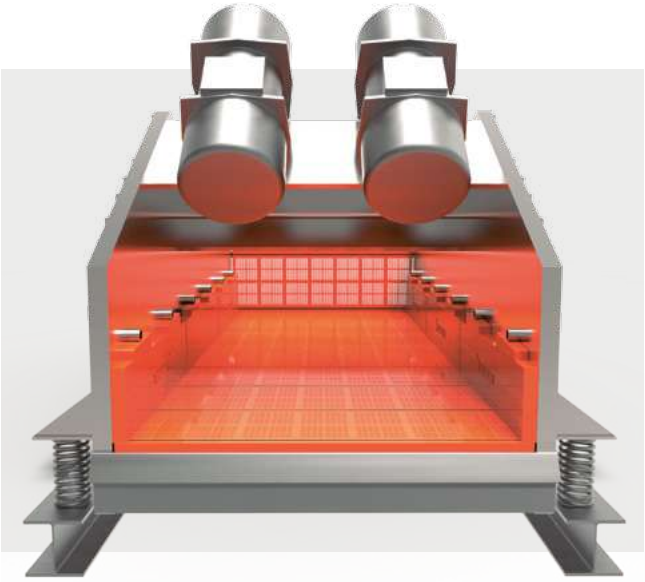
Trommel Lining Panel with Steel reinforcement



Dewatering screens

Dewatering screens are used to recover water from wet screening processed material, lowering the water content and eliminating any fines, clays or fillers that could be left in the material feed.

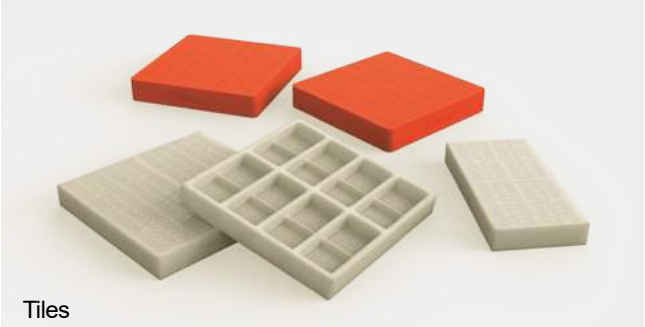
When it comes to solving the dewatering process, there are two types of screen media: polyurethane modular screen with integrated tiles and electrowelded screens with a polyurethane frame.



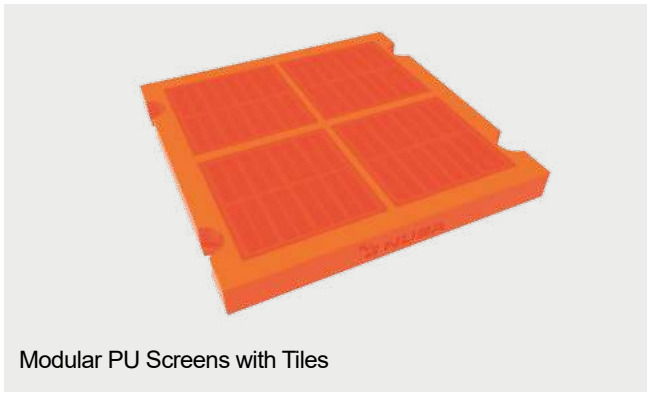
Modular PU Screens with Tiles or electrowelded mesh

Dewatering modular PU Screens with Tiles have great properties in wet applications and high wear resistance.They can be configured to fit any **dewatering screener** and are manufactured with apertures of **0.3x12** - **0.5x12** - **0.8x12** - **1x12** and **1.2x12mm**.

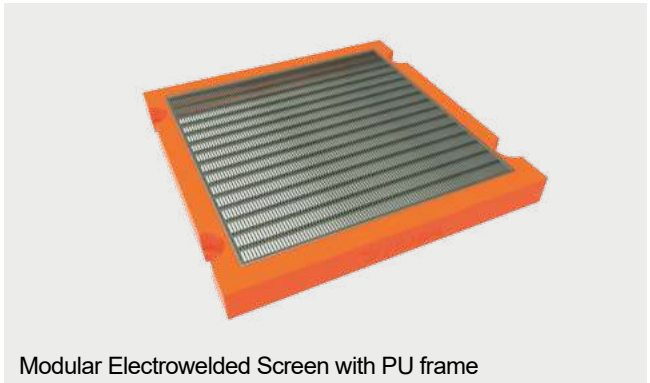
While the electrowelded screens with a polyurethane frame are more versatile, allowing apertures **from 0.05mm**. See page 107.



Tiles



Modular PU Screens with Tiles

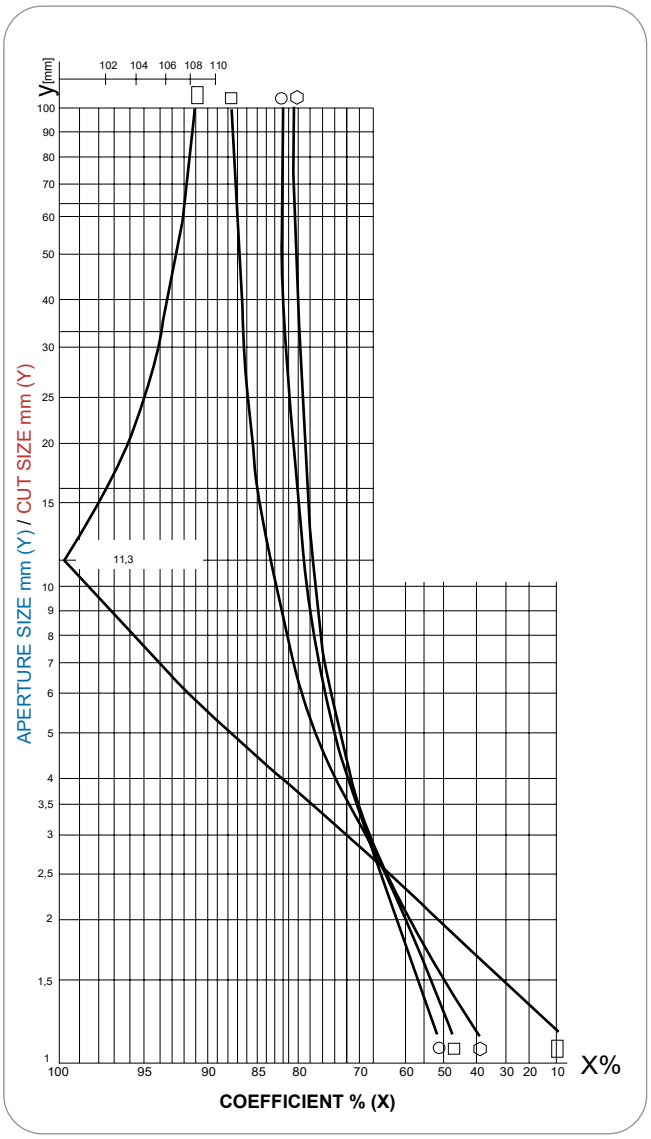


Modular Electrowelded Screen with PU frame

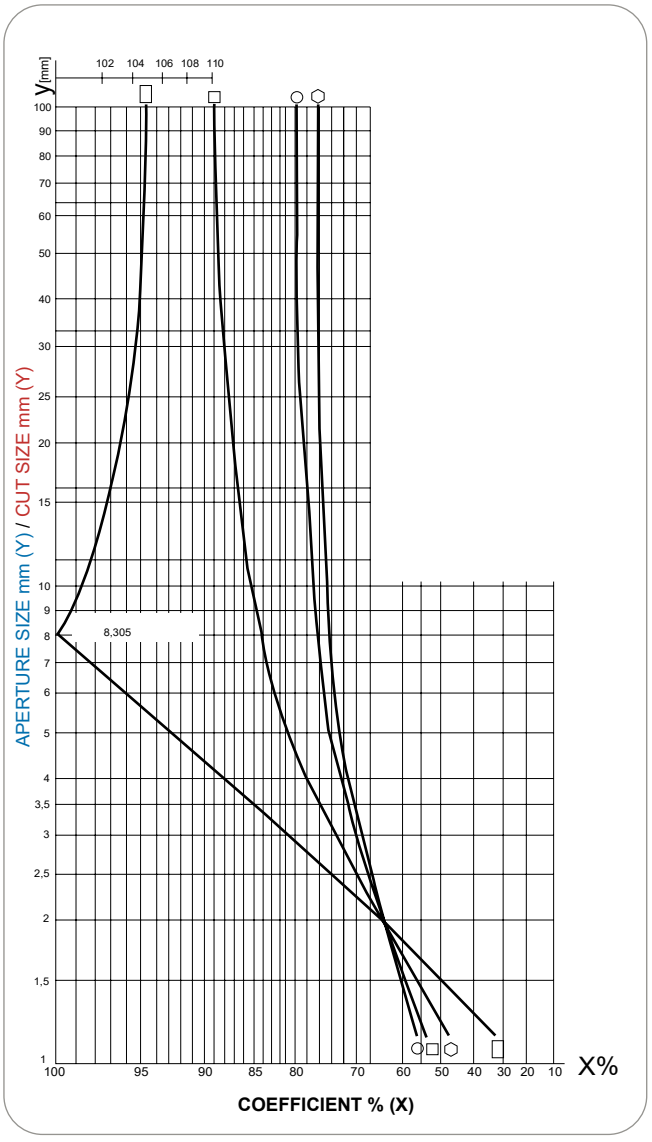
Approximate screening tables and calculations

Determining aperture size and particle size for polyurethane screens.

NATURAL Material



CRUSHED Material



Determining CUT size from a specific PU aperture size:

Take the aperture size on the CUT SIZE mm (Y), follow the horizontal as far as the curve (○,□,⬡ and ▯) and take the **COEFFICIENT % (X)**.

$$\text{APERTURE SIZE mm (Y)} = \frac{\text{CUT SIZE mm (Y)} \times \textbf{COEFFICIENT \% (X)}}{100}$$

Determining PU aperture size for a specific CUT size:

Take the aperture size on the APERTURE SIZE mm (Y), follow the horizontal as far as the curve (○,□,⬡ and ▯) and take the **COEFFICIENT % (X)**.

$$\text{CUT SIZE mm (Y)} = \frac{\text{APERTURE SIZE mm (Y)} \times 100}{\textbf{COEFFICIENT \% (X)}}$$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&
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