
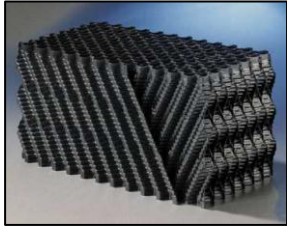



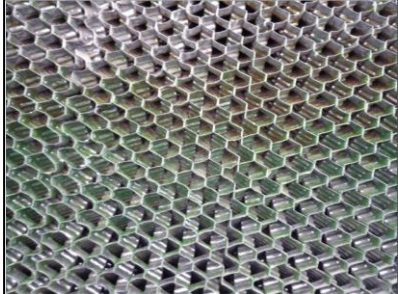




## Trickling Filters: Random Media vs GEA Structured Plastic Media

Aspect	Random Media	Structured Media (GEA)
<b>Plastic Media Shape</b>		
<b>Characteristic</b>	Packed bed arrangement, Random pathway through media	Open cross flow channels Clear pathway for air flow
<b>Plastic Media Surface</b>		
<b>Void</b>	95%,	>97% (open channels)
<b>Surface Area</b>	~100 m <sup>2</sup> / m <sup>3</sup> for BOD removal ~160 m <sup>2</sup> / m <sup>3</sup> for nitrification (stone has 80-90m <sup>2</sup> / m <sup>3</sup> )	~125 m <sup>2</sup> / m <sup>3</sup> for BOD removal ~240 m <sup>2</sup> / m <sup>3</sup> for nitrification
<b>Performance</b>	1-2 times better than stone media Short circuiting possible due to clogging	2-3 times better than stone media
<b>Ventilation</b>	Forced air required for ventilation Large pressure drop across media due to frictional losses caused by media packing Bottom area can be compressed due to filter weight => less ventilation	Natural ventilation Low pressure drop as air has clear pathway through media Structurally designed so bottom layer will not be compressed due to media and biomass weight resting on bottom layer.
<b>Odour Potential</b>	Higher blocking risk equals higher odour risk	Less odour risk due to clear ventilation pathway – system is kept aerobic

Aspect	Random Media	Fixed Structure
<p><b>Clogging potential</b></p>	<p>Clogging potential as debris can easily get trapped in packed bed matrix. Greater clogging potential than stone because of random arrangement and smaller media size than traditional stone systems</p> 	<p>Less likely to clog as debris has a pathway with lower resistance through the media</p> 
<p><b>Ponding</b></p>	<p>Ponding risk if clogging occurs Ponding =&gt; performance loss plus odour</p>	<p>Water can never pond, due to columnar arrangement of media</p>
<p><b>Installation</b></p>	<p>Easier to install: media fills tank space with little effort.</p> <p>Transport can be expensive for large systems – can't flat pack. E.g. 1x20m diameter, 2.5m high TF would require ~12 shipping containers. 3 x 20m TF ~36-40 containers.</p>	<p>Requires more installation effort to cut media to fit the tank. Usually only 1% wastage</p> <p>For larger projects, may save money on transport by shipping media as flat-pack to site and welding on site (Polypropylene).</p>
<p><b>Substructure</b></p>	<p>Substructure is critical, smaller media size calls for fine grating =&gt; reducing airflow; higher costs</p> 	<p>Substructure can be as simple as using stones to place blocks onto</p> 
<p><b>Maintenance</b></p>	<p>Cannot walk on surface – may sink or damage media (crush it) which can cause blockages</p>	<p>You can walk on surface (top) of structured Polypropylene media for maintenance – be it for distributor maintenance or media maintenance. Structurally designed to allow person to walk on surface.</p>

