Warden Biomedia specialises in the research and development of random filter media for aeration and biological treatment plants. With the philosophy of increased surface area, the eco-friendly biological filter media are injection-moulded in recycled polypropylene with specific design features to increase the efficiency of the effluent treatment process.

At Warden Biomedia, we design, manufacture and supply Random Biological Filter Media to improve aerobic treatment across the full range of applications – from the largest municipal sewage treatment plant down to a garden fishpond.

In a choice of spherical and tube formats, to suit the application, the random filter media provide excellent ventilation to speed-up the aerobic reaction, and also have high voidage to prevent blocking (and the resulting slowing-down) of the wastewater treatment process that might occur.

Warden Biomedia

With purpose-designed features, the media in the Warden Biomedia filter range are an excellent alternative to traditional mineral-based media and are ideal for improved performance in new wastewater treatment plants. In addition they are perfect for overcoming problems in established trickling filter beds. Biological filter media of the relevant dimensions can replace all or part of the mineral-based media to improve system efficiency where it has become impaired by overloading.

Selecting the right media for the application has never been an easy task. With our extensive experience, we can help clients select the accurate filter media for each application, ensuring the most appropriate and cost-effective solution to meet their needs.
Warden's biological filter media are feasible for both industrial and municipal wastewater and are used for organic removal, nitrification and denitrification - Low weight - Large active surface area - Compact - Easy upgrade of existing plants - Durable, long-life - Minimal clogging - Random filter media - High BOD reduction (up to 90%) and nitrification - Low capital, low installation, operating and maintenance costs - Corrosion resistant components

Advantages:

- Light weight, easy installation
- The surface textures of our products offer a key which enables biomass or bacteria to adhere by special means, to lessen loss of media during installation procedures
- Made with eco-friendly recycled polypropylene material
- Compact, low maintenance
- Patented technologies
- R&D driven

Features:

- The choice of spherical and tube formats, offers performance advantages not found in other random biological media
- Our range of biomedia can be used as a direct replacement for gravel media, thus increasing both the degree of treatment and capacity of existing trickling filters
- Our media greatly increase the contact time of the wastewater within the media, resulting in high efficiency with minimum recirculation
- Due to continuous redistribution of water flow, the media offer a very high resistance to clogging
- Setting effluent Total Suspended Solids (TSS) is much lower
- Spherical shape designs feature triangular fins which increase the total surface area and encourage the formation of the biological films of bacteria, protozoa and fungi which will eat and biologically break down the organic content
- The edges are serrated, this enables them to interlock in the filter bed giving excellent mechanical strength
- They assist to distribute wastewater thoroughly, enhancing mixing and contact between wastewater and bacteria
- They increase mean cell residence time thus increasing the efficiency of the wastewater treatment unit
- Light weight, easy installation
- The surface textures of our products offer a key which enables biomass or bacteria to adhere by special means, to lessen loss of media during installation procedures
- Made with eco-friendly recycled polypropylene material
- Compact, low maintenance
- Patented technologies
- R&D driven

Applications:

Warden Biomedia has numerous applications in wastewater treatment. The shape of the media has a significant influence on application and must be considered along with specific surface area and void ratio. The surface area of media will be covered with biofilm. Attached growth bacteria will function cooperatively with suspended bacteria, thus its efficiency is higher when compared with other systems. Applications are as follows

- Upgrading existing gravel trickling filters
- BOD reduction in trickling filters
- Complete secondary treatment
- Trickling filters / solids contact (TF/SC)
- Roughing of pre-treatment
- Nitrification
- Denitrification
- Organic removal
- Detoxification
Biofil

With a surface area of 135m²/m³ Biofil has a spherical design, suitable for applications where larger or greater voidage is required.

Technical Information

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
</tr>
<tr>
<td>Dimensions</td>
<td>95 x 65 mm</td>
</tr>
<tr>
<td>Surface Area</td>
<td>135 m²/m³</td>
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<tr>
<td>Voidage</td>
<td>95%</td>
</tr>
<tr>
<td>Weight (dry)</td>
<td>45 kg/m³</td>
</tr>
<tr>
<td>Weight (operational)</td>
<td>up to 477 kg/m³</td>
</tr>
<tr>
<td>Consolidation</td>
<td>5 - 10%</td>
</tr>
<tr>
<td>Flow Direction</td>
<td>Non specific</td>
</tr>
</tbody>
</table>

With purpose-designed features Biofil, in the Warden Biomedia filter range, are an excellent alternative to traditional mineral-based media and are ideal for improved performance in new wastewater treatment plants.

Suitable Applications

Biofil is ideal for trickling filter beds in large scale industrial and municipal wastewater treatment plants, and is suitable for the

- Printing industry
- Dairy product producers
- Large SAF units
- Municipal wastewater treatment plants
- Industrial wastewater treatment plants
Bioball has a spherical design and surface area of 220m²/m³. Bioball is a perfect solution when surface area is more important than voidage.

Suitable Applications

They are ideal for trickling filter beds in large scale industrial and municipal wastewater treatment plants, and suitable for the

- Printing industry
- Dairy product producers
- Large SAF units
- New housing developments
- Municipal wastewater treatment plants
- Industrial wastewater treatment plants

Technical Information

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
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<tr>
<td>Dimensions</td>
<td>65 x 53 mm</td>
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<tr>
<td>Surface Area</td>
<td>220 m² / m³</td>
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<tr>
<td>Voidage</td>
<td>92%</td>
</tr>
<tr>
<td>Weight (dry)</td>
<td>50 kg / m³</td>
</tr>
<tr>
<td>Weight (operational)</td>
<td>up to 530 kg / m³</td>
</tr>
<tr>
<td>Consolidation</td>
<td>5 - 10%</td>
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<tr>
<td>Flow Direction</td>
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</table>
Biomarble

With a spherical design and surface area of 310m²/m³, Biomarble has the highest surface area of the three spherical designs in the Biomedia filter range.

Technical Information

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
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<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
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<tr>
<td>Dimensions</td>
<td>46 x 36 mm</td>
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<tr>
<td>Surface Area</td>
<td>310 m²/m³</td>
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<tr>
<td>Voidage</td>
<td>90%</td>
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<tr>
<td>Weight (dry)</td>
<td>76 kg/m³</td>
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<tr>
<td>Weight (operational)</td>
<td>up to 583 kg/m³</td>
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<tr>
<td>Consolidation</td>
<td>5 - 10%</td>
</tr>
<tr>
<td>Flow Direction</td>
<td>Non specific</td>
</tr>
</tbody>
</table>

*Recycled Polypropylene

With purpose-designed features Biomarble, in the Warden Biomedia filter range, is an excellent alternative to traditional mineral-based media and is ideal for improved performance in new wastewater treatment plants.

Suitable Applications

Biomarble caters for a wide range of biological wastewater treatment plants of different sizes serving

- New housing developments
- Commercial premises
- Single dwellings
- Small or large SAF units
- Municipal wastewater treatment plant
- Industrial wastewater treatment plant
Biopipe is designed to provide a large protected surface area for the biofilm and optimal conditions for the bacteria culture when the media are suspended in water. A durable, rugged and highly efficient media for moving bed biological reactors (MBBR) and integrated fixed film activated sludge (IFAS) systems.

Its innovative design creates a high percentage of protected surface area for micro-organisms to adhere. In turn, this increases the overall biomass concentration and can reduce the tank volume required for wastewater treatment. Large openings allow for the wastewater to freely pass through the media which helps maintain a healthy and thin biofilm.

**Technical Information**

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
</tr>
<tr>
<td>Dimensions</td>
<td>21.5 mmø x 13 mm</td>
</tr>
<tr>
<td>Surface Area</td>
<td>600 m²/m³</td>
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<tr>
<td>Voids</td>
<td>82.5%</td>
</tr>
<tr>
<td>Weight (dry)</td>
<td>150 kg/m³</td>
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<tr>
<td>Consolidation</td>
<td>5 - 10%</td>
</tr>
<tr>
<td>Flow Direction</td>
<td>Non specific</td>
</tr>
</tbody>
</table>

**Suitable Applications**

Biopipe is ideal for MBBR industrial and municipal treatment plants where higher surface area is typically important. It is also designed for use in aquatic applications ranging from garden fishponds to large tank.

- Private houses and small communities
- Service stations, restaurants and public houses
- Rural schools, hospitals, care homes for the elderly
- Camping sites, farms
- Organic industrial effluents
- Municipal wastewater treatment plant
- Industrial wastewater treatment plant

*Recycled Polypropylene

Wheel shaped random filter media with internal and external fins and surface area of 600m²/m³.
Bioflo

Bioflo has a circular shape with internal and external fins, offering a surface area of 800m²/m³.

Technical Information

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
</tr>
<tr>
<td>Dimensions</td>
<td>16.75 mmø x 10.50 mm</td>
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<tr>
<td>Surface Area</td>
<td>800 m² / m³</td>
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<tr>
<td>Voidage</td>
<td>81%</td>
</tr>
<tr>
<td>Weight (dry)</td>
<td>210 kg / m³</td>
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<td>Consolidation</td>
<td>5 - 10%</td>
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<tr>
<td>Flow Direction</td>
<td>Non specific</td>
</tr>
</tbody>
</table>

The Bioflo is designed to provide a large protected surface area for the biofilm and optimal conditions for the bacteria culture when the media are suspended in water. A durable, rugged and highly efficient media for moving bed biological reactors (MBBR) and integrated fixed film activated sludge (IFAS) systems.

Its innovative design creates a high percentage of protected surface area for micro-organisms to adhere. In turn, this increases the overall biomass concentration and can reduce the tank volume required for wastewater treatment. Large openings allow for the wastewater to freely pass through the media which helps maintain a healthy and thin biofilm.

Suitable Applications

Bioflo caters for MBBR industrial and municipal treatment plants where extreme surface area is important. Like Biopipe, it is also designed for use in aquatic applications ranging from garden fishponds to large tanks.

- Private houses and small communities
- Service stations, restaurants and public houses
- Rural schools, hospitals, care homes for the elderly
- Camping sites, farms
- Organic industrial effluents
- Municipal wastewater treatment plant
- Industrial wastewater treatment plant

*Recycled Polypropylene
The Biotube is designed to provide a large protected surface area for the biofilm and optimal conditions for the bacteria culture when the media are suspended in water. A durable, rugged and highly efficient media for moving bed biological reactors (MBBR) and integrated fixed film activated sludge (IFAS) systems.

Its innovative design creates a high percentage of protected surface area for microorganisms to adhere. In turn, this increases the overall biomass concentration and can reduce the tank volume required for wastewater treatment. Large openings allow for the wastewater to freely pass through the media which helps maintain a healthy and thin biofilm.

Suitable Applications

Biotube caters for MBBR industrial and municipal treatment plants where extreme surface area is important. Like Biopipe it is also designed for use in aquatic applications ranging from garden fishponds to large tanks:

- Private houses and small communities
- Service stations, restaurants and public houses
- Rural schools, hospitals, care homes for the elderly
- Camping sites, farms
- Organic industrial effluents
- Municipal wastewater treatment plant
- Industrial wastewater treatment plant

Technical Information

<table>
<thead>
<tr>
<th>Material</th>
<th>Polypropylene*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
</tr>
<tr>
<td>Dimensions</td>
<td>12 mmø x 8 mm</td>
</tr>
<tr>
<td>Surface Area</td>
<td>1000 m² / m³</td>
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<tr>
<td>Voidage</td>
<td>80%</td>
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<tr>
<td>Weight (dry)</td>
<td>217 kg / m³</td>
</tr>
<tr>
<td>Consolidation</td>
<td>5 - 10%</td>
</tr>
<tr>
<td>Flow Direction</td>
<td>Non specific</td>
</tr>
</tbody>
</table>

*Baked Polypropylene
Bionet is a perfect method of securing and installing the plastic random filter media in situ.

Designed for municipal and package sewage plants, Bionet is ideal for random media filtration control for water processing. Bionet has major long-term health and safety benefits for both initial installation and for longer-term maintenance.

Bionet can be used with:
- Biofil
- Bioball
- Biomarble

Technical Information
- Bionet is manufactured in recycled polyethylene
- The Bionet has a strength of 550lbs per square meter
- Manufactured under ISO 9001 & EN 6208
- The strength of the Bionet is 3kn per 1000 kg
- Bionet holds safely and securely random media in differing profiles and surface areas

Key advantages of Bionet
- Bionet is adaptable to any structural shape without leaving voids
- Bionet can be easily removed for replacement or cleaning
- Bionet can be used in conjunction with other filter media to increase the surface area allowing the growth of microorganisms to help breakdown raw sewage.
- Bionet sack has been engineered for strength, allowing multi-directional flow, and will not break down or emit dye into the plants.
- Bionet sack will not stretch or deteriorate when immersed in effluent for many years.