

# **Hazard Analysis and Waste Risk Assessment**

## **Graphite Organic Fibre**

## Hazard Analysis and Waste Risk Assessment - Graphite Organic Fibre

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This document relates to the Graphite Organic Fibre material prepared for non-agricultural landspreading, the assessment has been carried out to support of a bespoke mobile plant permit application.

The site operates an autoclave facility under an installation permit (EPR/KB3939RR).

### Summary of Operation

All wastes undergo a strict waste acceptance protocol, waste inputs are limited to mixed municipal wastes only. The waste is shredded before being loaded into one of the three autoclaves for systems. Once loaded the autoclaves are sealed. The units are rotated and steam is added. The waste is heat treated in batches to ensure all of the waste is sanitised. The process has Animal By-Product (ABP) approval to treat the waste and ensure the fully sanitised and meets Animal By-Products Regulations (ABPR). The breakdown of biodegradable materials; including food, paper and card into a pulp like fibre during the autoclave process is key to separating contamination from the final material as the non-biodegradable material and rejects become clearly separate from the organic pulp. A comprehensive post-process separation system ensures that all possible recylates and rejects are then removed leaving a clean fibre material.

## Identifying the Hazards

Hazards include (but are not necessarily limited to):

- Adverse effects on the environment - including human and animal health - due to **pathogens** in organic fibre.
- Adverse effects on plant health due to **pests, pathogens, toxins** or **intermediate biodegradation breakdown by-products** in the fibre.
- Adverse effects on plant health where fibre is used in sensitive applications due to **immaturity** of the material.
- Adverse effects on the environment – including human, animal and plant health - due to **toxics** in the fibre.
- Odours offensive to people who live or work close to where the fibre is used due to **odours** released from fibre when being used.
- Introduction of or increase in **weed seeds or propagules** to soil, or any other substrate due to use of fibre
- Damage to equipment for handling, mixing or applying materials due to **any man-made particles** in fibre
- Adverse effects on human animal or plant health due to **sharps or contaminants** in fibre
- Pollution of the environment or adverse effects on human, animal or plant health due to inappropriate use of fibre (not as recommended)

Process step	Hazards	Control measures	Corrective action	Monitoring	Verification	Risk Assessment			
						Probability of Risk	Consequence	Magnitude	Residual Risk
<b>1. Receipt of Municipal waste (19 12 12 &amp; 1</b>	1. Pollution to land caused by Excessive contamination with: - plastic, - glass, - metal, - stones and, - other non-biodegradable items.	1. Only pre-agreed deliveries from known sources accepted. 2. Only municipal waste accepted. 3. No hazardous waste accepted. 4. Each waste load received is visually inspected by a trained site operator. 5. Up-stream audits and compliance sampling of all waste streams	-If waste is not municipal waste from agreed suppliers load is rejected.  -Final organic fibre tested if the material does not meet the Physical Contamination or PTE limits agreed with the EA for landspreading the material will be sent for disposal.	-Input supply agreement review;  - Upstream producer audits  -Waste sampling  -Testing of fibre  -Visual inspection of waste loads  -Visual inspection of fibre prior to dispatch	-Organic Fibre sample results do not exceed 2.5% for physical contaminants.  -PTE limits set on organic fibre material  -No complaints or reports of unacceptable levels of physical contaminants by end users.  -Site Manager verification checks.	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>
	2. Toxic effects on animals or plants from toxins found in the wastes.	6. Waste rejection procedure.				<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>
	3. Introduction of or increase in aggressive weeds, seeds or propagules to due to use of fibre	1. Waste Input Supply agreements state no Japanese Knotweed or other invasive species accepted.	- All staff trained to identify invasive species any loads found to contain this will be rejected and EA informed.	-Input supply agreements. - Upstream producer audits -Visual Inspections Testing of fibre.	- Site Manager Verification checks	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>

<b>2. Autoclave Processing</b>	1. Adverse effects on human, plant and animal health and environment due to pathogens in fibre.	1. ABPR Sanitisation minimum process parameters.  2. Batch traceability  3. Designated areas for process steps / stages to avoid any contamination.	- Any batch that fails to meet ABPR sanitisation limits (70°C/1Hr) reprocessed  - Any sanitised batch that has become contaminated through by-pass of dirty waste material or boots reprocessed,	- ABP Approval - Continuous temperature monitoring during autoclave process - Daily inspection of cleaning processes	- Monthly Microbial Sampling - Independent sampling by APHA - Temperature data	Low	Low	Low	Low
	2. Odours offensive to people who live or work close to where the fibre is used due to odours released from landspreading.	1. Moisture content of final batch must be <60% w/w  2. Batch continuously monitored to ensure process is completed correctly.	- Any batch that is excessively wet on unload to be re-processed  - Process parameter of autoclave process fully monitored and CCPs all met	- Monitoring records for autoclave process - Grip test on unloaded material - Odour checks on fibre - Sampling of end material	- Grip test records of unloaded fibre - Stability testing of organic fibre Results to be <20mg/l CO2	Medium	Medium	Medium	Low
	3. Adverse effects on plant health due to immaturity and/ or intermediate biodegradation breakdown by-products in fibre.								

<b>3. Sorting and Screening</b>	<p>1. Objectionable material appearance or damage to equipment for handling, mixing or applying fibre due to contamination:</p> <ul style="list-style-type: none"> <li>- plastic,</li> <li>- glass,</li> <li>- metal,</li> <li>- stones, and</li> <li>- other non-biodegradable items.</li> </ul> <p>2. Pollution of the environment or adverse effects on human, animal or plant health due to physical contamination in the fibre.</p>	<ul style="list-style-type: none"> <li>- Screening to correct particle size to remove the majority of contamination.</li> <li>- Checks and maintenance of sorting process</li> <li>- Visual inspection carried out on each batch</li> </ul>	<ul style="list-style-type: none"> <li>- Any batch to fail physical contaminants to be re-screened and investigation carried out</li> </ul>	<ul style="list-style-type: none"> <li>- Visual inspection on each batch</li> <li>- Samples collected for physical contaminants</li> </ul>	<ul style="list-style-type: none"> <li>- Limits of physical contaminants &lt;2.5%</li> <li>- No complaints or reports of unacceptable levels of physical contaminants by customers or end users.</li> <li>- Site Manager verification checks</li> </ul>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>
<b>4. Dispatch</b>	<p>1. Pollution of the environment or adverse effects on human, animal or plant health due to inappropriate use of fibre.</p> <p>2. Excessive application for crop / soil requirements</p>	<ul style="list-style-type: none"> <li>- All fibre sent out to approved sites with correct waste permits in place</li> <li>- No fibre sent to agricultural applications</li> <li>- Grazing restrictions</li> <li>- Approved benefit statements submitted for each deployment</li> </ul>	<ul style="list-style-type: none"> <li>- Material found to have gone to unintended use: Advise customers and recall</li> <li>- inform EA /regulators of any application that is above agreed amount or in wrong location</li> </ul>	<ul style="list-style-type: none"> <li>- Site manager/ supervisor to positive release batches to approved sites only</li> <li>- Benefit statements and spreading plans agreed and reviewed before fibre is</li> </ul>	<ul style="list-style-type: none"> <li>- Duty of Care documents</li> <li>- Copies of receiving site permits to be held with batch details</li> <li>- Benefit statements</li> <li>- Receiving soil analysis</li> <li>- Spreading Plans</li> </ul>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>

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		application - All applications must be approved by EA prior to deployment being issued		dispatched - Deployment applications have to be agreed with EA prior to spreading	- Permit and Deployment issue letter				
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## Specification for the Graphite Organic Fibre

Specification for the Graphite Organic Fibre for use in Land Restoration/Reclamation			
Parameter	Units	Limit	Source document <sup>1</sup>
Total zinc	mg/kg dm	<2,500	EEC (1986)
Total copper	mg/kg dm	<1,000	EEC (1986)
Total cadmium	mg/kg dm	<20	EEC (1986)
Total nickel	mg/kg dm	<300	EEC (1986)
Total lead	mg/kg dm	<750	EEC (1986)
Total chromium	mg/kg dm	<1,000	EU (2000)
Total mercury	mg/kg dm	<16	EEC (1986)
Organic matter	% dm	>15	IPTS (2012)
<i>E.coli</i>	cfu/g	<1,000	BSI (2010)/BSI (2011)
<i>Salmonella spp</i>	/25g	Absent	BSI (2010)/BSI (2011)
pH		5.5-8	BSI (2007)
Stability	mg CO <sub>2</sub> /g OM/day	<22	Based on BSI (2018 Consultation)
Total plastic >2 mm	% w/w	<2.5	Based on BSI (2007) and SNIFFER (2010)
Total other physical contaminants >2mm	% w/w	<2.5	Based on BSI (2007) and SNIFFER (2010)

<sup>1</sup>. The proposed standard is drawn from the following existing documents

EU Sludge Directive (86/278/EEC), EEC (1986);

3rd Working Document on Sludge Management, EU (2000);

End-of-Waste 3rd Working Document (IPTS, 2012);

PAS100/PAS110 (BSI, 2011; BSI, 2014);

British Standard for Topsoil (BSI, 2007);

Code of Practice for the Use of Sludge, Compost and Other Organic Materials for Land Restoration (SNIFFER, 2010).