

# FACTSHEET BIO-BASED COATINGS

Procurement of Innovative Products: Bio-Based Products in Procurement

## Why bio-based coatings?

### What are bio-based coatings?

A coating is a covering that is applied to the surface of an object for decorative, protection or specific technical purposes. Following the definition of the European Commission<sup>1</sup>, 'paint' means a pigmented coating material and 'varnish' means a clear coating material. In the infrastructure construction materials sector, coatings are applied for decorative, protection or specific technical purposes to the road (marking), guide rails, walls (for example in a tunnel) and street furniture. Mainstream paints and varnishes are produced from synthetic chemicals. Bio-based paints consist of a vegetable fraction and can also be made entirely from bio-based materials such as vegetable oils and natural pigments. This factsheet provides information on bio-based coatings and how to take these into account in procurement.

### Why should organisations consider bio-based coatings in procurement?

Organisations could consider bio-based coatings in procurement if they would benefit from one or more of the capabilities attributed to bio-based coatings. Bio-based coatings have different capabilities as described below. 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 also be attributed to bio-based coatings<sup>2</sup>.

*Reduced Greenhouse Gas (GHG) Emissions:* the greenhouse gasses emitted during the production of bio-based coatings have the potential to be lower than their petrochemical equivalent. Succinic acid, a chemical used for the production of resins and solvents (two of the main three components of paint;

pigment being the third main component) have been found to reduce emissions approximately 50% when using bio-based materials compared to the petrochemical counterpart<sup>3</sup>. This is amongst others influenced by the biomass location and cultivation methods applied. 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<sup>4</sup> as is included in the COP 21 agreement and ratified by UN-countries including the EU.

### Reduced GHG emissions

Bio-based succinic acid has the potential to reduce GHG emissions approximately 50% compared to its petrochemical counterpart. This comparison takes into account CO<sub>2</sub> uptake from the atmosphere, polymer production and incineration but excludes GHG avoidance. Future succinic acid production could amount to 75% savings. Source: 'Bio-based economy and climate change', Nova Institute, 2017-01.

*Reduced VOC content:* Coatings contain solvents (or thinner) which usually are made from Volatile Organic Compounds (VOCs). VOC emissions impact on human health and contribute to climate change. Bio-based paints could potentially contain reduced or no VOCs<sup>5</sup>.

<sup>1</sup> The definition has been adapted from the original definition provided by the European Commission (2014/312/EU).

<sup>2</sup> These benefits can differ between products and should always be confirmed by the supplier.

<sup>3</sup> Bio-based economy and climate change', Nova Institute, 2017-01

<sup>4</sup> McGlade C. and Ekins, P. (2015) 'The geographical distribution of fossil fuels unused when limiting global warming to 2 °C', Nature 157.

<sup>5</sup> An example of a VOC free bio-based paint can be found on <http://www.advancedbiobasedpaint.com/>

# How to take into account specific capabilities of coatings in procurement?

## Procedures and purchasing strategies

Procurement within the infrastructure construction materials sector often implies procurement of services or works. Coatings are likely to be part of a service or works contract. The capabilities of coatings could be described in terms of GHG emissions and VOC content. The 'reduced VOC content' criterion is based on the EU Ecolabel criterion for coatings.

### 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 coating should be less than the carbon footprint of an appropriate reference coating.

Additional information: Carbon footprint of the coating should be conducted in accordance with ISO 14067 or equivalent. The procurer shall specify the reference coating.

Verification: The tenderer shall provide information on the content of the coating and the carbon footprint results of the coating, which shall be calculated and reported according to ISO 14067 or equivalent. The comparison with the reference coating shall be included in the report.

### Example 3. No VOC content

If the procurer wishes to purchase coatings with no VOC content, this criterion must be used as an alternative to the criterion on 'reduced VOC content'

Minimum Requirement: The coating shall not contain Volatile Organic Compounds (VOCs).

Additional information: The content of VOCs shall be determined for the ready to use product and shall include any recommended additions prior to application such as colourants and/or thinners. The VOC content shall be determined either by calculation based on the ingredients and raw materials or by using the methods given in ISO 17895.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. The applicant shall provide for the VOC content of the ready to use product either a test report using the methods given in ISO 17895 that demonstrates compliance or a declaration of compliance supported by calculations based on the paint ingredients and raw materials.

### Example 2. Reduced VOC content

If the procurer wishes to purchase coatings with reduced VOC content, it is recommended that the criterion for reduced VOC content from the EU Ecolabel for coatings is used. The below presented criterion, additional information and verification guidance is largely based on the EU Ecolabel.

Minimum Requirement: The maximum content of the Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) shall not exceed the limits given in Table 3 of European Commission Decision of 28 May 2014 'Establishing ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes' (2014/312/EU).

Additional information: The content of VOCs and SVOCs shall be determined for the ready to use product and shall include any recommended additions prior to application such as colourants and/or thinners. The VOC content shall be determined either by calculation based on the ingredients and raw materials or by using the methods given in ISO 11890-2:2013 (Paints and varnishes – Determination of volatile organic compound (VOC) content – Part 2: Gas chromatographic method) or, alternatively for products with a VOC content of less than 1.0 g/l, the methods given in ISO 17895:2005 (Paints and varnishes – Determination of the volatile organic compound content of low-VOC emulsion Paints (in-can VOC)). The SVOC content shall be determined using the method given in ISO 11890-2. The markers given in Table 4 shall be used as the basis for delimiting the Gas Chromatography results for SVOC's. In the case of products used both indoors and outdoors the strictest SVOC limit value for indoor paints shall prevail.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. The applicant shall provide for the VOC content of the ready to use product either a test report using the methods given in ISO 11890-2 or ISO 17895 that demonstrates compliance or a declaration of compliance supported by calculations based on the paint ingredients and raw materials. The applicant shall provide for the SVOC content of the ready to use product either a test report using the method given in ISO 11890-2 or a declaration of compliance supported by calculations based on the paint ingredients and raw materials.

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## What bio-based coatings are available?

The following databases contain information on the availability of bio-based coatings:

- The 'Datenbank FNR' (Germany) database provides an overview of 16 bio-based coating products. Information on the product, supplier and whether the product is certified is available within the database.
- The Biobased Bouwen' database (the Netherlands) contains two different types of bio-based coating products. Detailed information about the product, supplier and whether the product is certified is available within the database.
- The 'Agrobiobase' database (France) provides an overview of three bio-based coating products, as well as product specifications and whether the product is certified.
- The website 'Soy Biobased Products' (USA) contains one soy based coating and detailed information about the product and the supplier.

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## 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 'coatings':

- **Costs:** the costs of bio-based coatings tend to be higher than conventional coatings. One example of a bio-based paint with a cost of €42 per litre was found. Conventional paint prices range from approximately €17 to approximately €40.

- **Level of development:** The European database above contains 21 bio-based coatings products. An online search presents more options. The level of development is therefore considered relatively new.

- **Availability:** Producers of bio-based coatings were found in France, the Netherlands and Germany. These would possibly also deliver in other European countries.

- **Quality of the products:** Before the development of the chemical coating industry as we know it today, coatings used to be based on vegetable oils. The quality of the coating can be controlled through application of the criteria on quality, efficiency and performance as part of the EU Ecolabel (European Commission Decision of 28 May 2014 'Establishing ecological criteria for the award of the EU Ecolabel for indoor and outdoor paints and varnishes' (2014/312/EU)).

