

 Whitepaper

# EU Taxonomy and harmful substances and emissions

The practical application  
of the DNSH 5 criteria



Dutch  
Green Building  
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# INTRODUCTION

The EU Taxonomy was launched in March 2021. It was developed as part of the EU goals to promote sustainable investments and economic growth within the framework of the EU Green Deal and European Green Deal initiatives. The EU Taxonomy defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and thereby can be considered environmentally sustainable activities. To meet the requirements, a significant contribution must be made to at least one of six environmental objectives. The EU Taxonomy also lists requirements which must be met in order to prevent negative side effects for the environment as a result of the economic activity. These requirements are called the ‘Do No Significant Harm’ or DNSH criteria.

One of the challenging DNSH requirements for new construction and renovation projects has been the requirement DNSH 5, which is part of climate objective 5 “prevention and control of pollution”. In particular, the DNSH 5 requirements which are aimed at selecting materials with no known harmful ingredients and low volatile organic compounds (VOC) emissions are challenging, which this paper is focused on<sup>1</sup>. Currently, it is unclear how one should assess DNSH 5 compliance for building materials. As all DNSH criteria must be met to comply with the EU Taxonomy, it is crucial to have a better understanding of the requirements regarding harmful substances and emissions. This document therefore provides guidance on how to approach the DNSH 5 criteria and can be a useful resource.

## 1. WHAT ARE THE DNSH 5 REQUIREMENTS REGARDING HARMFUL SUBSTANCES AND EMISSIONS?

The DNSH 5 requirements apply to new construction and the renovation of buildings. Annex 1 of the EU Taxonomy lists the DNSH 5 requirements for these activities. An important part of the DNSH 5 criteria set limitations to the concentration of harmful substances in the material and harmful emissions from the material.

Regarding the requirements aimed at material substances, the DNSH 5 requirements can be subdivided into three categories:

- **A ban on materials with known harmful substances**

(e.g. mercury). These requirements already apply to all materials and products that are being sold on the European market. In other words, when a product is allowed to be sold on the EU market these specific requirements are already met.

- **A ban on materials with substances subject to authorization**

Annex XIV of Regulation EC 1907/2006). Currently (without DNSH 5) materials are still allowed to contain these substances, but manufacturers have to inform users of these materials of the associated health risks. DNSH 5 bans materials with these substances in a concentration above 0,1% weight by weight (w/w) except if it is assessed and documented by the operators that no other suitable alternative substances or technologies are available on the market.

<sup>1</sup> Note: DNSH 5 also requires a soil assessment on contaminated sites as well as measures to prevent noise, dust and pollutant emission during construction. These requirements are excluded from the scope of this whitepaper.

- **A ban on materials with substances of very high concern**

Substances of very high concern are substances that are expected to be harmful to human health (and which might be included in Annex XIV of Regulation EC 1907/2006) but where sufficient evidence for a complete ban of the substance is not (yet) available. These substances can still be used according to normal EU law (apart from DNSH 5). DNSH 5 applies the precautionary principle instead and does not allow use of materials with substances of very high concern above a concentration of 0,1% w/w. Since materials with substances of very high concern are still allowed to be sold on the EU market, project teams will have to assess if their materials include ingredients listed as '[substances of very high concern](#)' by the European Chemicals Agency (ECHA).

### Scope

While the DNSH 5 requirements for material ingredients apply to all building materials, the requirements to reduce emissions of (very) volatile organic compounds (VVOc) only apply to materials which may come into contact with the occupants of the building. The DNSH 5 emission requirements align with the BREEAM International HEA 02 requirements (and local equivalents) as well as emission labels like AgBB, M1, Greenguard Gold etc.

### The benefit of the DNSH 5 requirements

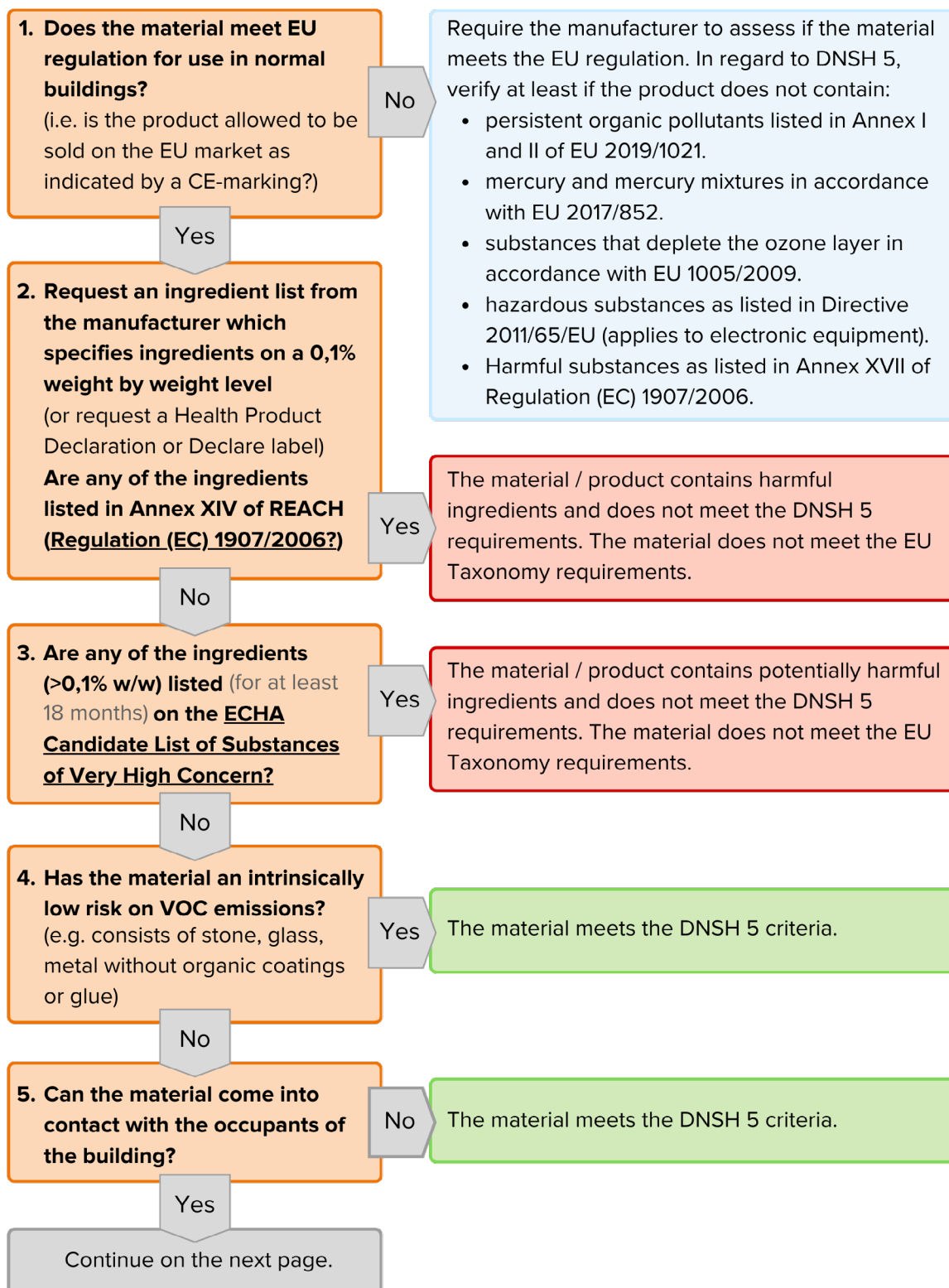
The EU Taxonomy encourages the application of (new) sustainable and circular materials. Since re-evaluation of common building materials is necessary to reduce greenhouse gas emissions, the use of new materials might also introduce new health risks. DNSH 5 ensures new (sustainable) materials do not contain harmful ingredients. Furthermore, by preventing the use of materials with (potentially) harmful ingredients, the materials are also more suitable for re-use and contribute to a circular economy.

The application of low emission materials is important to reduce indoor exposure to VOC. The Dutch Health Council (GR) recommends to limit indoor exposure to VOC's to 200 µg/m<sup>3</sup> (TVOC-concentration) to prevent chemo-sensoric reactions (irritation of nose or eye mucus by VOC's in indoor air). This target threshold will be achieved if DNSH 5 compliant materials are used in buildings.



## 2. HOW TO ASSESS IF A MATERIAL COMPLIES WITH DNSH 5?

The workflow below shows which steps can be applied to determine if a new material or product complies with DNSH 5: These steps do not apply to already existing materials in buildings.



**6. Do the VOC and formaldehyde emissions of the material meet BREEAM International HEA 02 or a local equivalent?**

Yes

The material meets the DNSH 5 criteria.

No

**7. Have the formaldehyde and VOC emission been determined in accordance with CEN / EN 16516 or ISO 16000-3 or equivalent method?**

No

Determine the formaldehyde and VOC emission in accordance with CEN / EN 16516 or ISO 16000-3 / ISO 16000-6 or equivalent method.

Yes

**8. Does the material meet any of the following emission standards:**

Greenguard Gold, M1, French VOC-label Class A or A+, AgBB, Der Blauer Engel, Indoor Air Comfort Gold, Indoor Advantage Gold, or equivalent standard.

Yes

The material meets the DNSH 5 criteria.

No

**9. Does the material meet the following requirements:**

- Formaldehyde emission < 0,06 mg / m<sup>3</sup> of test chamber air
- Cat. 1A and 1B carcinogenic VOC < 0,001 mg per m<sup>3</sup> of test chamber air

Yes

The material meets the DNSH 5 criteria.

No

The VOC emissions of the product exceed the DNSH 5 thresholds. The material / product does not meet the DNSH 5 criteria.

## 3. FREQUENTLY ASKED QUESTIONS

This section will be updated when new frequently asked questions pop up.

### 1. How do I know if a material or product meets the EU regulations?

When in doubt, ask the supplier and / or manufacturer to provide evidence which demonstrates none of the following substances are included in the material / product:

- A ban on materials with substances subject to authorization
- mercury and mercury mixtures in accordance with EU 2017/852.
- substances that deplete the ozone layer in accordance with EU 1005/2009.
- hazardous substances as listed in Directive 2011/65/EU (applies to electronic equipment).
- hazardous substances as listed in Annex XVII from EU 1907/2006.

### 2. What is the authorization list in the REACH regulation?

The substances on the authorization list and the restriction list (Annex XIV and XVII) in the REACH regulation are considered prohibited or have strong limitations (step 1 and 2 in the flowchart).

The candidate list contains substances that are candidates to be included on the authorization or restriction list and are to be phased out over time:

When it comes to the candidate list, the manufacturer or importer is obliged to disclose whether the product contains hazardous substances on the candidate list and to register the product in the SCIP database of the European Chemicals Agency (ECHA) according to REACH.

### 3. What is considered a 'normal' building?

The EU regulations do not apply to buildings with specific uses like laboratories, buildings for national defense and historic buildings. Materials / products which have been approved for sale / application specifically for these specific building types might still contain hazardous substances and therefore might not comply with DNSH 5. This means that materials specifically developed for use in laboratories, defense structures etc. will always require an assessment of the material ingredients in accordance with step 1 of the flow diagram of this whitepaper.

The exemptions to the EU regulations do not apply to materials and products available for 'normal' buildings. Therefore, products which are allowed to be sold and installed in 'normal' buildings can be considered to meet step 1 of the DNSH 5 workflow.



#### 4. If I follow the proposed DNSH 5 workflow, am I sure the selected materials do not contain harmful ingredients?

No, the proposed DNSH 5 workflow uses the existing regulations to prove DNSH 5 compliance. For instance Regulation (EC) 1907/2006 requires reporting of substances when used in quantities of one tonne or more per year and when this substance is present in articles above a concentration of 0,1% weight by weight (w/w). The regulation allows materials which use harmful substances in lower concentrations. In other words: materials can meet DNSH 5 and still contain harmful substances either in very low concentrations and / or ingredients of which the negative health effects are not yet known.

When more information about health effects of material ingredients is required, choose materials which provide full ingredient disclosure like a Declare label or third party verified Healthy Product Declaration.

#### 5. Which requirements should I include in my technical brief to include DNSH 5 compliance?

All materials used as part of the building should meet the following requirements:

- The material / product does not contain any of the following substances:
  - persistent organic pollutants listed in Annex I and II of EU 2019/1021.
  - mercury and mercury mixtures in accordance with EU 2017/852.
  - substances that deplete the ozone layer in accordance with EU 1005/2009.
  - hazardous substances as listed in Directive 2011/65/EU (applies to electronic equipment).
  - substances listed in Annex XIV of Regulation (EC) 1907/2006.
  - substances listed on the [Candidate List of substances of very high concern for Authorisation](#) - ECHA (europa.eu)
  
- The material / product should meet the VOC emission requirements of one of the following standards:
  - BREEAM International HEA 02 (or local equivalent)
  - One of the following emission labels: Greenguard Gold, M1, French VOC-label Class A or A+, AgBB, Der Blauer Engel, Indoor Air Comfort Gold or Indoor Advantage Gold.

## 6. How can projects demonstrate DNSH 5 compliance?

On the date of publication of this document there were no instructions available for preparing DNSH 5 evidence. It is recommended to store VOC emission certificates / test reports and ingredient lists for each of the products applied in a project. Furthermore it is recommended to create a table as shown below to provide an overview of DNSH 5 compliance.

*Example of a table to register DNSH 5 compliance for building products.*

Product	Brand	Type	Does the product contain substances listed in:						Does the product have low VOC emissions?
			Annex I and II of EU 019/1021	EU 2017/852	EU 1005/2009	2011/65/EU	Annex XIV of 1907/2006	SVHC List	
Concrete	X	Y	No	No	No	No	No	No	Yes, material with intrinsically low VOC emission
Glue	X	Y	No	No	No	No	No	No	GreenGuard Gold
Sealant	X	Y	No	No	No	No	No	No	AgBB label

*To be verified with a material ingredient list, Declare label, Health Product Declaration or a compliance declaration from the manufacturer.*

## 7. What are materials with 'intrinsically' low VOC emissions?

Certain materials like glass, ceramics, stone and metals do not contain volatile organic ingredients. Therefore these materials have low VOC emissions by default and can be considered 'intrinsically' low emission materials. Materials which are sealed with an airtight outer layer can also be considered a 'low emission materials'. Examples are particle board with HPL outer layer, insulation mats sealed in PE-foil etc.

Do note that glass, ceramics, stone and metals can only be regarded as low emission materials as long as **no** VOC-containing materials like glues, paints, sealants or coatings are applied. When glass panels are for instance fixed with sealant, the VOC emission of the sealant *will* have to be verified.

## 8. What are typical materials with high VOC emissions?

All materials with a high volatile organic compound content, especially those that are applied 'wet' on-site, should be considered as materials with potentially high VOC emissions. Typical materials with high VOC emissions are glues, sealants and in-situ poured (non-concrete) flooring. Particle board without an airtight outer layer can also be considered a material with high VOC emissions.

## APPENDIX 1 DNSH 5 REQUIREMENTS FOR NEW CONSTRUCTION AND RENOVATION

According to EU 2021/2139 from January 1st 2024 article 7.1 and 7.2, the following DNSH 5 requirements apply to new constructions and renovations:

*Building components and materials used in the construction comply with the criteria set out in Appendix C to this Annex.*

*Building components and materials used in the construction that may come into contact with occupiers emit less than 0,06 mg of formaldehyde per m<sup>3</sup> of test chamber air upon testing in accordance with the conditions specified in Annex XVII to Regulation (EC) No 1907/2006 and less than 0,001 mg of other categories 1A and 1B carcinogenic volatile organic compounds per m<sup>3</sup> of test chamber air, upon testing in accordance with CEN/EN 16516 or ISO 16000-3:2011 or other equivalent standardised test conditions and determination methods.*

*Where the new construction is located on a potentially contaminated site (brownfield site), the site has been subject to an investigation for potential contaminants, for example using standard ISO 18400.*

*Measures are taken to reduce noise, dust and pollutant emissions during construction or maintenance works.*

Appendix C of EU 2021/2139 (January 1st, 2024) lists the following additional requirements:

*The activity does not lead to the manufacture, placing on the market or use of:*

- a. substances, whether on their own, in mixtures or in articles, listed in Annexes I or II to Regulation (EU) 2019/1021, except in the case of substances present as an unintentional trace contaminant;*
- b. mercury and mercury compounds, their mixtures and mercury-added products as defined in Article 2 of Regulation (EU) 2017/852;*
- c. substances, whether on their own, in mixture or in articles, listed in Annex I or II to Regulation (EC) No 1005/2009;*
- d. substances, whether on their own, in mixtures or in an articles, listed in Annex II to Directive 2011/65/EU, except where there is full compliance with Article 4 of that Directive;*
- e. substances, whether on their own, in mixtures or in an article, listed in Annex XVII to Regulation (EC) 1907/2006, except where there is full compliance with the conditions specified in that Annex;*
- f. substances, whether on their own, or in mixtures or in an article, in a concentration above 0,1 % weight by weight (w/w), and meeting the criteria laid down in Article 57 of Regulation (EC) No 1907/2006 and that were identified in accordance with Article 59(1) of that Regulation for a period of at least eighteen months, except if it is assessed and documented by the operators that no other suitable alternative substances or technologies are available on the market, and that they are used under controlled conditions.*
- g. other substances, whether on their own, in mixtures or in an article, that meet the criteria laid down in Article 57 of Regulation (EC) 1907/2006, except where their use has been proven to be essential for the society.*

*In addition, the activity does not lead to the manufacture, presence in the final product or output, or placing on the market, of other substances, whether on their own, or in mixtures or in an article, in a concentration above 0,1 % weight by weight (w/w), that meet the criteria of Regulation (EC) No 1272/2008 for one of the hazard classes or hazard categories mentioned in Article 57 of Regulation (EC) No 1907/2006, except if it is assessed and documented by the operators that no other suitable alternative substances or technologies are available on the market, and that they are used under controlled conditions.*



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