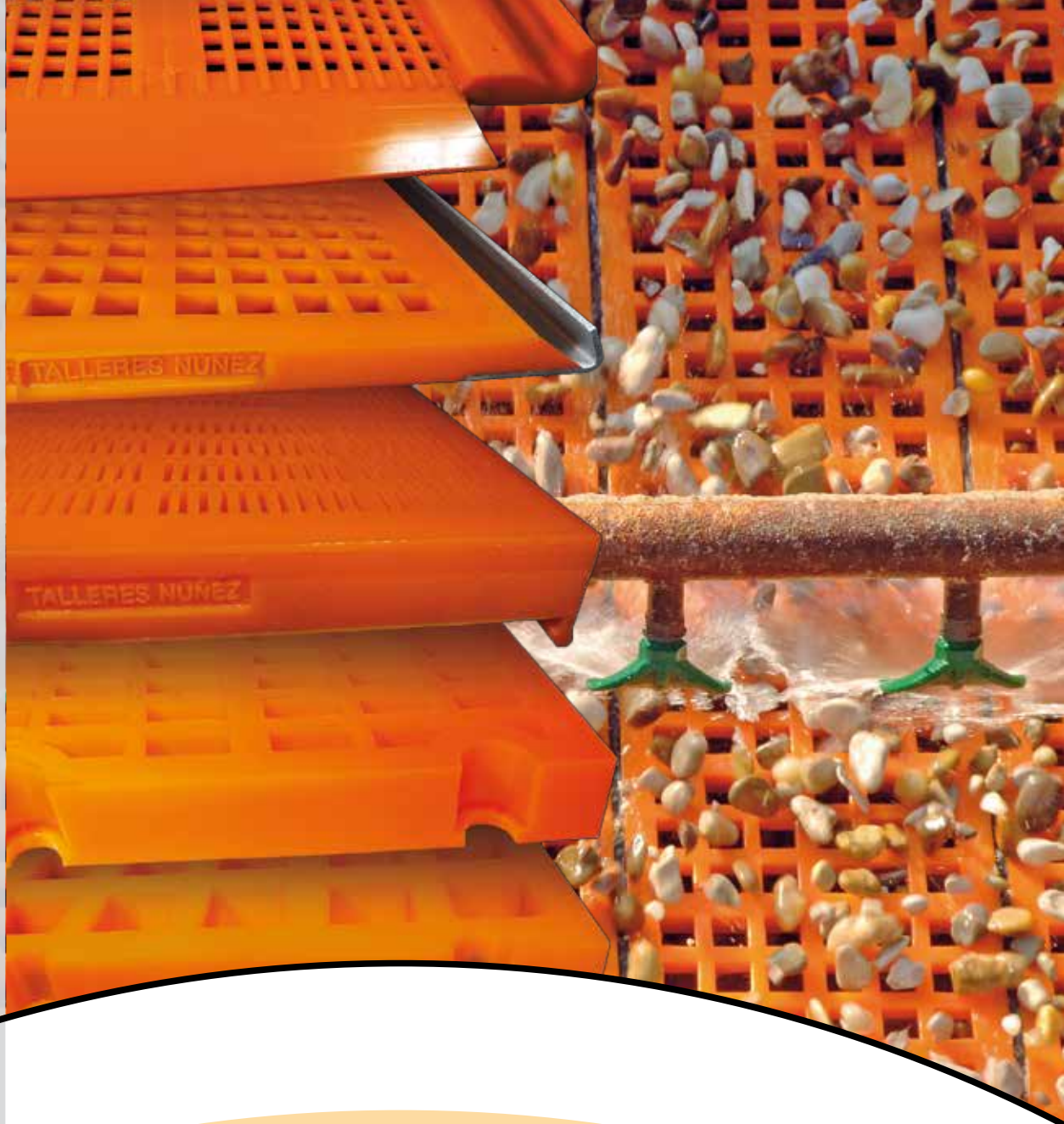


Polyurethane Screens



Screening
Media

6

6. Polyurethane Screens

6.1. Polyurethane tension screens:

PU Tension screen

Poliuflex®

TN Flex®

TN-DK

Poliuflex® and TN Flex® hook types

6.2. Modular systems:

TN®

Indalo

Mixed

Three point fixing

U shape profile

Multiple stub fixing

Pin and sleeve

Flat screen panel

Cascade

With ceramic inserts

6.3. TN-LW system

TN-BIN system

6.4. Dewatering screens

6.5. Approximate Screening tables and calculations

6.6. Available apertures



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.

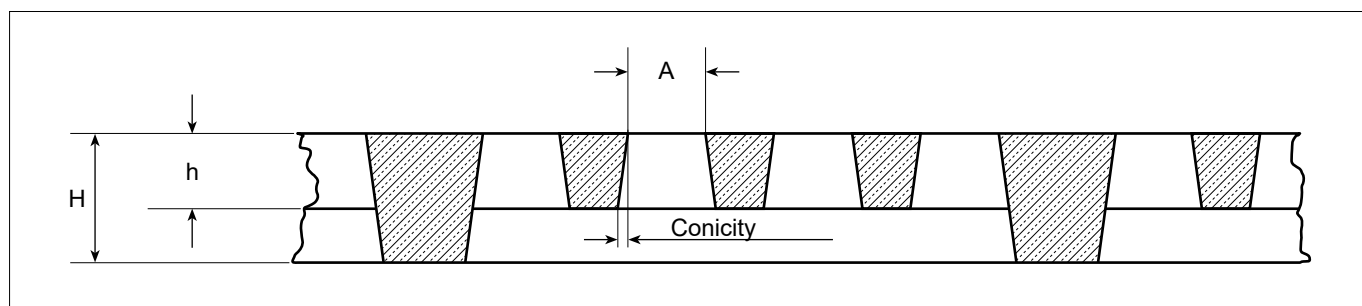
Characteristics

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



Mechanical characteristics of PU TN:

Shore hardness A:	55°	60°	65°	70°	75°	80°	85°	90°
Tensile strength DIN 53504-Mpa	31	37	43	54	56	56	57	56
Elongation break DIN 53504-%	615	550	530	520	520	520	515	515
Tear strength without nick ISO 43-1-KN/m	37	48	61	73	80	92	105	120
Tear strength with nick ISO 43-1-KN/m	21	22	24	25	27	30	41	53
Resilience DIN 53512-%	65	63	59	55	54	53	49	46
Abrasive loss ISO 4649-1-mm ³	40	40	40	40	40	45	45	45
Compression set ISO 815-1-%	46	44	41	39	38	25	25	25
Density	1,20	1,21	1,21	1,21	1,21	1,21	1,22	1,22



A = Aperture (square and rectangular).

H = Total thickness

h = Screening thickness

The thicknesses depend on the aperture requested and the workload.

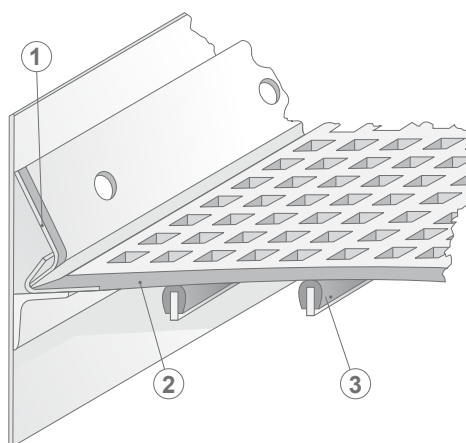
Range of possible hardnesses: 45° - 90° Shore A

Polyurethane Tension Screens

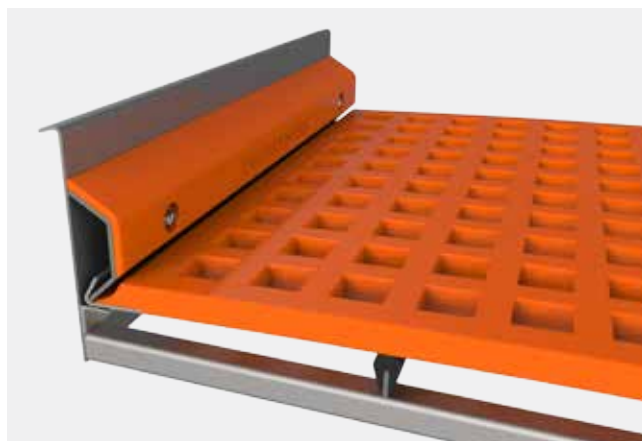
PU Tension screen

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.

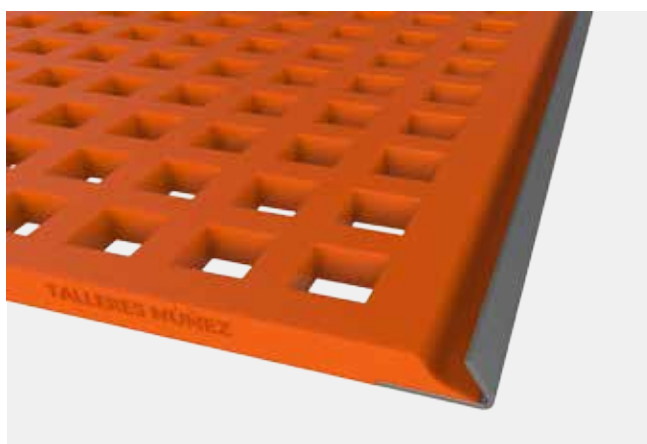


- ① Tension side plate
- ② PU Panel
- ③ Rubber profile



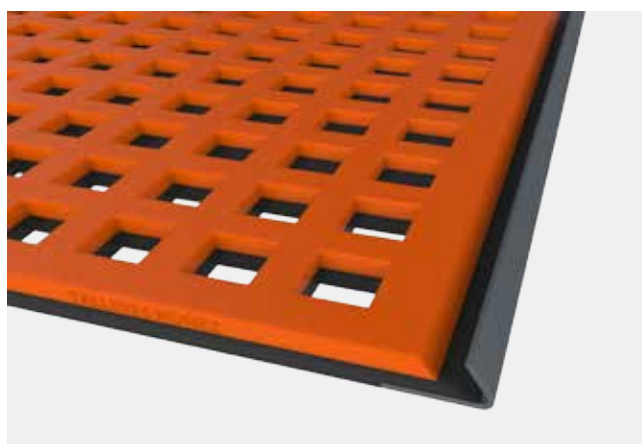
Flexible polyurethane

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



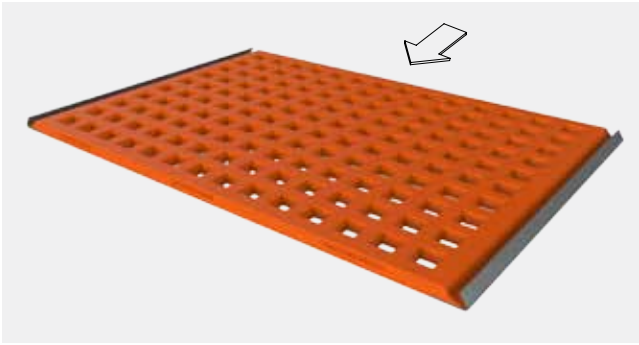
Standard monolayer polyurethane (single layer)

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



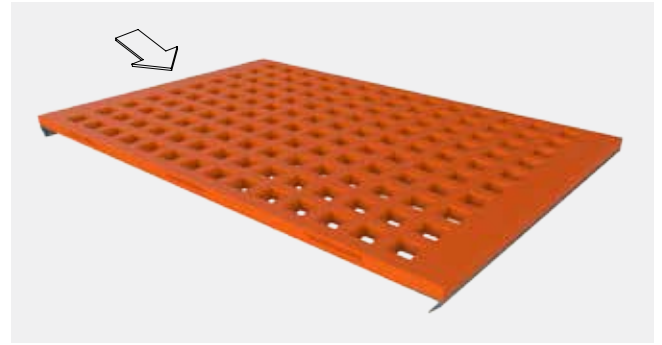
Bishore polyurethane (double layered)

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



Side tension meshes

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

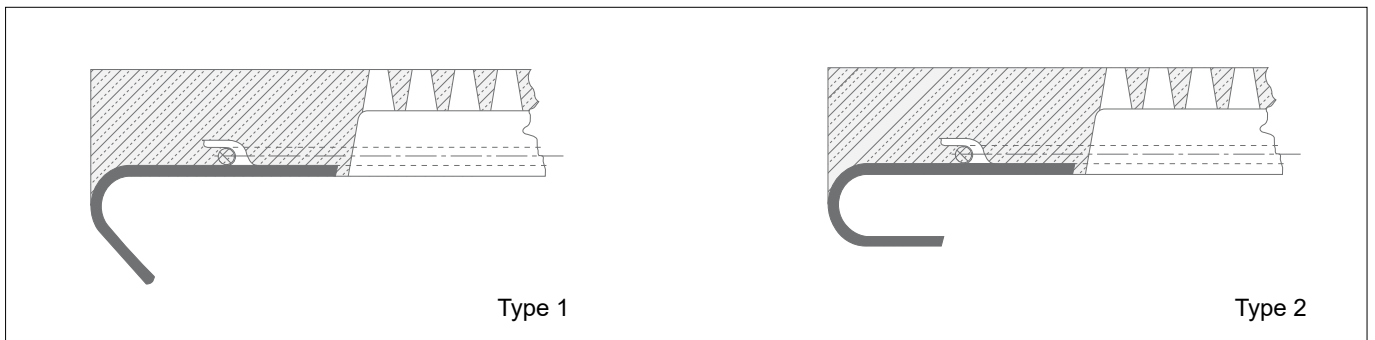


End tension meshes

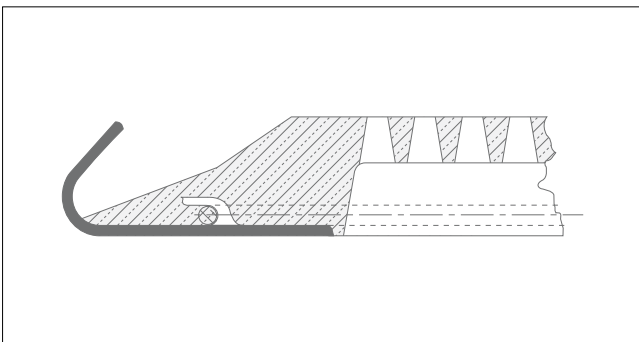
With metallic cable reinforcement to withstand the tension from the end tension hooks, parallel to the material flow.

Tension types

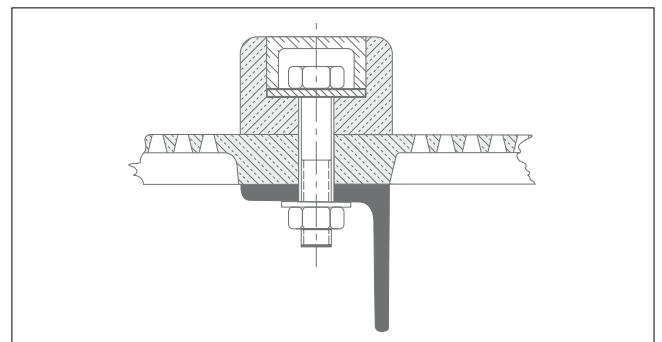
End tension



Side tension



Polyurethane centre hold-down bar



Polyurethane Tension Screen

Poliuflex®

Properties

Due to its cable reinforcement in between almost every aperture it reduces the blind areas and increases its capacity to make it similar to metallic meshes, but with the wear resistance of PU.

Installation

Installing Poliuflex® screens requires no modification of the deck or tension system. It is installed just the same as a metallic screen, but while doing so bear in mind:

- Each Poliuflex® screen must be tensioned by individual tension plates.
- State the amount and distance of the deck's support bars. Wherever there is a support bar a blind area should be placed to reinforce the screen.
- As in metallic meshes, make sure that when tensioned the hooks of the screen don't touch the inside of the screens walls.
- If the Poliuflex® screen requires a centre hold-down bar, make sure not to cut any of the cables inside the screen.

Maintenance

Frequently check the tension of the Poliuflex® screens and re-tension if required. In the event of material build-up, pegging or blinding, do not use sharp metallic objects to clear it, if necessary use declogging rods (See page 120), or look at TN Flex® screens.

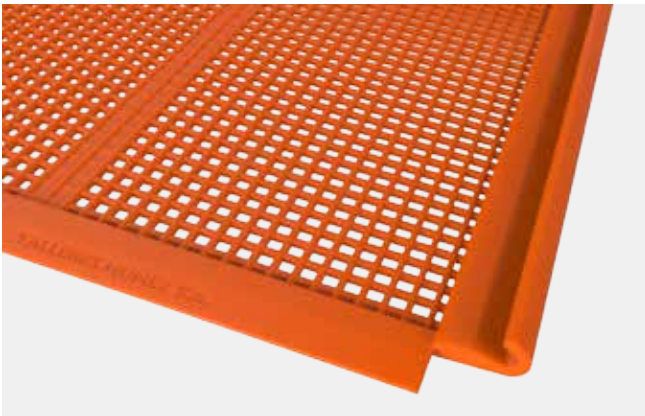
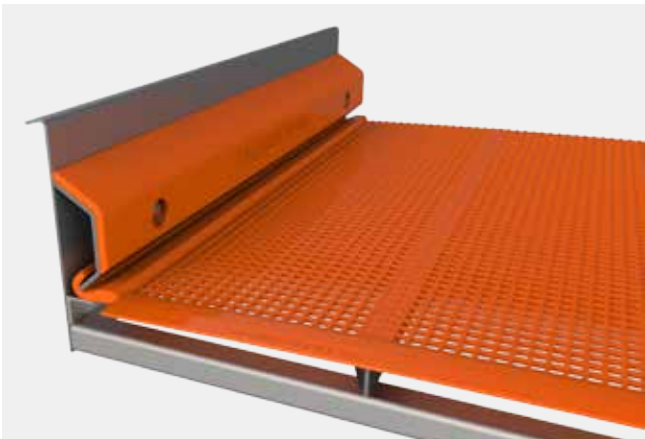
A positive result is obtained by keeping the screen working without any load when meshes are installed for the first time.

Available apertures

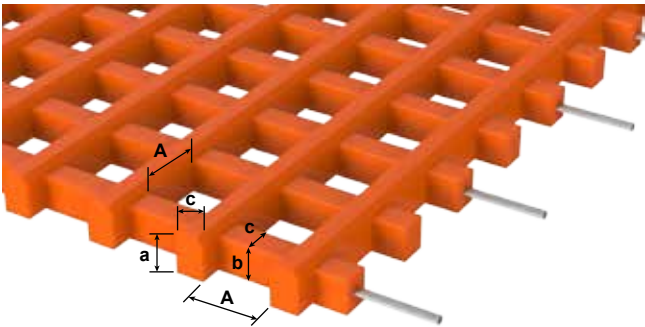
Apertu-re AxA	a	b	c	Screening area
5	5	4	3,2	37,2%
6	6	4,5	3,5	39,9%
7	6	4,5	3,6	43,6%
8	6,5	5	4,3	42,3%
9	6,5	5	4	47,9%
10	6,5	5	4	51,0%
11	7	5,5	4	53,8%
12	7,5	6	5	49,8%
13	7,5	6	5	52,2%
14	8	6,5	5	54,3%

Apertu-re AxA	a	b	c	Screening area
15	8	6,5	5	56,3%
16	8,5	7	6	52,9%
17	8,5	7	6	54,6%
18	8,5	7	6	56,3%
20	9	7,5	6	59,2%
22	9	7,5	6	61,7%
23	10	8	7	58,8%
24	10	8	7	59,9%
25	10	8	7	61,0%
-	-	-	-	-

*For other apertures please check availability.



Poliuflex® screen Aperture 9 thread 4 mm after 1150 hours carrying out wet screening of quartzite material with 97% SiO₂



Polyurethane Tension Screen

TN Flex®

Characteristics

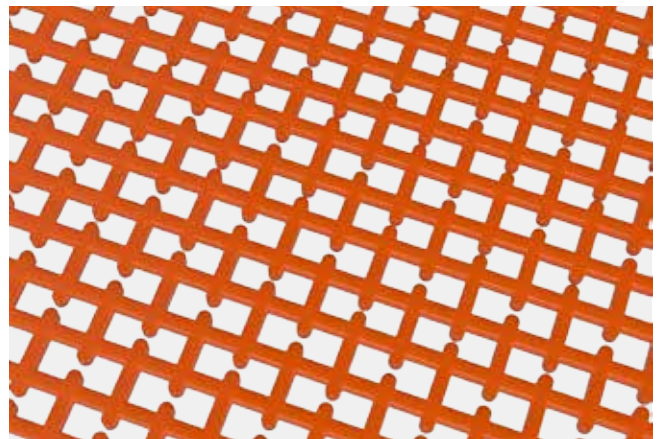
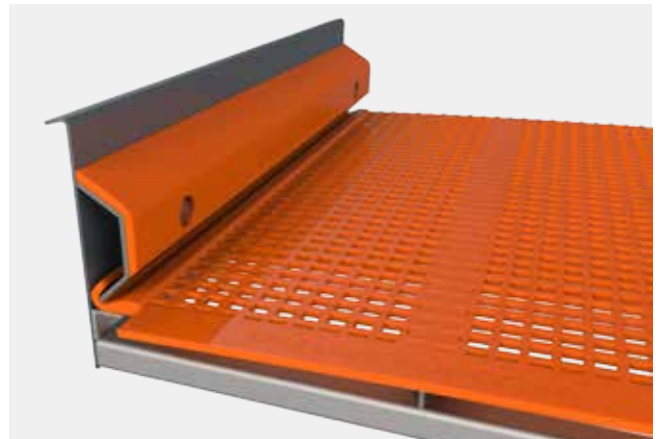
Polyurethane has great properties as a screening material. It is abrasion-resistant, works perfectly in dry or wet screening and has elastic properties to avoid material build-up, pegging and blinding. This is why there are many different screening systems made from PU.

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.

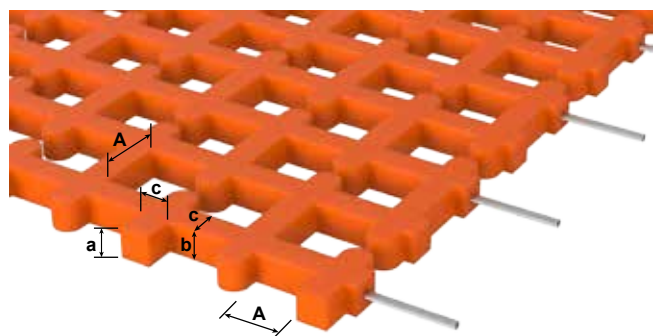


Ranged of manufactured elements

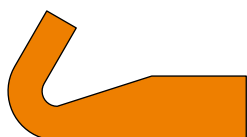
Apertu- re AxA	a	b	c	Screening area
5	5,5	3	3,0	40,9%
6	6,5	3,5	3,5	43,9%

Apertu- re AxA	a	b	c	Screening area
7	6,5	3,68	3,7	47,1%
8	7,0	3,73	3,7	51,5%

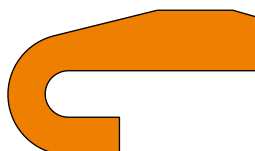
*For other apertures please check availability



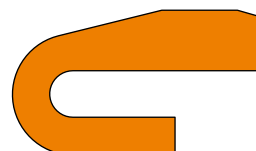
Poliuflex® and TN Flex® hook types



Side tension hook



End tension hook 25



End tension hook 50

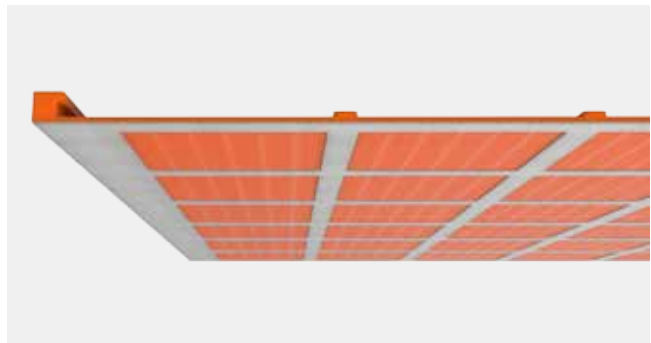
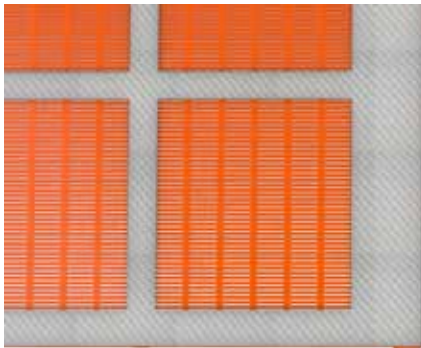
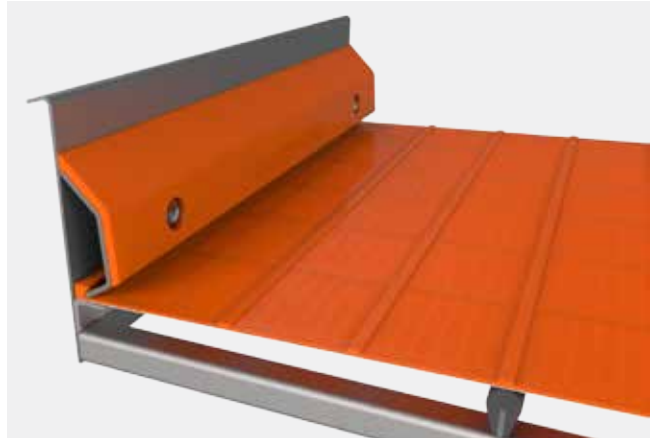


AZ hook

Polyurethane Tension Screen TN-DK

Properties

This kind of screen combines the high abrasion resistance of TN's polyurethane with the tension resistance of an additional material, creating a screen with high abrasion resistance, flexibility, avoiding pegging and blinding, and can be made with aperture sizes as small as 300 microns. It can be manufactured to any size, specification and to fit any machine.



View of lower face



View of upper face

Polyurethane Modular Systems



TN®



Multi Stub Fixing



Indalo



Pin and Sleeve



Mixed



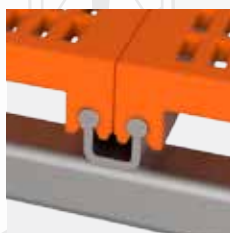
Flat Screen Panel



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 module that's affected. Each modular system will have its advantages and disadvantages mainly according to the ease of installation, the faster a module can be changed the less downtime of the machine.

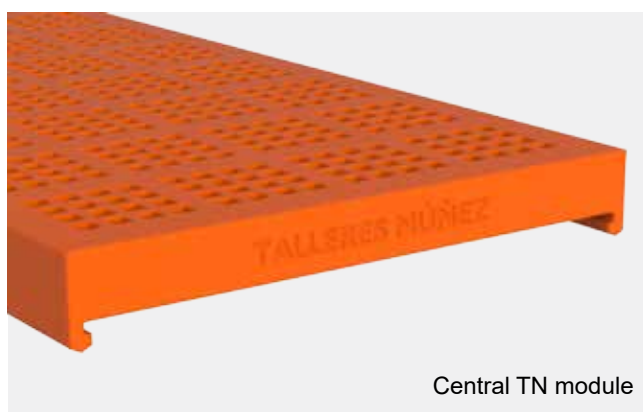
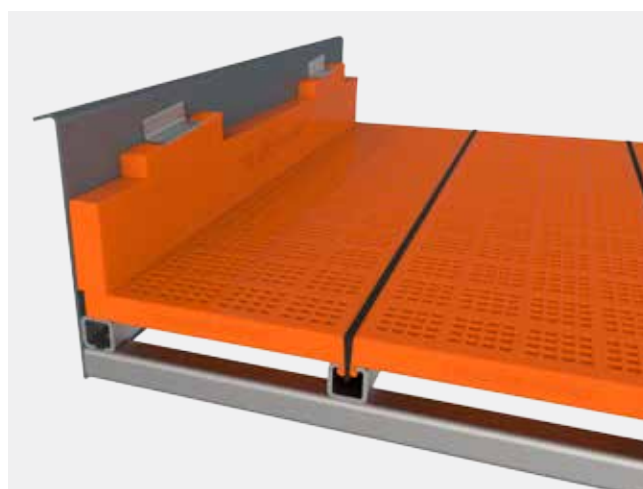
The way the modular systems are fixed on to the deck varies from one system to another, having to modify the deck if you want to change it. Many systems in Europe use a grooved metallic profile (40x40mm or 40x80mm, see Fig.5 on next page). NUBA Screening Media has its own patented system called TN® which uses this profile too, making it interchangeable with any other that uses this system.

Polyurethane Modular System

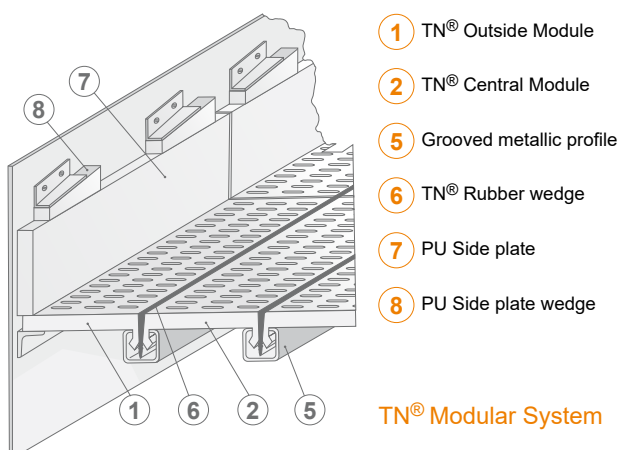
TN®

Characteristics

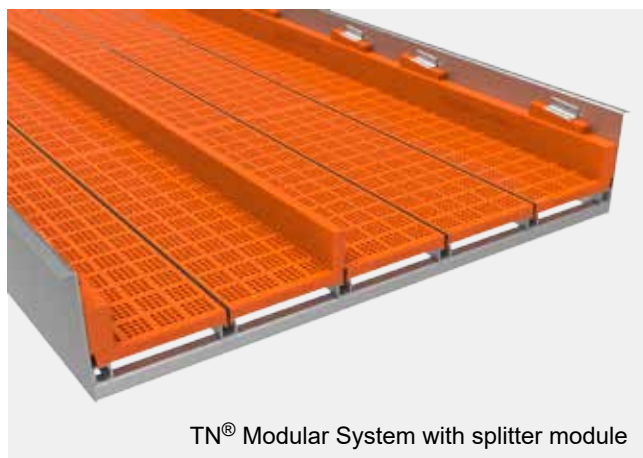
- The TN® modular system is completely interchangeable with other systems using the grooved metallic profile.
- It works perfectly in screening and dewatering applications.
- Panels can be replaced very fast without any specialized tools. The rubber wedge system fixes the panels tightly to the deck and 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. No bashing or banging needed.
- It has many different accessories to use in different situations like: a splitter module, which splits the screen deck in two, to screen two materials at the same time; deflectors, which can be added to any panel to redirect the material flow to the screening area of the deck; retainer bars, that retain material in order to distribute it evenly across the deck surface.



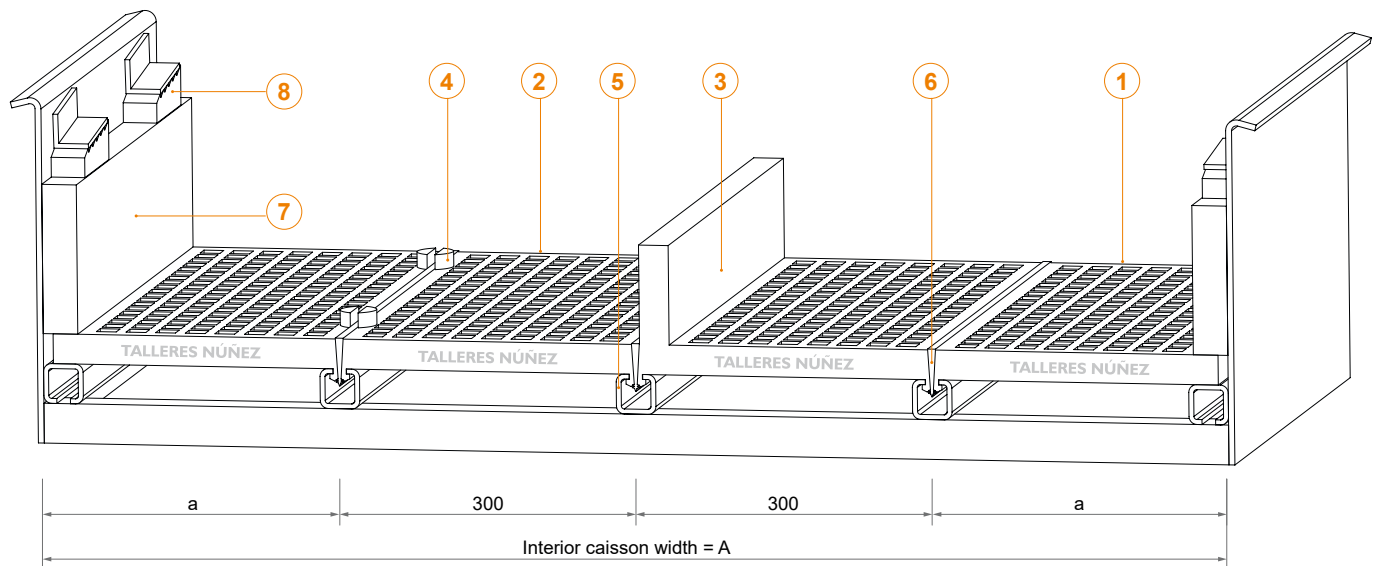
Central TN module



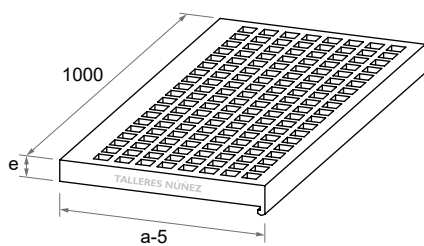
TN® Modular System



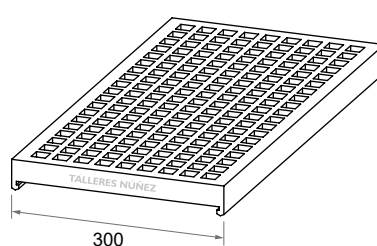
TN® Modular System with splitter module



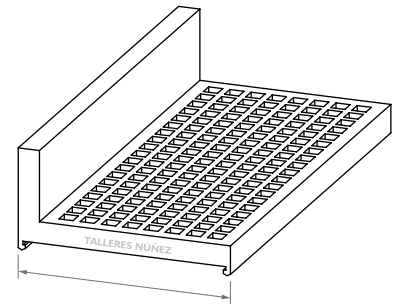
1 TN® Outside Module



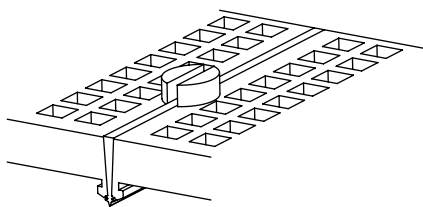
2 TN® Central Module



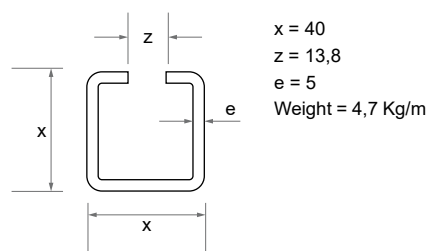
3 TN® Splitter Module



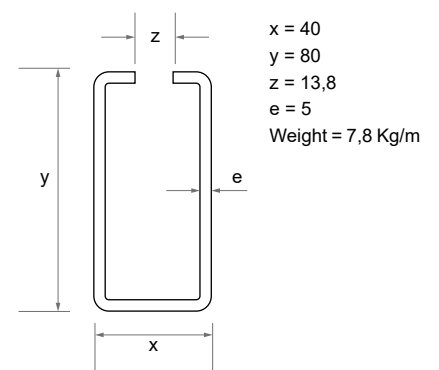
4 TN® Deflector Module



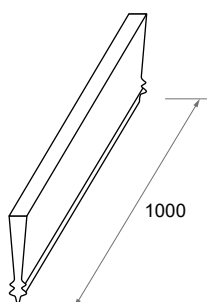
5 Grooved metallic profile 40x40



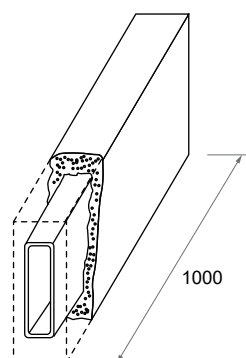
5 Grooved metallic profile 40x80



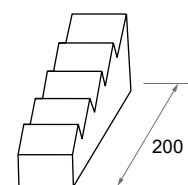
6 TN® Rubber wedge



7 PU Side plate



8 PU Side plate wedge



Polyurethane Modular System Indalo

Characteristics

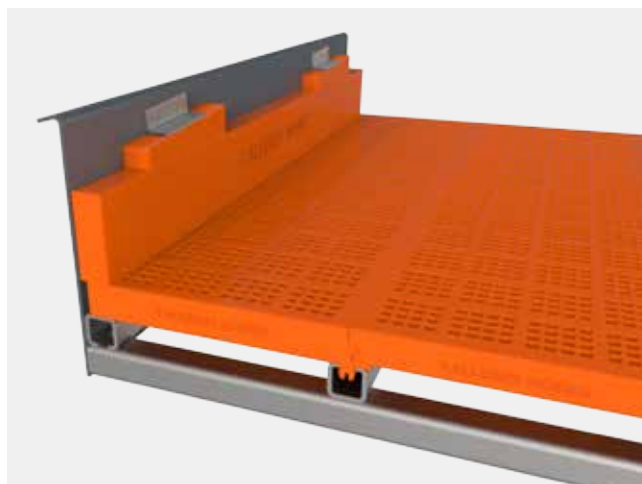
This modular system uses an additional connector piece called Indalo to fix the panels to the deck. These connectors fit in the grooved metallic profile by pressure. On the outside module it can either be incorporated (2), to avoid any gaps, or not (1).



Indalo System 1



Indalo System 2



Standard Indalo connector

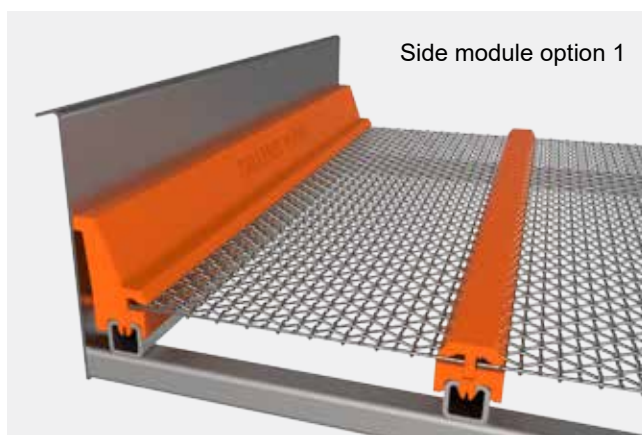
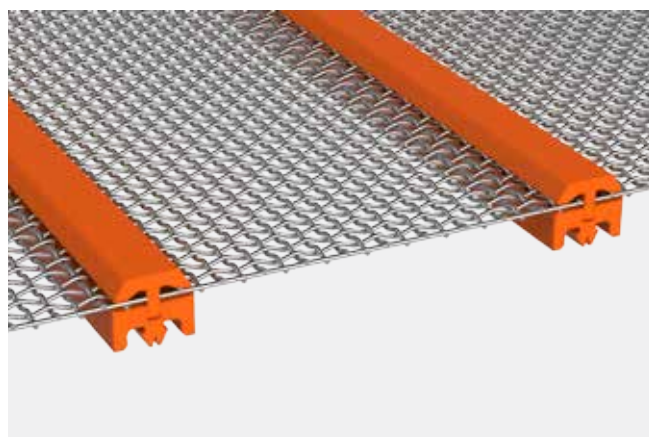


Indalo connector with lateral protections

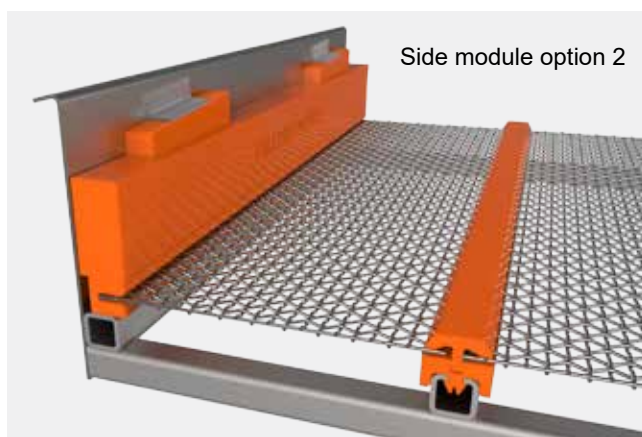
Polyurethane Modular System Mixed

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.



Side module option 1

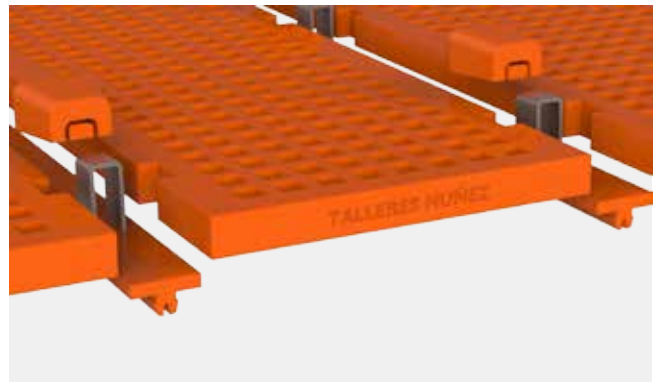
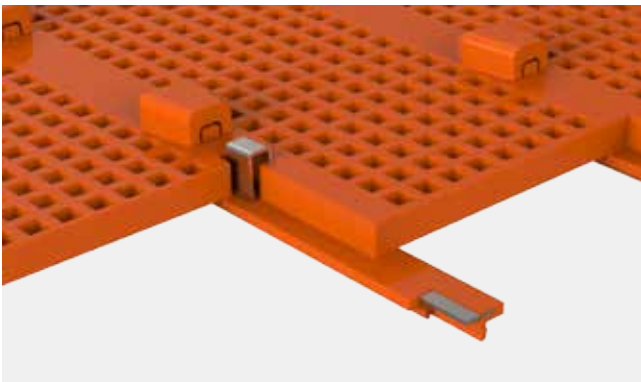
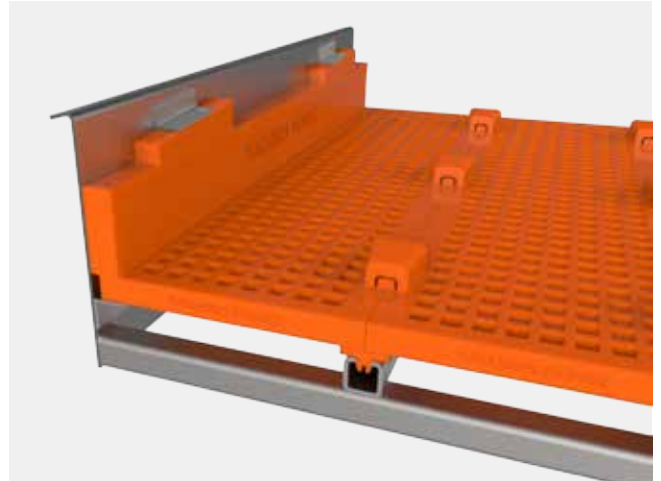


Side module option 2

Polyurethane Modular System Three Point Fixing

Characteristics

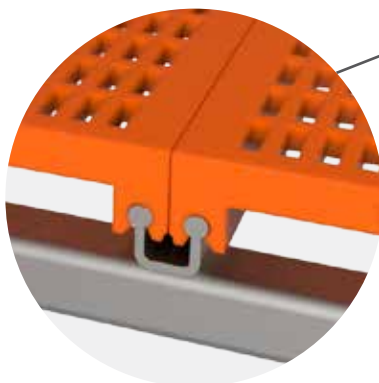
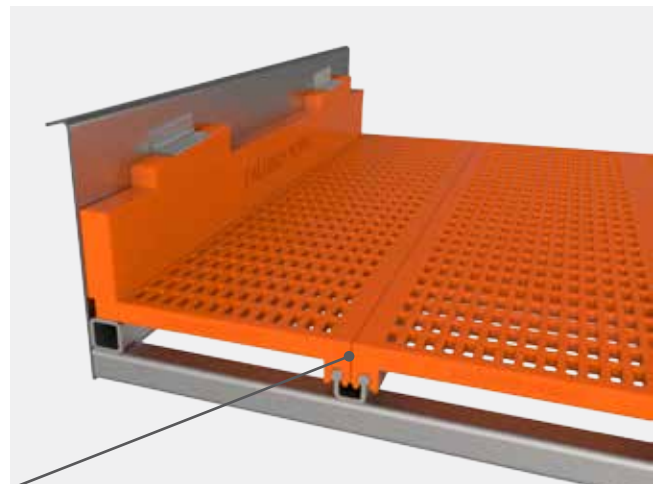
This system uses a different connector profile that has three connection points; it also fits in the grooved metallic profile by pressure. The panels are fitted in and wedged down with a special PU Wedge.



Polyurethane Modular System U-shape Profile

Characteristics

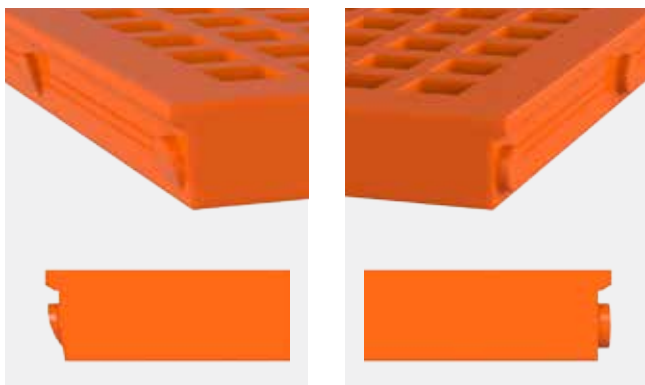
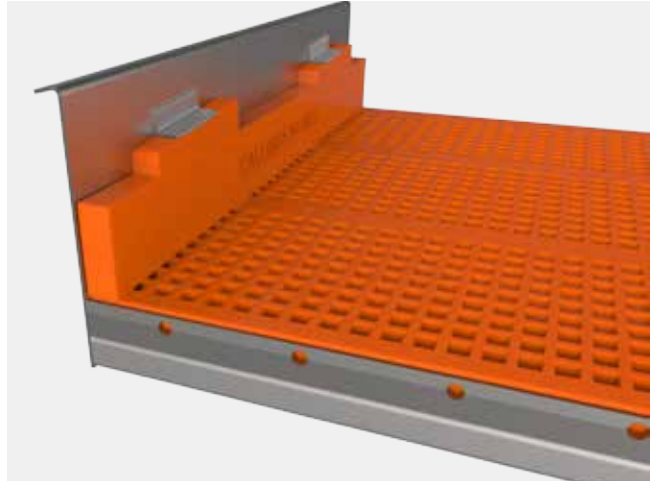
In this system the PU panels are snapped in to place by pressure on a special U-shaped metallic profile.



Polyurethane Modular System Multiple Stub Fixing

Characteristics

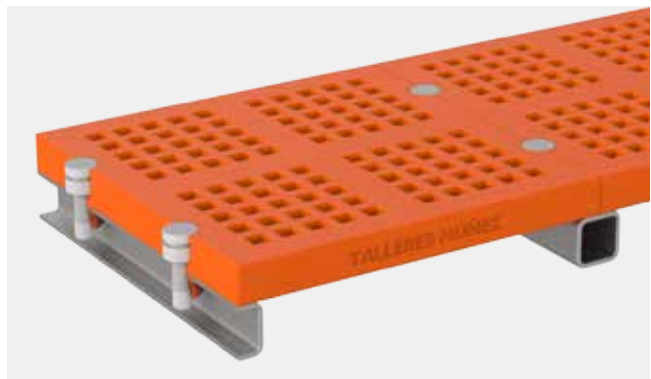
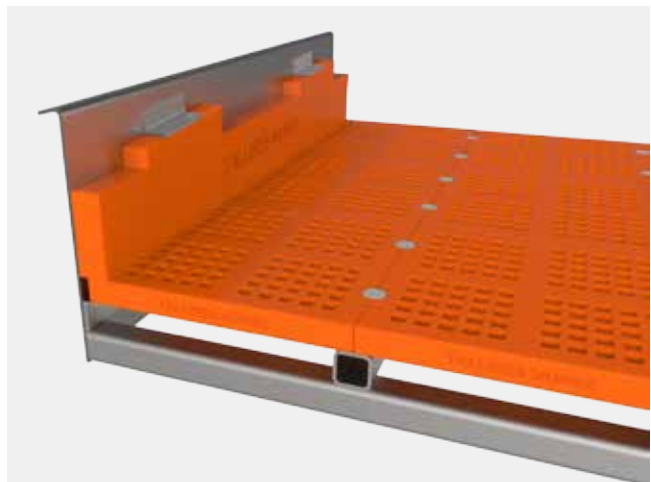
This system has little PU stubs on the side of the panels that fit in by pressure on perforated flat bars welded to the screen deck.



Polyurethane Modular System Pin and Sleeve

Characteristics

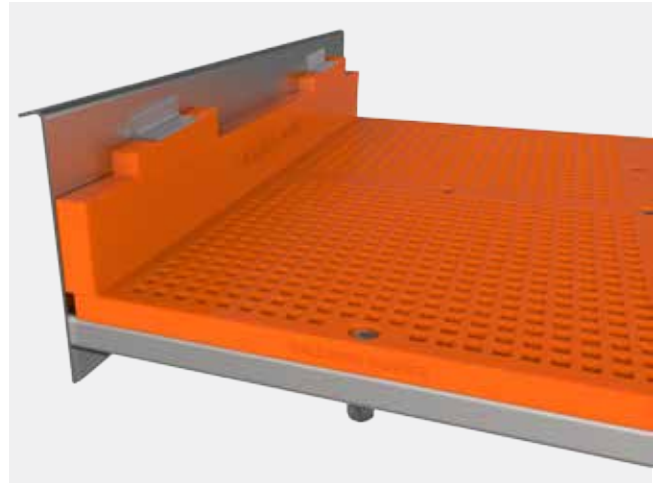
In this system the PU panels are secured with a pin, which bends the sleeves on the panel and fixes the panel to the deck. There are many different variations on this system such as sleeves separate from the panel as an accessory.



Polyurethane Modular System Flat Screen Panel

Characteristics

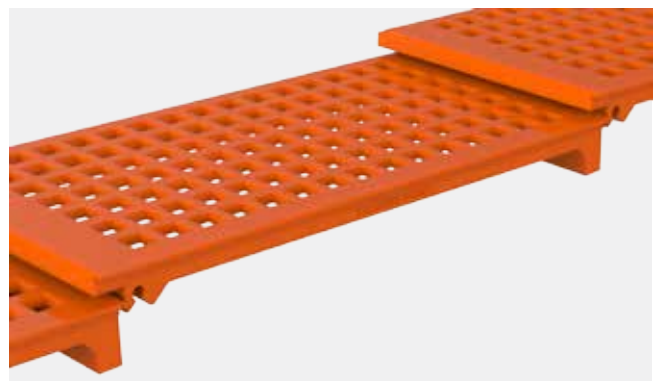
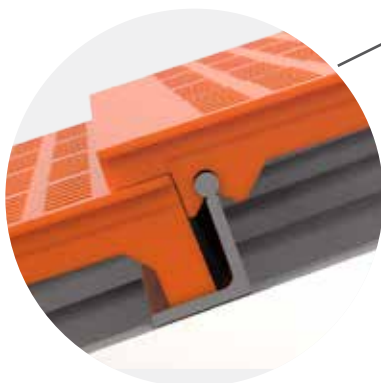
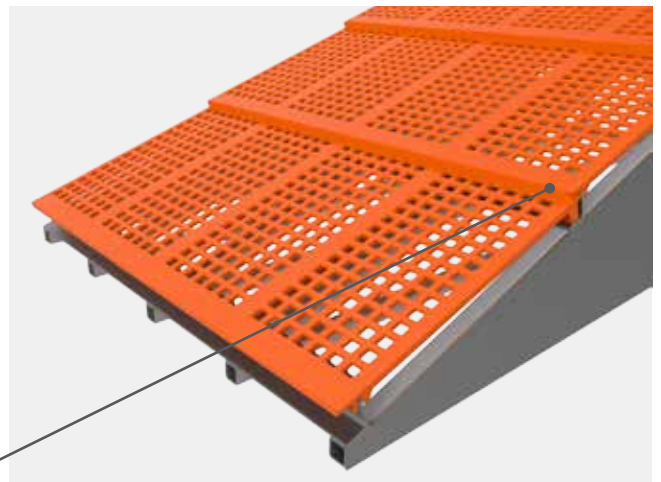
Flat screen panels can be made to any size, shape, metallic structure reinforcement, etc. Customized to fit any machine or client specification.



Polyurethane Modular System Cascade

Characteristics

It is a snap-on panel that fits on a special L shaped metallic profile. This system focuses on rotating the material, as it flows down the deck, to give the material particles more options to be screened.

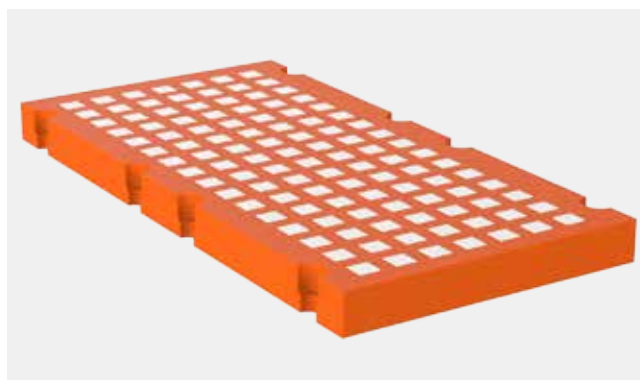
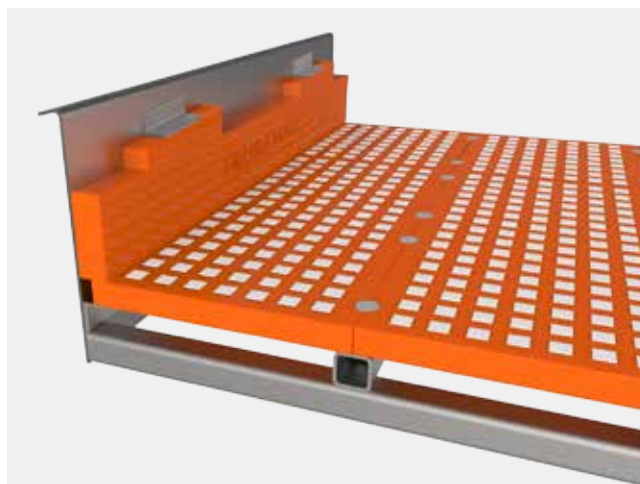


Polyurethane Modular System With ceramic inserts

Characteristics

PU modules with ceramic inserts for different types modular fixturing.

They are used to increase the lifetime of the production lines. Recommended in areas of high impact (primary, discharge areas, large production and abrasive materials)

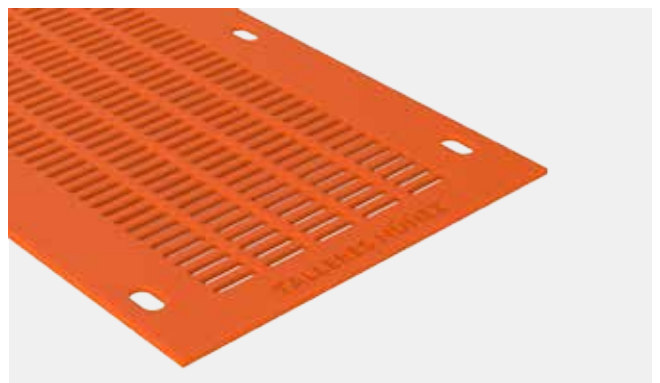
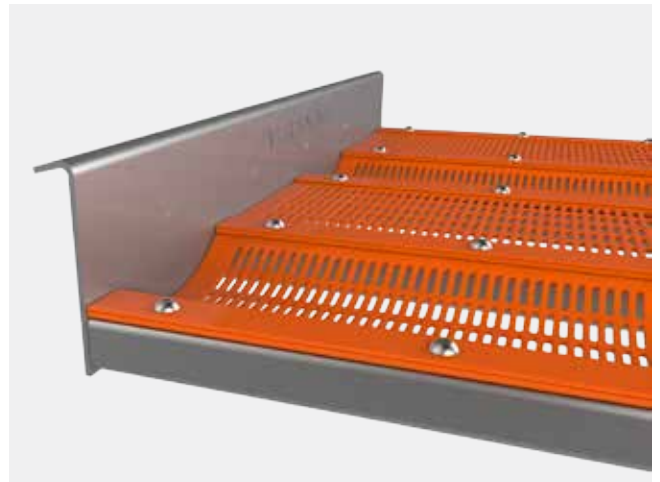


Polyurethane System

TN-LW

Characteristics

These Flip flop or Flip flow screens are made to suit dual vibration screening machines, which agitate the material violently. This will leave the screen free from blinding even with the most difficult materials. They are generally made in 70° Shore polyurethane in 3-5mm thickness.

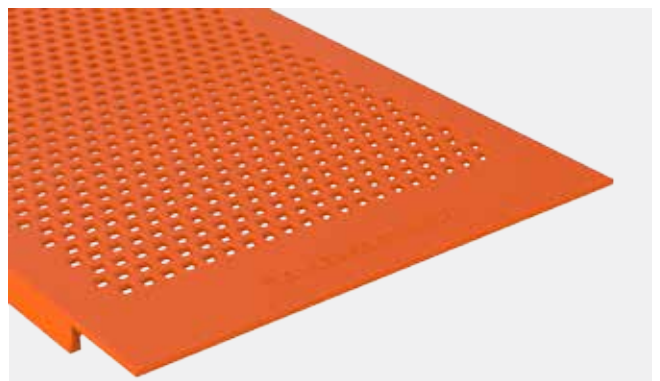
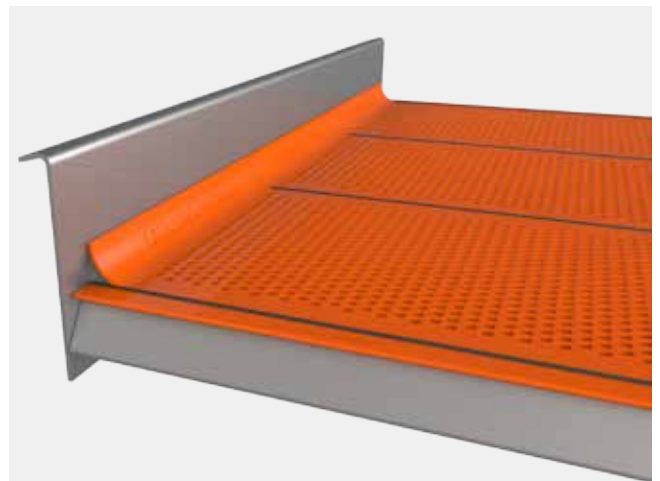


Polyurethane System

TN-BIN

Characteristics

This is another model of Flip flop or Flip flow screen; in this case the deck has a special metallic profile, where the panels are fitted using a rubber wedge. These screens are also manufactured in 65° – 80° Shore.

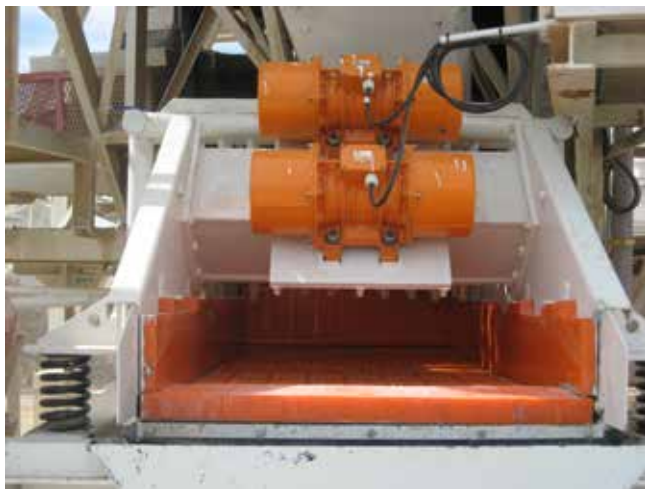


Dewatering Screens

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.

Dewatering PU modules have great properties in wet applications and a high wear resistance.

They can be configured to fit any dewatering screener and are manufactured with apertures of 0,2x11 - 0,3x16 - 0,4x11 - 0,5x16 - 0,6x11 y 0,8x16 mm.



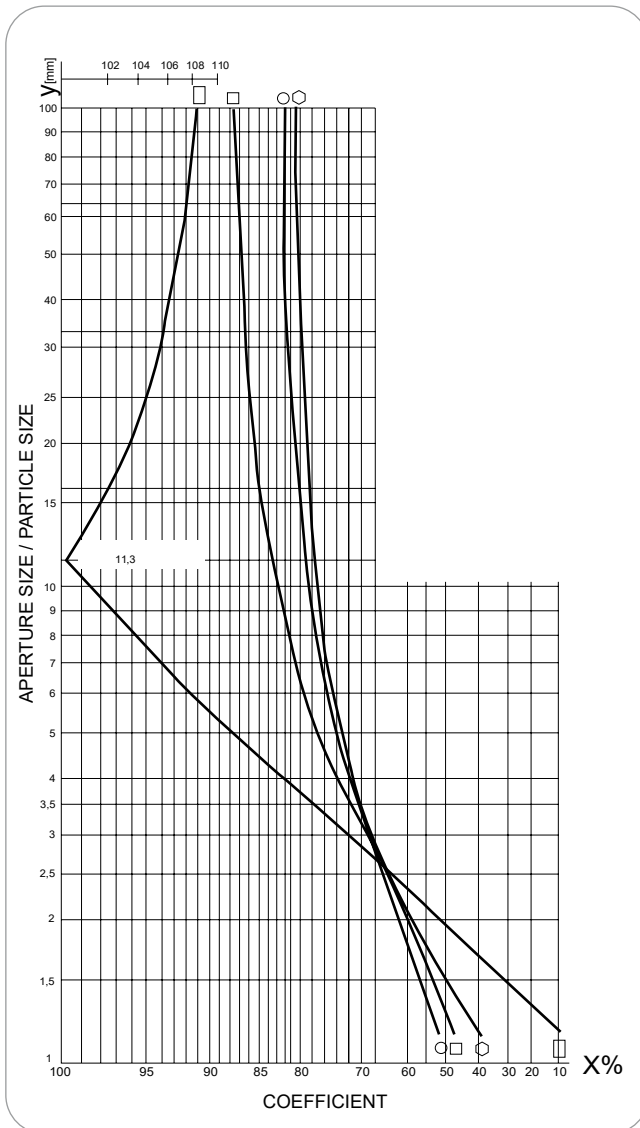
Dewatering aperture module



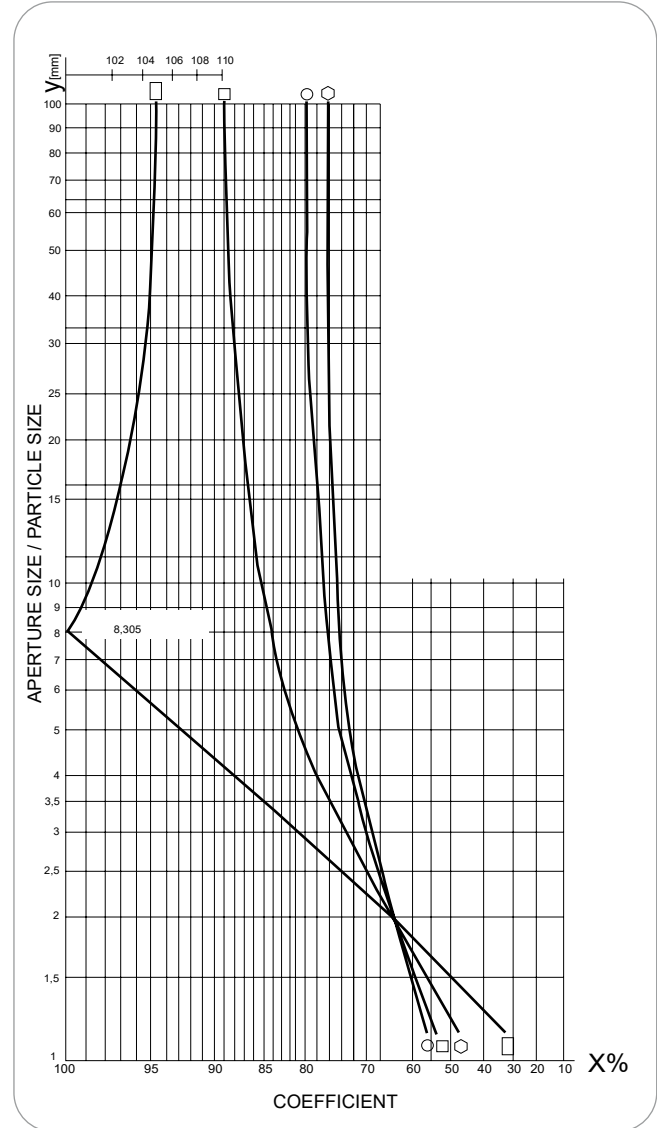
Approximate screening tables and calculations

Determining aperture size and particle size for polyurethane screens:

Natural material



Crushed material



Determining particle size from a specific PU aperture size

Take the aperture size on the Y-axis, follow the horizontal as far as the curve and take the % on the X-axis.

$$\text{Particle size} = \frac{\text{Aperture size (mm)} \times X (\%)}{100}$$

Determining PU aperture size from a specific particle size

Take the particle size on the Y-axis, follow the horizontal as far as the curve and take the % on the X-axis.

$$\text{Aperture size} = \frac{\text{Particle size (mm)} \times 100}{x (\%)}$$

Available apertures in Modular and Tension polyurethane screens


Square

Aperture	Screening thickness	Total thickness tension	Total thickness Modular
2,50	7	25	30
2,80	7	25	30
3,20	7	25	30
4,00	7	25	30
4,50	8	25	30
5,00	9	25	30
5,50	8	25	30
6,20	9	25	30
6,50	9	25	30
7,30	9	25	30
7,50	9	25	30
8,00	9	25	30
9,50	10	25	30
10,00	11	25	30
11,50	12	25	30
12,50	13	25	30
13,00	13	25	30
14,00	13	25	30
15,00	15	25	30
16,50	16	25	30
17,50	15	25	30
18,50	15	25	30
20,00	18	30	30
22,00	18	30	30
23,00	18	30	30
24,00	24	30	30
25,00	24	30	30
25,90	22	30	30
27,00	24	30	30
28,00	21	30	30
30,00	24	30	30
32,00	21	30	30
35,00	28	35	35
37,00	28	35	35
40,00	27	35	35
42,50	28	35	35
45,00	28	35	35
50,00	37	40	40*
55,00	40	40	40*
60,00	40	40	40*
65,00	40	40	40*
70,00	40	40	40*
75,00	40	40	40*
80,00	45	45	45*
85,00	45	45	45*
90,00	45	45	45*
95,00	45	45	45*
100,00	35	35	35
120,00	40	40	45*

Rectangular

Aperture	Screening thickness	Total thickness tension	Total thickness Modular
0,20x11,00	8	30	30
0,30x16,00	7	30	30
0,40x11,00	8	30	30
0,50x16,00	7	30	30
0,60x11,00	8	30	30
0,80x16,00	7	30	30
1,00x11,00	8	25	30
1,20x11,00	8	27	30
1,50x11,00	8	25	30
1,50x20,00	8	25	30
1,50x25,00	8	25	30
2,00x20,00	8	25	30
2,50x20,00	8	25	30
3,00x20,00	8	25	30
4,00x20,00	12	25	30
4,50x20,00	8	35	30
5,00x20,00	8	25	30
6,00x20,00	12	25	30
8,00x20,00	12	25	30

(*) Exclusively in INDALO modular system.

 Apertures available for dewatering screens.