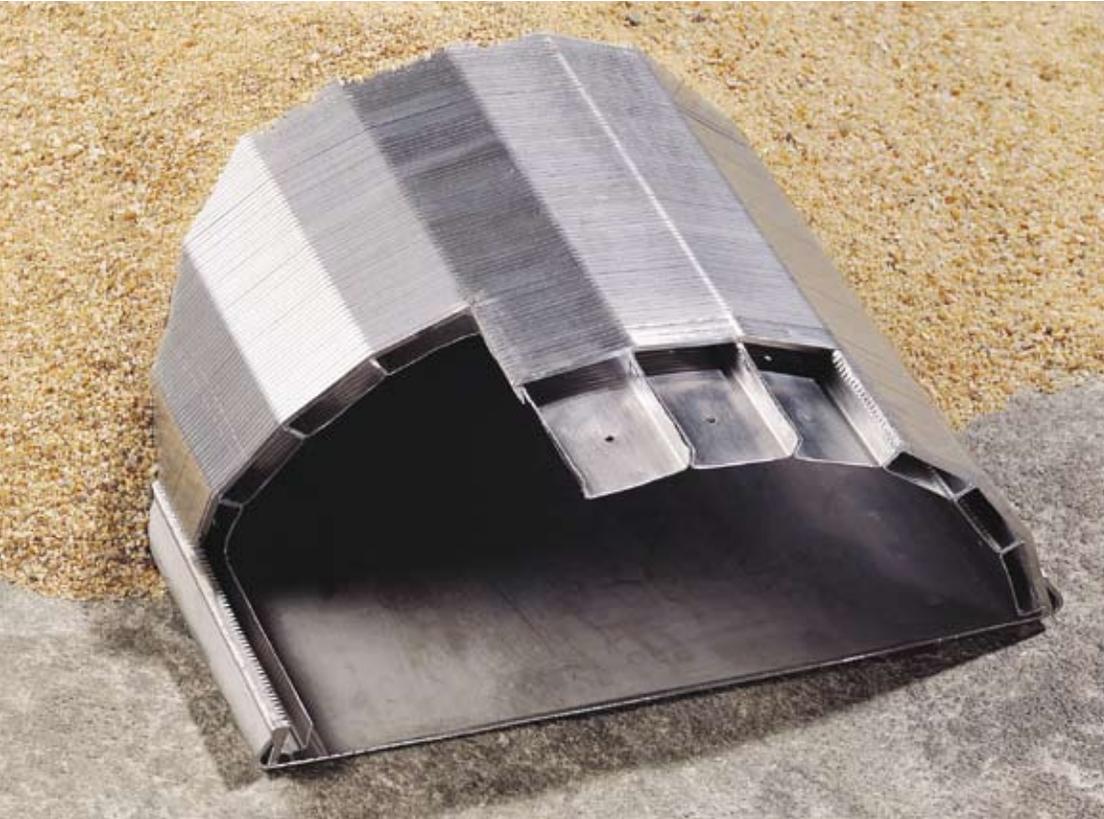


# TRITON<sup>®</sup> Underdrain Systems



# TRITON® UNDERDRAINS: The solution

*Triton* Underdrains' exceptional performance as a filter underdrain system utilizes Johnson's world renowned Vee-Wire® screen technology and our wealth of filtration technology experience.

Available in stainless steel and in PVC, *Triton* Underdrains offer maximum surface area to optimize filtration efficiency.

## DISCOVER THE UNIQUE FEATURES OFFERED BY *TRITON* UNDERDRAIN

*Triton* Underdrain is designed for the collection and distribution of water with direct retention of filtering media.

With large open areas, U shaped perforated supports and Vee-Wire filtering media support profiles, the *Triton*

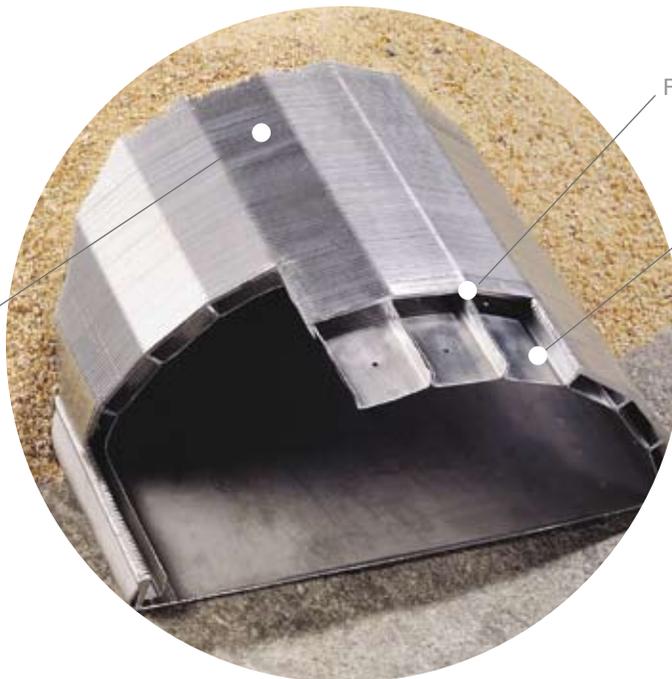
Underdrain system offers fine slots to suit the selected filter media spec.

Vee-Wire surfaces are common to all of Johnson Screens' underdrain products. The slot width can be constructed and controlled to handle many different types of media.

The *Triton* Underdrain system, because of its superior flexibility, can be customized to suit your needs.

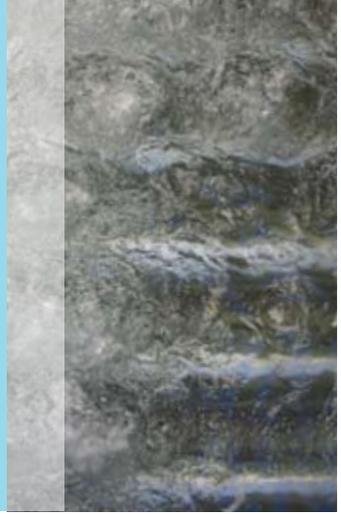


Vee-Wire filtering surface



Fine filtration to suit media

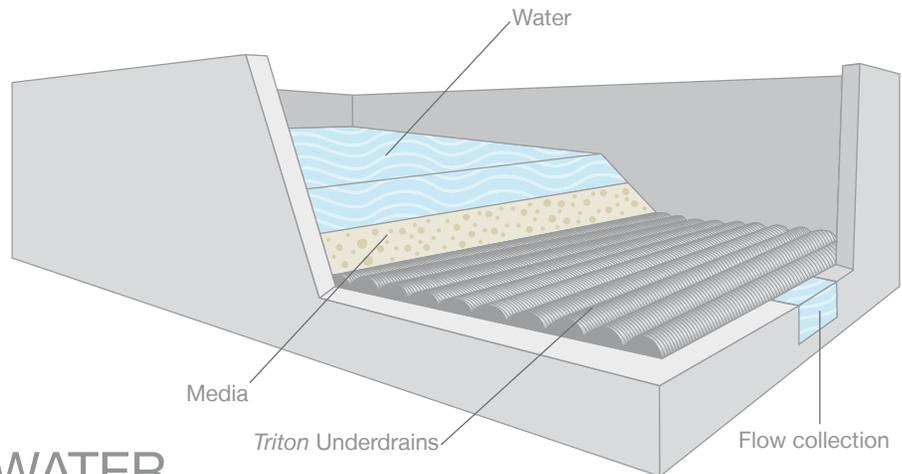
U shape perforated support



## FOR SUPERIOR PERFORMANCE AND PROBLEM SOLVING CAPABILITIES, CHOOSE TRITON® UNDERDRAIN

With the benefits of Johnson Screens® experience in filtration, *Triton* Underdrains are designed to solve typical problems that occur in filtration plants and offer the following advantages:

- Smooth robust plug-free retention surface
- Covers the entire filter area
- Direct retention of filter media
- Slot opening to suit various filter media sizes
- Effective washing (air/water)
- Low initial headloss
- Several layers of filter media may be used without risk
- Lower through slot velocity compared to nozzles reduces the possibility of fines breakthrough
- Reduced number of backwash cycles, resulting in higher production ( $m^3/m^2$ )



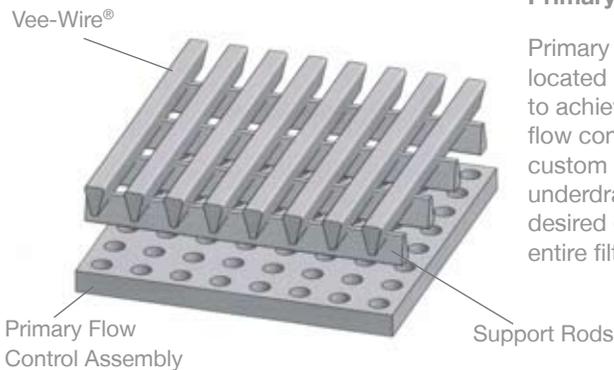
## UNIFORM AIR AND WATER BACKWASH FLOW DISTRIBUTION IS CUSTOM ENGINEERED FOR EACH APPLICATION

### Primary Flow Control

Primary Flow Control Assembly is located internally and custom designed to achieve specific open area allowing flow control for both air and water. These custom designs allow us to manipulate underdrain head loss to provide any desired distribution efficiency across the entire filter basin.

### Secondary Flow Control

Secondary Flow Control Assembly is the *Vee-Wire* filter media retaining surface. This secondary flow control allows increased flexibility to meet optimised design requirements for media retention and air/water distribution while minimizing pressure loss across the system.





## TRITON® UNDERDRAINS SOLVE DIFFICULT AND COSTLY FILTER BED PROBLEMS

Our *Triton* Underdrain system eliminates problems associated with most conventional underdrain systems.

### IMPROVED BACKWASH EFFECTIVENESS

The uniform bubble pattern of the *Triton* Underdrain system allows you to apply air/water backwash as vigorously as required without media upsets.

Improved backwashing, results in longer filter runs, less backwash water used and a cleaner, better performing filter bed.

### INCREASED FILTER CAPACITY

The collection area of the screens' surface is up to 108% of the total filter floor area. This means flow through is unimpeded and because *Triton* Underdrains have a higher open area and a dramatically smaller slot or opening, pressure drop is reduced and media selection expanded compared to alternate designs. This allows the end user to have greater flexibility to meet operational demands.

The *Triton* Underdrain's unique design provides a higher water velocity than conventional nozzles and provides a higher filter loading rate.

Low profile screens and the elimination of gravel media layers make more room for additional filter media, which results in a treatment that is more effective. In new installations less expensive tanks can be used.

### FILTER BED UPSETS ELIMINATED

Backwashing conventional systems can disrupt the support gravel and lead to problems ranging from minor loss of flow efficiency to a complete system shutdown. Because treatment media rest directly on the face of the screens, gravel can be eliminated as well as the potential for bed upset.

### CUT MAJOR DOWNTIME COSTS

When conventional systems experience serious bed upset, they need to be shut down and all the support gravel and treatment media must be removed and replaced. Since *Triton* Underdrain eliminates bed upset, it also eliminates this costly, time-consuming rehabilitation cycle.

### ADAPT TO ANY FILTER DESIGN

Johnson Screens will help design a *Triton* Underdrain system that precisely fits your filter size, capacity and budget. We'll provide any level of assistance you need from supplying basic components to handling complete turnkey installations, retrofits and upgrades.

### INSTALLATION FASTER AND EASIER

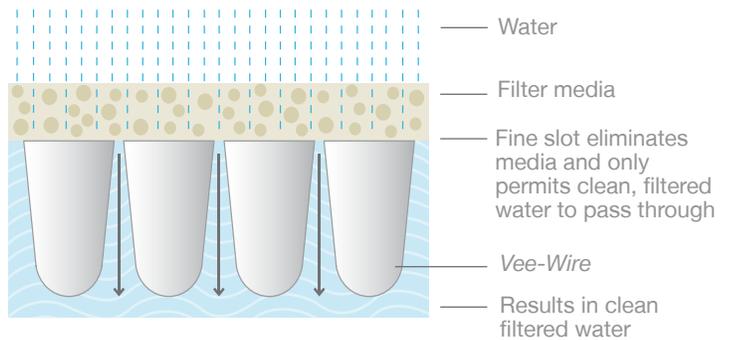
Despite their great strength, *Triton* Underdrains are lightweight and under proper supervision can be easily installed by one or two people. Laterals are supplied as a single piece ready to install. Placing the treatment media is also simplified. Support gravel does not need to be purchased or carefully stratified.



## THE FILTRATION TECHNIQUE

The Triton® Underdrain design is essentially stainless steel or PVC Vee-Wire® wound around and welded to “U” shaped channel rods. The design ensures a very robust construction.

Plugging problems are considerably reduced as the Vee opening allows only two point particle contact.



## HOW TRITON UNDERDRAIN SYSTEMS CAN SAVE YOU TIME AND MONEY

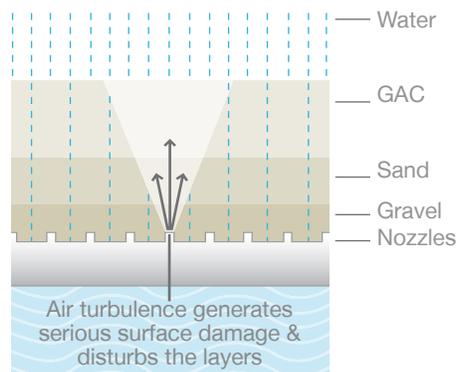
- A higher capacity system that lasts longer and reduces both installation and operating costs
- Reduced consumption of treated water for backwashing
- Reduced maintenance, repair or shutdown
- Savings in filter height and volume
- No need for a suspended plenum floor
- No need for gravel
- Installation is faster and easier
- Filter design simplified

## LET'S COMPARE OTHER SYSTEMS WITH TRITON UNDERDRAINS

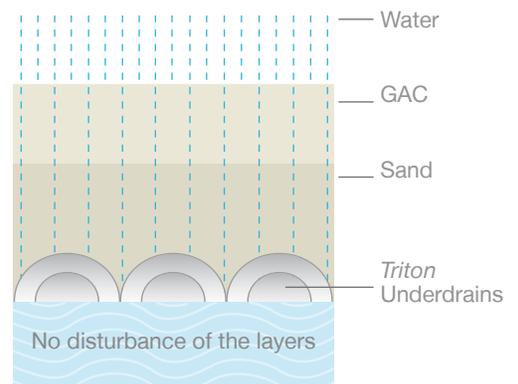
Conventional systems require an intermediate layer of gravel between the treatment media and the underdrains. Vigorous backwashing can cause bed upset, reducing the hydraulic efficiency of the bed and allowing some media to migrate past the filter underdrain. Triton Underdrain systems retain the media directly, eliminating gravel as a potential problem.

Triton's Vee-Wire media support surface has a greater open area, which provides plug-free and low headloss performance. The perforated slots of the Tee-Pee folded plate or block types with its centered plastic top underdrain systems do not provide the same area.

The Triton's channel rod which is below the Vee-Wire surface, generates the flow distribution during backwash and provides the double layer of media support.



The Tee-Pee type is a singular layer of about 1/10th the open area supporting the media.



# TRITON® UNDERDRAINS: Frequently Asked Questions (F.A.Q)



## TRITON® UNDERDRAIN F.A.Q

### What improvements do *Triton* Underdrains provide?

- Even air and water distribution
- Trouble free operation
- Simple to operate
- Genuine capital and operational savings

### What is the cost?

Upon request we are able to provide prices for your individual requirements of material and underdrain length to suit your application.

### How are the savings achieved?

- Reduces water consumption in back washing
- Increases through-put
- Reduces maintenance of filter media
- Reduces capital and installation cost

### How easily are the *Triton* Underdrains installed?

- Simple to install
- Can be retro fitted with minimum alteration to existing plant
- Johnson Screens® can arrange installation

### What is the pressure drop?

It depends on the media, but it is reduced when using *Triton* Underdrains over conventional systems.

### Does the media influence the pressure drop?

YES: The smaller the effective size of the media the greater the pressure drop.

### Why do *Triton* Underdrains produce more water between backwash cycles compared to older systems?

1. The screens cover almost the entire filter bed and the perforations in the channel rods spread the water flow through all the media hence an optimised media utilization.
2. The perforations in the channel rods spread the air and water over the whole surface of the filter bed hence a more thorough clean each time.

### What determines filtration performance?

The media. The underdrain will impact on its efficiency, i.e. the number of m<sup>3</sup>/m<sup>2</sup> that will be produced. The screen in the *Triton* Underdrain is only designed to retain the sand / GAC.

### Backwash: What happens in the zones between the *Triton* Underdrains?

The lateral holes allow a bi-water flow rate to clean them from both sides. These effectively allow backwashing due to the holes in the channel rods.

### Why use the PVC *Triton* Underdrains?

The PVC *Triton* Underdrain has the same features as the stainless steel version. Often the PVC version is used as a good alternative to stainless steel when budgets are tight and stainless steel is not warranted and also when used in sea water applications due to stainless steel corroding in salt water.



## TRITON® UNDERDRAIN TECHNICAL INFORMATION

### DIRECT RETENTION

Direct retention of most media (sand, garnet, dual media, mixed media, GAC etc.). Material with effective size of 0.007 in. - 0.008 in. (0.18mm - 0.20 mm) can be supported without the use of any support gravels.

### SLOT WIDTH

Can be tailored to suit media specifications.

### PRESSURE DROP ACROSS UNDERDRAIN

During Backwash @ 15gpm/ft<sup>2</sup> = 1.64 ft  
(@ 37m<sup>3</sup>/h/m<sup>2</sup> = 0.5 m.)

During Filtration @ 5gpm/ft<sup>2</sup> = 0.164 ft  
(@ 12.5m<sup>3</sup>/h/m<sup>2</sup> = 0.05m.)

### FILTRATION MODE

Application rates of 2.025gpm/ft<sup>2</sup> - 10.135gpm/ft<sup>2</sup> (5 - 25 m<sup>3</sup>/h/m<sup>2</sup>) depending on media type and size.

### TYPICAL BACKWASH

1. Shut off influent into filter and run filter level down to top of media.
2. Air @ 2.0 - 3.0 SCFM/ft<sup>2</sup> (35-55m<sup>3</sup>/hr/m<sup>2</sup>)
3. Air/Water Wash at:  
Air @ 3.0 SCFM/ft<sup>2</sup> @ 4.0psi (55m<sup>3</sup>/h/m<sup>2</sup> @ 27.5kPa)  
Water @ 2.838gpm/ft<sup>2</sup> @ 4.0psi (7m<sup>3</sup>/h/m<sup>2</sup> @ 27.5kPa)
4. When the water reaches the bottom of the filter trough, shut the air off and wash at the high water rate of 14.189 - 20.270gpm/ft<sup>2</sup> (35 - 50 m<sup>3</sup>/h/m<sup>2</sup>) (based on media design & temperature).

### TRITON UNDERDRAIN DIMENSIONS

4.725 in. high x 10.236 in. wide x custom length (120mm high x 260mm wide x custom length) based on filter basin application. **Note:** Factory should be consulted if lateral exceeds 20 ft (6m).

### AIR/WATER FEED

Either center or end feed connections can be supported. Air can be fed from the bottom or the top.

### INSTALLATION

*Triton* laterals must be installed to be flat within plus or minus 0.197 in. (5 mm).

### MATERIALS OF CONSTRUCTION

304 and 316L Stainless or PVC is standard

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innovation and customer satisfaction.  
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Collectors/distributors  
Resin traps  
Precoat filters  
Milliscreen®  
Suboscreen®  
Stepscreen  
Centre-Flo Screen

### ARCHITECTURE AND CONSTRUCTION

Column covers  
Urban furniture  
Frontages  
Floor grating  
Ventilation grids

Sun-control screens  
Custom lighting  
Wall partitions

### GENERAL INDUSTRIAL

Flat panels  
Sieve bends  
Cylindrical screens  
Centrifugal baskets  
DSM screens  
Trommels  
Vibrator screens  
Diffuser screens  
Pressure screens

### MINERAL AND AGGREGATE PROCESSING

Centrifuge baskets  
Pipo® Two modular screening systems  
Pipo® Three modular screening systems  
Koko® screening systems  
Polyurethane and rubber screen panels

Woven wire  
Sieve bends  
Trommel mats

### PETROCHEMICAL AND REFINING

Centerpipes  
Outer baskets  
Scallops  
Support grids and beams  
Outlet collectors  
Laterals  
Distributor trays  
Nozzle systems  
Scale traps

### WATER WELL

Well screens (stainless steel and PVC)  
Riser pipes  
Sand spears  
Environmental monitoring screens  
Drilling fluid  
Nu-Well® rehabilitation chemicals

### ON-SITE SERVICES

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Assistance  
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