FACTSHEET BIO-BASED GEOTEXTILES

Procurement of Innovative Products: Bio-Based Products in Procurement

Why bio-based geotextiles?

What are (bio-based) geotextiles?

Geotextiles are permeable fabrics which, when used in association with soil, have the ability to separate, filter, reinforce, protect, or drain. Geotextiles have many applications but are usually used in civil engineering applications such as roads, airfields, railroads, reservoirs, canals, dams, and construction site silt fences. In this factsheet, erosion mats are included in the category geotextiles. Geotextiles are conventionally made from polypropylene or polyester. Bio-based geotextiles can be made of various bio-based materials derived from various agricultural products and waste streams. Examples include maize based PLA geotextiles, sheep wool erosion mats and straw and coconut erosion mats. This factsheet provides information on bio-based geotextiles and how to take these into account in procurement.

Why should organisations consider bio-based geotextiles in procurement?

Organisations could consider bio-based geotextiles in procurement if they would benefit from one or more of the capabilities attributed to the bio-based geotextiles. Bio-based geotextiles potentially have different capabilities. Aspects to keep in mind are environmental impact over the life cycle of the product (this could be determined through Life Cycle Assessment in accordance with ISO 14040) and the sustainable sourcing of the input material (this could be assessed in accordance with the sustainability criteria for biobased products from EN 16751 in combination with CEN/TR 16957 - Bio-based products - Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase). With this kept in mind, several potential benefits can be attributed to bio-based geotextiles[1].

Resource efficiency: For the production of bio-based geotextiles, use can be made of agricultural by-products and waste streams. For example, erosion mats which include straw are produced. This switch in material use could improve resource efficiency and in addition stimulate the market for secondary raw materials and the circular economy in general.

Reduced Greenhouse Gas (GHG) Emissions: The greenhouse gasses emitted during the production of bio-based products have the potential to be lower than their petrochemical equivalent[2]. Reduced greenhouse gas emissions will in turn contribute to combating climate change.

Avoidance of GHG Emissions: By using bio-based products which replace petrochemical products, GHG emissions can also be avoided. Fossil feedstock need to remain in the ground to achieve the limit of a temperature increase less than 2°C[3] as is included in the COP 21 agreement and ratified by UN-countries including the EU.

Reduced GHG Emissions

An example of a geotextiles made of corn based PLA was found. Following a study into biobased materials and their petrochemical counterpart, it was found the biobased PLA could reduce GHG emissions with approximately 30%. In the future this is expected to be further improved. Source: 'Bio-based economy and climate change', Nova Institute, 2017-01.

Biodegradability and compostability: Some bio-based products have the capability of being biodegradable and/or compostable including biodegradable in the soil[4]. Assuming a baseline in which used polypropylene erosion mats are either landfilled or burned after use, switching to erosion mats which are biodegradable or compostable, could result in waste reduction and improved resource efficiency. Assuming a baseline in which polypropylene or polyethylene geotextiles are left in the soil, switching to geotextiles which biodegrade could have the benefit of reduced plastic in the soil.

Product characteristics: Several producers have described special characteristics due to the bio-based nature of the geotextile. For example an erosion mat made from sheep wool retains water, which might lead to increased yields. Another geotextile was lighter because the bio-based PLA was lighter than previously used polypropylene. This reduced transportation and application costs.

[1] These benefits can differ between products and should always be confirmed by the supplier.

[2] Bio-based economy and climate change', Nova Institute, 2017-01

[3] McGlade C. and Ekins, P. (2015) 'The geographical distribution of fossil fuels unused when limiting global warming to 2 °C', Nature 157.

[4] Biodegradation is a natural chemical process in which materials are being transformed into natural substances such as water, carbon and biomass with the help of microorganisms. Compostability is a characteristic of a product that enables biodegradation under specific conditions (i.e. a certain temperature, timeframe, etc.). (Source: ISO 472:2013 Plastics - Vocabulary)

How to take into account specific capabilities of geotextiles in procurement?

Procedures and purchasing strategies

Procurement within the gardening and landscaping sector often implies procurement of services or works. Geotextiles are likely to be procured as part of a service or works contract or form part of a supply contract for other products, such as plants. The capabilities of the bio-based geotextiles in procurement could be described in terms of GHG emissions, biodegradability in soil and compostability.

Example 1. GHG Emissions

The potential capability of reducing GHG emissions would be an important benefit and could therefore be confirmed as part of the procurement criteria.

Minimum Requirement: The carbon footprint of the raw material used for fabrication of the geotextile should be less than the carbon footprint of an appropriate reference raw material.

Additional information: The carbon footprint of the raw material should be conducted in accordance with ISO 14067 or equivalent. An example of a reference raw material could be polypropylene.

Verification: The tenderer shall provide information on the raw materials used and the carbon footprint results, which shall be reported according to ISO 14067 or equivalent. The comparison with the reference raw material shall be included in the report as well as a motivation for the choice of reference material.

Example 2. Compostability

This criterion can be used if the procurer wishes to compost geotextiles. Compostability should be determined for either industrial or home composting conditions.

Minimum Requirement: The geotextiles should be compostable under home OR industrial composting conditions (to be selected by the procurer).

Additional information: All materials used in the geotextile must be compostable in accordance with EN 13432:2000 or an equivalent standard. In the case of home composting, the French Standard 'NF T51-800:2015-11: Plastics – Specifications for plastics suitable for home composting' could be used. This standard is based on EN 13432 but has adapted the timing for biodegradability and the temperature at which biodegradability should take place to match home composting conditions. The manufacturer could also prove compliance with EN 13432 and include an explanation of the testing procedure used to determine biodegradability under home composting conditions.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. A technical dossier of the manufacturer or a test report demonstrating that these requirements have been met is also accepted. The following labels comply with the EN 13432:2000 standard (made applicable for home composting) and can be used for verification:

- Vincotte: OK compostable
- Din Certo: DIN Geprüft compostable
- Blauer Angel: weil compostierbar

Example 3. Biodegrability in soil

If the procurer wishes to purchase geotextiles which biodegrade in the soil, this criterion must be used as an alternative to the criterion on compostability.

Minimum Requirement: The geotextiles should biodegrade in the soil.

Additional information: All materials used in the geotextiles must be biodegradable in the soil. To prove this, in practice often use is made of standard EN 13432:2000. When using this standard, the medium in which the biodegradation should take place changes, as well as the timing of biodegradation. Following this information, biodegradability could be proven in accordance with EN 13432:2000 or an equivalent standard such as the French Standard 'NF T51-800:2015-11: Plastics – Specifications for plastics suitable for home composting'. Other standards that can be used are 'ISO 17556:2012 Plastic – Determination of the ultimate aerobic biodegradability of plastic materials in soil', or 'ASTM D5988-12 Standard test method for determining aerobic biodegradation of Plastic Materials in Soil'. Moreover, French standard 'NF U52-001 Biodegradable materials for use in agriculture and horticulture- Mulching products' and the Italian standard 'UNI 11462 Plastic materials biodegradable in Soil', include specifications defining the test methods and criteria (minimum pass levels) to designate a material as biodegradable in soil

An explanation of the testing procedure used to determine biodegradability under soil conditions should be included by the manufacturer.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. A technical dossier of the manufacturer or a test report demonstrating that these requirements have been met is accepted. The following labels comply with the EN 13432 (or equivalent) and can be used for verification:

- Vincotte: OK biodegradable soil,
- Din certo : DIN-Gepruft biodegradable soil

What bio-based geotextiles are available?

The following databases contain information on the availability of bio-based geotextiles:
- The 'Datenbank FNR' database (Germany) provides an overview of bio-based geotextiles. Information on the product, supplier and whether the product is certified is available within the database.
- The 'CoE BBE' database (the Netherlands) provides an overview of bio-based products amongst which geotextiles. Information about the producer, product characteristics and whether the product is certified is specified.
- Vincotte provides an overview of the bio-based geotextiles that it certified and carries its 'OK Bio-based' label. The product name and a link to the producer website as well as a contact person are supplied.
- The 'BioPreffered' database (USA) provides an overview of bio-based geotextiles available within the USA. Product characteristics and whether the product is USDA Certified as Biobased is specified.

Points of attention

The following potential barriers and bottle necks have been identified by procurers, policy makers and professionals that work with bio-based products in procurement. The relevance of each of these potential barriers is discussed for the product group geotextiles:

- Costs: The cost information obtained from suppliers was qualitative in nature. Some indicated that their bio-based geotextiles were more expensive (double the price) than conventional geotextiles and others indicated their bio-based geotextiles to be less expensive than the conventional geotextiles.

- Level of development: From the databases above, four producers of bio-based geotextiles were identified.

- Availability: The bio-based geotextiles identified through the databases presented above, are for certain available in Germany, France and the Netherlands.

- Quality of the products: The quality of bio-based geotextiles can differ. For example the application process or the time it takes for a geotextile to biodegrade can differ.

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