

## M101 – P Island

A premium Urinal accessory that eliminates splash, eradicates organics and malodours found in urinals and drain lines

### Stash the Splash



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## M101 – P Island the Ultimate Urinal Accessory

Malodour and poor hygiene in the men's restroom is an age old problem that together with any evolution in urinals has never really been addressed adequately – well until now.



Following the introduction of the deo-block - an extremely non-environmentally friendly product that is perceived to be carcinogenic and poses several other health risks and several newer perceived innovations have emerged on the South African and international markets. For example the Dome shaped

products or those screen shaped products designed to either treat or mask malodours whereas the urinal mats where designed to release a masking fragrance and the other screen type mats that **claim** to reduce splash back.

Pineland Environmental Technology are proud to introduce the ultimate urinal accessory. A devise that not only eliminates splash-back by as much as 90%, it incorporates the best features of recent innovations, i.e. slow release fragrances that can last up to 30 days or 2000 flushes, incorporated biological odour control, biological drain line clearing and cleaning. Given the combination of all these features the P-Island will provide the ultimate cleaning, deodorising and hygiene platform for all conventional urinals, trough urinals and waterless urinals – to the extent that you can now eliminate conventional chemical sanitizers

Urinals, as they exist today, do not adequately serve their function which is to be a sanitary means of unsanitary-fluid disposal. Quite frankly, one of the most simple and logical inventions since the origination of plumbing has only ever been improved marginally.

### Background

The back-splash that occurs when urinals are used is an age old problem for two main reasons: the unsanitary mess it creates for the patron as well as the facility owner (a qualitative observable) and a micro-biological dissemination via micro-droplets suspended in the air, which is a major health and hygiene concern not to mention urine splash droplets on your trouser legs.

Many existing products, both fully functional urinals and urinal inserts claim to reduce splash, but if you require true sanitation none of these solutions are adequate because none address the fundamental issue: under pressure fluid flow making contact with a hard surface at a certain velocity will cause a splash and not truly address the components associated with true hygiene and good sanitation

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## The Design



Due to the difficulty of mathematically modelling an irregular stream of urine, our process has involved using qualitative understanding of the nature of splash and combining that knowledge with the numerical data and comparing it to a waterfall with stone splash at its base as depicted in nature.

Our solution is a series of curved, irregular nodules (peaks and troughs) resembling a bed of stone pebbles placed on a curved shape. By orienting them such that the leading edge is always tangent to the stream of urine, we reduce splash as long as the leading edge and neighboring peaks and troughs are of dissimilar heights. And if the stream travels between

stators (as it statistically most often will), we orient the pebbles such that the stream never contacts the pebbles with a normal velocity above the splash threshold. Furthermore, because at some point the fluid will run off the smooth surface, we will ensure that the fluid decelerates via friction sufficiently to prevent splash at that point. In this way, we near completely (> 90 %) reduce splash from out of the bowl.

Due to the irregular nature of the phenomenon we are handling, our optimization resulted from quantitative and qualitative analysis. The P-Island is a product of two factors in the fluid flow; the first being the velocity of the flow and the second being the geometry of the surface which the fluid impacts. Knowing that fluid velocity is a variable with each user and cannot be controlled, we focus on the geometry of our design. In our design, pebbles are tangent to the direction of flow and work to gently redirect the path of the fluid and prevent splash and evenly distribute the fluid.

As well as having a circular dome curve to redirect the flow, the pebbles are also angled in varying degrees ranging from  $10^0$  to  $45^0$  degrees and varying heights (as in peaks and troughs). This ensures that when used properly (i.e. fluid is directed from any angle in relation to the device) no fluid will impact the urinal at a normal direction to result in splash-back. The dimensions for our design were extrapolated from both current models and human features.

The P-Island is a variant of three significant design features that incorporates in its design fine hygiene elements such as impregnated pleasant restroom fragrances, a biological disc housed in a basket attached to the undercarriage of the device for the treatment of and or eradication of malodours which are emitted from the urinal system and the anti-splash back feature of the pebbles

The SPLASH - In an adult the point of origin is usually located +/- 70 centimetres to the front or sides of the urinal (our research shows that we can control this variable consistently). The stream velocity (on average) was determined to be approximately 2.5 m/s (meters per second).

**Splash Back Results:** We observed close to zero splash-back. Even when we drastically altered the point of origin and increased the velocity of the stream, there was very little splash-back.

However, a significant deflection of the flow was observed and because of our understanding of the phenomenon of splash there is micro-splash (micro-droplets) that is unobservable with our current procedure.

**Fragrance:** Fragrances and deodorants for polymers are used in a variety of applications and are playing a growing role in marketing consumer products for the home, health and hygiene markets hence the incorporation thereof.

## Biological results

By incorporating the biological urinal disc into the P-Island the bacteria in the disc degrades and eliminates organics found in the urinal, toilet and drain lines. The urinal disc incorporated in the P-Island maintains a cleaner and odour-free system. The urinal disc maintains effective microbe and enzyme activity in septic systems by eliminating odours caused by incomplete digestion of malodorous volatile fatty acids.

The *Bacillus Subtilis* CFU (Colony Forming Unit)  $> 1 \times 10^7/\text{g}$  the main active ingredient within the urinal disc penetrates cracks, crevices and pores of surfaces where organics accumulate, actually removing the organics (VOC) to leave a visually cleaner surface and provides long-term odour control, removing the organics that cause odours and prevents the return of odour-causing compounds.

## P-Island urinal disc

- Is a stable consortium of safe *Bacillus* spores
- Production of multiple enzymes providing a wide range of degradation capabilities
- A synergistic blend that works in concert to provide superior performance across multiple applications
- Excretion of high levels of amylase, cellulase, lipase and protease enzymes
- Ability to work under aerobic and anaerobic conditions

**BEFORE treatment**



**14 Days AFTER treatment**



The observed results indicate that our device is superior to any other device currently on the market and will be a tremendous asset to urinals, bathrooms, toilets and ultimately a credit to the facilities manager and hygiene specialist.

## P-Island Main Features and Benefits

- The vast reduction of splash back holds significant hygiene benefits i.e. when standing at a urinal, the splash back could spray microscopic droplets up to 3.50 m far, as measured from a drop height of about 77 cm.
- The elimination of splash back will allow for a more pleasant experience to the user of the urinal
- The elimination of splash back reduces the need of constant cleaning and will result in substantial cost savings – both man hours and cleaning materials/product
- The incorporation of a fragrance allows for a pleasant environment
- The aesthetics of the device is such that it will enhance the appearance of all urinals
- The choice in fragrant options will add value to the personal selection of such in all restrooms
- The P Island Urinal Device is cost effective considering all the added benefits it holds for the user and for facilities managers.

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- The product choice variants available to the facilities manager and or buyer of the P-Island caters for pricing, pleasant fragrance, biological cleaning and malodour elimination and a near to zero splash back action plus possible saving by not having to engage sanitizers.
- P-Island can equally well be incorporated into conventional urinals and waterless urinals

#### **P-Island Features & Benefits when in use**

- Releases a pleasant fragrance that keeps a urinal and the surrounding areas smelling fresh for up to 30 days depending on the frequency of use and number of flushes (2000).
- Releases a pleasant fragrance in combination with bio-enzymes keeping the urinal smelling fresh for up to 30 days plus the bio-enzymes capability to degrade and eliminate organics found in the urinal, and drain lines.
- Unique ribbed and serrated-edge design prevents even the smallest debris falling into the urinal trap causing potential drain blockages.
- Innovative angled pebble design that keeps urinal area clean & inhibits unwanted splash back.
- Safe installation & disposal allows the product and all its packaging to be recycled.
- Activated fragrance burst increases fragrance lift on contact with fluid.
- The pebbles/stones are target orientated allowing better aim for user.
- Bio-enzyme mal-odour eliminating technology eliminates malodour, the need for constant cleaning and will allow you to discontinue your conventional sanitizer.
- Universal design fits all styles of urinals.
- The serrated edge and rib design allows urinal to flush quickly.
- Unique anti-slip polymer feature keeps the device in an optimum position in the urinal.
- P-Island is suitable for both conventional urinals and waterless urinals including trough type urinals

#### **Product variants**

P-Island family is available in the following formats:

- P-Island in four modern colours and fragrances combined with a biological treatment tablet

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