

Water Treatment Using Reactive Filtration Media

With the imperative for Water Sensitive Urban Design, Low Impact Development and Total Water Cycle Management, there has been increasing interest in using filtration systems as a solution for the treatment and reuse of stormwater and low flow industrial waste water runoff. STAR Water Solutions has released a range of Reactive Filter Media that treat polluted stormwater and low flow industrial waste water.

Custom Designed

STAR Reactive Filter Media is custom designed for specific treatment applications using a blend of tailored components in defined proportions that are engineered for specific performance requirements such as contaminant removal, lifespan, hydraulic conductivity, compaction and plant growth. The STAR Reactive Filter Media product range includes Ecomedia® and Infiltrat®.



The **Ecomedia®** range is custom designed to achieve performance requirements in vegetated applications such as:

- Wetlands
- Rain gardens
- Landscape gardens
- Sports fields, Golf courses
- Fill around permeable pipes
- Roof gardens, Planter boxes
- Swales
- Sand filters
- Leach drains
- Retaining walls
- Building site runoff
- Water harvesting/reuse

The **Infiltrat®** range is custom designed to achieve performance requirements in non vegetated applications such as:

- Car park
- Retaining walls
- Building site runoff
- Water harvesting/reuse
- Sub-surface drainage systems
- Under permeable paving system
- Pavement sub base (structural grade)
- Pavement sub base (non structural grade)
- Sand filters
- Detention basins
- Fill around permeable pipes
- Kerb-gully by-pass system

Pollutant Removal Performance

Scientific studies have shown conclusively that STAR Reactive Filter Media can remove pollutants from water to enable harvesting and reuse or be safely discharged into waterways.

A distinctive strength of the media is its ability to remove dissolved contaminants such as nutrients (e.g. nitrogen, phosphorous) metals (e.g. copper, lead, zinc), bacteria (e.g. faecal coliforms) and hydrocarbons (e.g. petroleum) from stormwater. Particulates can be removed by STAR Reactive Filter Media through physical filtration. However, the lifespan of the media is far greater when particulates are removed through primary treatment.

Treatment of dissolved contaminants is achieved by chemical and biological processes created by the selected components in the filter media. These processes include:

- Sorption
- Ion exchange
- Microbial biodegradation
- Precipitation
- Volatilisation
- Phytoremediation

Conclusion

The results from the laboratory and field research indicate that an engineered reactive filtration media can successfully remove substantial quantities of contaminants from water, allowing potential harvesting and reuse.

Typical Treatment Results

Parameter	Inflow Mean value	Outflow Mean value	Percentage Removal
Total Zinc (µg/L)	276	6	97.8 %
Total Lead (µg/L)	133	1	99.2 %
Total Copper (µg/L)	75	5	93.3 %
Total Nitrogen (mg/L)	1.97	1.08	45.2 %
Total Phosphorous (mg/L)	0.264	0.057	78.4 %
PAH (ug/L)	3.7	0.6	83.8 %
Turbidity (ntu)	448	42	90.6 %
Suspended solids (mg/L)	291	50	82.8 %

References

- AWT (1999) Powells Creek East Catchment Stormwater Quality Scheme, Australian Water Technologies.
- <http://www.environment.nsw.gov.au/stormwater/usp/grants/s1f0099.htm>. Accessed 24 June, 2006.

Reactive Filter Media - Product Range

Product Code	Product Type	Description
RENS010	Pavement Infiltrat (non structural grade)	Specifically designed for swale type applications on roads, car parks and railways, Roadside Ecomedia provides a higher drainage performance standard required to treat high levels of first flush contaminated run-off. Treated water can then be either directed to on-site detention, ground water recharge or stored and re-used to irrigate landscaped areas.
RES011	Pavement Infiltrat (structural grade)	Specifically designed for structural applications such as car parks and kerb gully by passes on roadways, Roadside Ecomedia provides structural integrity combined with a high infiltration rate and drainage performance standard required to treat high levels of first flush contaminated run-off. Treated water can then be either directed to on-site detention, ground water recharge or stored and re-used to irrigate landscaped areas.
LGE012	Landscape Garden Ecomedia	Designed for a wide range of landscape applications, Landscape Garden Ecomedia allows for the efficient infiltration and treatment of contaminated water run-off from roads or other impermeable surfaces. The purified water can then be stored and re-used to irrigate landscaped areas. A wide range of plant species can be grown in Landscape Garden Ecomedia that can also take up stored water by natural capillary action.
RWE013	Retaining Wall Ecomedia	A free draining structured media with high hydraulic conductivity, Retaining Wall Ecomedia is engineered to be used in conjunction with Drainage Cell for all retaining wall applications. Contaminated water is purified through the media and directed away from retaining walls by the drainage cell and can be stored in drainage tanks for re-use or for recharging depleted ground water reserves.
RGES014	Roof Garden Ecomedia (Standard Weight)	Designed for use on concrete structures that can bare a standard weight soil, Roof Garden Ecomedia (Standard Weight) has a dry weight density of approximately 1,525 Kg's per cubic metre. It is a free draining mix in which a wide range of plant species can be grown and contaminated surface water run-off from impermeable paving or roofing can be bio-remediated. Contamination is eliminated in the process and water is safe for recycling.
RGEL014	Roof Garden Ecomedia (Light Weight)	Designed for use on structures that require a lightweight planting media, Roof Garden Ecomedia (lightweight) has a dry weight density of approximately 660 Kg's per cubic metre. It also has a free draining structure in which a wide range of plant species can be grown and contaminated surface run-off can be bio-remediated.
PBE015	Planter Box Ecomedia	Specifically designed for growing in confined spaces or in areas of high wind turbulence, Planter Box Ecomedia is suitable for either light weight or standard weight structures and has a dry weight density of approximately 660 Kgs per cubic metre. Holding good humidity levels, it has a free draining structure which bio-remediates contaminated surface run-off from impervious paving and is suitable for a wide range of both indoor and outdoor plants.
SFES016	Sports Field Ecomedia (Standard Formulation)	Specifically designed for a wide range of playing field applications, Sporting Field Ecomedia also provides superior drainage performance and maintenance characteristics. Allowing all weather usage, it ensures better nutrient management, which saves on fertiliser cost and protects surrounding environments from nutrient and pesticide run-off and leaching.
SFEH017	Sports Field Ecomedia (High Performance)	Designed for use on high traffic playing fields, Sporting Field Ecomedia (High Performance) also provides superior drainage performance, low compaction characteristics, effective hydraulic conductivity and bulk density and better maintenance characteristics. The high wearing characteristics provide cost saving benefits and minimise the risk of injuries.
GCE018	Golf Course Ecomedia	Specifically designed for golf course application this mix provides superior drainage performance, low compaction characteristics, good hydraulic conductivity, bulk density and improved Turf recovery. The mix also ensures better nutrient management, saving on fertiliser cost and protects surrounding environments from nutrient and pesticide run-off and leaching.
RTE019	Race Track Ecomedia	Designed for high impact performance and to treat accumulated toxins, Race Track Ecomedia is a free draining media which in conjunction with drainage cell systems provides a better water management solution than conventionally used systems. Nutrient run-off can also be effectively managed and retained water can be re-used for irrigation.
LDE020	Leach Drain Ecomedia	Designed as a free draining biochemical media to treat effluent and drain water, Leach Drain Ecomedia bio-remediates accumulated toxins contained in run-off. The water is can then be passed through drainage cell systems for re-use.