



# Revision of EU Ecolabel Criteria for product group “*Furniture*”.

## Technical report: EU Ecolabel criteria draft 3.1

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## **1 EU ECOLABEL REVISION PROCESS FOR FURNITURE**

The EU Ecolabel criteria for wooden furniture<sup>1</sup> are under revision. The revision process involves the publication of a Preliminary report that aims to examine the current situation with the furniture industry and keep up to date with any relevant innovation that is related to the environmental performance of furniture products. The criteria aim to focus on the most important environmental impacts of furniture materials from a life cycle perspective of the final furniture product. The expansion of the product scope to include non-wood based materials has resulted in significant changes to the furniture criteria compared to the previous set published in Decision 2009/894/EC.

During the development of the EU Ecolabel criteria, a continuous and broad consultation was carried out with experts and stakeholders representing manufacturers, intermediaries, consumer organizations, NGO's and Member States. The evidence base targets available scientific information and data, adopts a life-cycle approach and engages participants to discuss the issues and develop consensus.

Following publication of the Preliminary report, a 1<sup>st</sup> technical report was published in which draft criteria areas for EU Ecolabel furniture were proposed and a 1<sup>st</sup> Ad-Hoc Working Group meeting took place in Sevilla on October 7<sup>th</sup> 2013 to discuss the proposals. Stakeholder feedback was gathered prior to the meeting via questionnaires, during the meeting and after the meeting via ongoing exchange of phone calls, emails and uploading of information onto the Batis webpage, to which all registered stakeholders have access.

After gathering all the stakeholder feedback, a new set of criteria and accompanying rationale were proposed in a 2<sup>nd</sup> technical report for EU Ecolabel furniture criteria, which was published approximately one month in advance of the 2<sup>nd</sup> Ad-Hoc Working Group meeting that took place in Brussels on May 15<sup>th</sup> 2014. Further stakeholder feedback was gathered both during the meeting and via the ongoing exchange of phone calls, emails and uploading of information and opinions onto the Batis webpage. A 3<sup>rd</sup> technical report (version 3.0) was published 4 weeks prior to the EUEB meeting in Brussels on the 5<sup>th</sup> November 2014 with what should have been nearly finalised criteria. However, due to the significant feedback received regarding certain issues it was considered necessary to rework a number of criteria to a significant degree.

Hence a new technical report (version 3.1) has been published for February 2015 along with a table of comments in a separate document and with JRC-IPTS responses. The publication of version 3.1 will be subject to a limited 2 week window for stakeholder feedback and only comments relating to new and relevant issues that have not already been discussed at length will be considered. After this 2 week consultation, any necessary changes will be made and the inter-service consultation procedure started.

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<sup>1</sup> 2009/894/EC: Commission Decision of 30 November 2009 on establishing the ecological criteria for the award of the Community eco-label for wooden furniture, available online at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:320:0023:0032:EN:PDF>

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## **2 SUMMARY OF KEY POINTS IN BACKGROUND REPORT**

In the background report several major issues covered included:

- Legislation and European Standards,
- Market analysis,
- Analysis of Life Cycle Assessment studies

### **2.1 Legal aspects and standards relevant to furniture**

A large number of Regulations and directives are relevant to one degree or another for specific furniture products. For all EU Ecolabel products, the overarching piece of legislation is the EU Ecolabel Regulation (EU) No. 66/2010, providing guidance as to how criteria should be developed and implemented.

Leading directly from Articles 6(6) and 6(7) of Regulation 66/2010, the importance of the REACH Regulation (EU) No. 1907/2006 and the CLP Regulation (EU) No. 1272/2008 are highlighted due to the banning or justified derogation of any substances that are; toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction in EU Ecolabel goods. These Regulations apply to all of the materials used in furniture and any assembly/finishing processes. Other more specific legal instruments include the VOC Directive (1999/13/EC) for installations where significant quantities of VOC containing compounds (e.g. surface coating chemicals for furniture) are handled and the Biocides Regulation (No. 528/2012) which establishes a framework for the authorization of active ingredients in biocidal products as a function of the product type they are used with.

For wood and wood based materials, the EU Timber Regulation (EU) No. 995/2010 outlines the requirements for any timber to be legally sold on the EU market and links with existing processes for FLEGT and CITES licenses. For sustainably sourced wood, the most relevant programmes are the FSC and PEFC certification schemes. Across the EU, wooden particleboards, fibreboards and panels, are classified as E1 (0.1ppm) or E2 (0.1-0.3ppm) based on the framework defined in Annex B of EN 13986 and on release rates of formaldehyde as assessed by relevant EN standards such as EN 120 and EN 717.

The presence of other ecolabel schemes used in the EU such as the Nordic Ecolabel and the Blue Angel were considered. EU Ecolabel criteria should embrace and align with any criteria that have been shown to have a positive impact in other ecolabels but not to repeat any specifications that have proven to be problematic.

A large number of EN standards exist that are specifically designed for individual product types such as EN 527 for work tables and desks in offices, EN 581 for outdoor tables and sets and EN 1728 for domestic seating. These standards are important from an environmental point of view when they refer to durability aspects of the furniture. For good quality leather, an important standard is EN 13336 and for upholstered furniture in general, an important standard is EN 1021 for fire resistance, which can effectively require that flame retardants be used with certain materials.

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## 2.2 Market analysis

According to the World Furniture Outlook by CSIL<sup>2</sup>, in 2010 the global furniture market was worth around US\$420 billion per year. The global market is dominated by China (37%) but the 3<sup>rd</sup> and 4<sup>th</sup> main producers were Germany and Italy (each with a 6% market share). In total, EU-27 countries accounted for around 20% of global furniture production.

The EU furniture industry faces strong competition from cheaper overseas competitors, in particular China. In response, they are developing more innovative and sophisticated furniture products and giving increased attention to the environmental impact of their products. The latter in particular is an important marketing tool in middle-high income countries and fits well with the EU Ecolabel and other European-based ecolabel schemes.

The market report reveals that the most common material used in the furniture sector is wood (56% of the pieces of furniture produced in the EU 27 in 2011 are based on wood, which also represents 56% of the production value). Metal is the second material most commonly used in the furniture industry (12% of items produced and 17% of the production value), followed by plastic (6% of items produced and 1% of the production value) and other materials (1% of items produced and negligible production value) like bamboo, canner, osier, glass. The remaining 25% are not specified within the PRODCOM database. Although wood is the most common material used, most pieces of furniture also contain other materials. Based on the segmentation of the furniture market, it is considered reasonable to widen the scope of the EU Ecolabel criteria in order to cover a much broader share of the furniture market and to respond better to the expectations of the potential licence holders. On both the demand and supply sides of the furniture market there is evidence that the framework is favorable to host EU Ecolabel products, because issues concerning sustainability and environmentally-friendly furniture are becoming increasingly important.

It is difficult to quantify any direct environmental impacts of assumed scenarios of the uptake of the EU Ecolabel criteria listed here because most market data is expressed in number of units of furniture or production value whereas environmental impacts related to materials are directly expressed as unit mass or volume of that material. Nonetheless, some of the more likely impacts of uptake of these EU Ecolabel criteria for furniture would be as follows:

- Increase in demand for sustainable certified wood.
- Incentivize the use of recycled wood by considering it as sustainable wood.
- Sending a market signal to small and medium enterprises for recycled plastic.
- Improving the product information made available to consumers.
- Encouraging innovation in furniture companies in terms of design for disassembly.
- Fostering skills development in furniture repair, renovation and responsible EoL disposal (either with the original manufacturer or 3<sup>rd</sup> parties).
- Reduction of the quantities of furniture waste sent to landfill as components become easier to separate and consumers are better informed of optimum disposal routes.

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<sup>2</sup> CSIL Furniture Outlook. Global trends and forecasts for the furniture sector. CSIL Alessandra Tracogna. February 2012. (available online at: <http://www.slideshare.net/ClarionGermany/03-csil-alessandratracogna>)

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## 2.3 Life cycle assessment of furniture

The life cycle of furniture products has been considered in the following phases; Materials, Manufacturing, Packaging, Distribution, Use and End of Life (EoL). An original total of 109 reports related to the LCA of furniture were assessed. After analysis of 13 screened Life Cycle Assessment (LCA) studies and 35 verified Environmental Product Declarations (EPD's), the main outcomes can be summarised as follows:

- The dominant fraction (80-90%) of environmental impacts is linked to furniture **materials/ components**. While embodied energy in metals and plastics are higher than wood, durability and recyclability are also important considerations. Specifying recycled materials can help reduce material impact.
- **Manufacturing**, the assembly and/or treatment of components, is the next most significant source of environmental impacts, particularly in injection moulded plastics and wood-based panels due to the use of elevated temperatures and pressures. Surface coating operations also have some significant environmental impacts due to chemicals used and elevated temperature curing processes.
- Impacts due to **packaging** were not dominant but not negligible either and some room for improvement exists in this area.
- **Distribution** was difficult to investigate since this can vary widely due to the global nature of the furniture market. In most studies, average scenarios were used.
- The **use** phase was not important in terms of environmental impact. However, durability and reparability of products are important considerations to extend the use phase.

The **EoL** impacts vary considerably depending on what materials are used in the furniture. Recycling of furniture components or recovering energy from furniture waste is often complicated due to difficulties in separating components.

According to the LCA screening, it will be important to set criteria for the different material types which may be used in furniture. The focus should be on the most important environmental impacts associated with wood and wood-based products (such as sustainable forestry), metals, plastics and other possible permitted materials.

EU Ecolabel furniture should not contain harmful substances. They should not pose any potential threat to human health and environment along the product life cycle. Analysis of the most commonly used substances has been conducted and the identification of substances of concern (e.g classified with hazard statements according to CLP Regulation) has been made, based on the substances inherent properties.

### 3 CRITERIA STRUCTURE, FEEDBACK AND CHANGES

The criteria structure has essentially not changed between TR 3.0 and 3.1 but is included below with the areas highlighted where major changes have been made.

Table 1. Major changes between TR 3.0 and TR 3.1 criteria have occurred (in yellow).

<b>New proposed criteria for EUEB Nov. 2015 (TR 3.0)</b>	
<b>Criterion</b>	<b>Part</b>
1 – Product description	
2 – General hazardous substance requirements	2.1 Substances of Very High Concern 2.2 General Hazardous Substance Requirements
3 – Wood and wood-based materials	3.1 Sustainable wood 3.2 Restricted substances a) contaminants in recycled wood b) polyvinyl chloride foils c) phthalates in plastic foils d) heavy metals in paints and varnishes e) VOC content in paints and varnishes 3.3 Formaldehyde emissions
4 – Plastics	4.1 Marking of plastic components 4.2 Restricted substances a) Heavy metals in plastic additives b) Polyvinyl chloride 4.3 Recycled plastic content 4.4 Take-back scheme for PVC
5 – Metals – Restricted substances	5.1 Electroplating restrictions 5.2 Heavy metals in paints and primers 5.3 VOC content in paints and primers
6 – Upholstery covering material (for leather, textiles and coated fabrics)	6.1 Physical quality requirements 6.2 Chemical testing requirements 6.3 Restricted Substances List during production processes 6.4 Cotton and other naturalcellulosic seed fibres 6.5 PVC-based coated fabrics
7 – Upholstery padding materials	7.1. Latex foam a) Restricted substances b) 24h VOC emissions from latex foam 7.2. Polyurethane foam a) Restricted substances b) 72h VOC emissions 7.3. Other padding/filling materials
8 - Glass	8.1 Heavy metals in glass 8.2 Information to the consumer 8.3 Glass Safety requirements
9 – Final product requirements	9.1 Fitness for use 9.2 Design for disassembly 9.3 VOC emissions
Information appearing on the Eco-label	



### 3.1 Feedback from stakeholders at EUEB

A number of issues were raised at the EUEB meeting in November 2014 that resulted in a prolonged discussion and that had to be addressed in this next revision. The main points are summarized below:

The hazardous substance criteria were too complex for Competent Bodies and especially for applicants. The general hazardous substance criteria text was considered to go into too much detail with derogations for substances in coatings and some other derogations should not be placed in the general hazardous substance text but instead as specific sub-criteria for particular materials, if at all. One key argument was whether the concentration limits (i.e. 0.1% w/w) for hazardous classifications adapted from Article 6(6) of the EU Ecolabel Regulation should apply to the entire final product only or also to "*homogenous components thereof*".

- A clear division was noted regarding PVC criteria, where a number of stakeholders supported the criterion that effectively banned PVC from EU Ecolabel furniture whereas industry representatives opposed such criteria, citing the fact that PVC as a material itself has no hazardous properties that are REACH classified.
- The link between PVC incineration and dioxin formation claimed in the TR 3.0 rationale supporting the PVC criteria was questioned, with reference to quotations from selected conference presentations by experts in the field.
- Industry stakeholders criticised the criterion for plastic marking as being of no use at end-of-life if furniture is incinerated and only of limited value if plastic is recycled, referring that automated sorting systems do not rely on labels.
- Industry stakeholders also questioned the plausibility of the recycled content requirements for plastics, citing problems with the availability of recyclates, concerns with unknown impurities and asking why no recycled content requirements are in place for wood, metals or glass.
- Some specific exemptions were requested for biocides in health-sector or catering furniture, higher VOC content adhesives, stabilisers and varnishes.
- Regarding VOCs, one Competent Body expressed a desire to align the maximum VOC content limits for coated materials to align with the Nordic Ecolabel.
- Clarification was requested regarding the framework and parameters for final product VOC testing by industry stakeholders.
- The reference to the fitness for use standards was considered too vague by some stakeholders and more specific guidance should be provided. The Nordic Ecolabel approach was cited as a possible example to follow.

### 3.2 Summary of main changes between TR 3.0 and 3.1

For ease of reference, any significant changes made between TR 3.0 and 3.1 are highlighted in yellow. The main changes and the reasons behind them are summarised below.

### **3.2.1 General hazardous substance criteria changes**

The general hazardous substance criterion text has been completely rewritten, aligning with the new, and hopefully more pragmatic horizontal approach, which has been developed by the JRC in collaboration with ECHA.

Applicants are required to screen the product and its components for use of certain functional substances that are likely to remain in the components of the final product. The scope is narrowed to biocides, flame retardants, dyestuff, auxiliary carriers, plasticisers and water/dirt/stain repellents. Any derogations and applicable conditions are provided. By using a horizontal approach, and applying it to homogenous parts instead of only the final product, it is now possible to remove many of the material specific sub-criteria that related to hazardous substances.

The derogation for formaldehyde has been removed because after curing the free formaldehyde content is well below 0.10% w/w of wood-based panels.

The derogation for isocyanates in adhesives was requested by stakeholders and was included in TR 2.0 and 3.0. However, since the adhesives no longer emit isocyanates after curing (i.e. in the final product), no such derogation should be necessary. It was decided not to impose any workplace health and safety exposure conditions on the use of isocyanate resins and adhesives because no agreed upon EU-wide limits could be found that would serve as a guideline.

The derogation for metal complex dyes in textiles has been removed because no specific hazardous statements are mentioned. Instead this is included in a list of restricted substances as upholstery covering sub-criteria.

The derogation for VOCs in glues/adhesives have been removed because this was not aligned with any specific hazard classification(s) and in any case would be an example of chemicals used in manufacture whose properties become non-hazardous after curing and which, in any case would not amount to more than 0.1% of the glued article. Feedback from the furniture industry revealed that high VOC content glues are only used in situations where near zero VOC (i.e. hot melt glues/adhesives) are not technically viable and where water-based glues/adhesives do not give satisfactory performance.

### **3.2.2 Wood criteria changes**

The sub-criterion for legal wood has been removed. This was after some stakeholders questioned the need for such a sub-criterion given that the EU Timber Regulation (EUTR – No. 995/2010/EC) is now in force. The separate requirement for legality was originally introduced because a number of furniture items and components are currently exempted from the requirements of the EUTR. However, it can be considered that such a requirement for legal wood may be unnecessary duplication because it is basically covered by the sub-criterion for sustainable wood. Given that the overall set of criteria has been criticised for its length and complexity, this represents an opportunity to streamline the criteria.

In order to support the reasoning for referring to FSC and PEFC in the criteria rather than simply stating the common sustainable forest management criteria and only mentioning FSC and PEFC certification as potential assessment and verification, the principles and criteria of

both the FSC and PEFC criteria have been uploaded in a new Appendix (I). Reading Appendix I, it becomes clear that agreeing on a text concerning common principles would be very complicated.

The formaldehyde emission sub-criterion has been simplified slightly in response to some doubts raised by one stakeholder. In the previous text, 3 possible approaches were mentioned:

- i. Use uncoated E1 wood-based panels and treat them so that the final treated panel complies with the 50% / 65% E1 formaldehyde emission requirements.
- ii. Use coated or uncoated wood-based panels that already comply with 50% / 65% E1 formaldehyde emission requirements and make no further treatments that would potentially increase formaldehyde emissions from the panels.
- iii. Use coated or uncoated wood-based panels that comply with the Japanese F-3 star or F-4 star requirements or CARB Phase II requirements (which are considered as at least equivalent to 50% / 65% E1 formaldehyde emission requirements) and make no further treatments that would potentially increase formaldehyde emissions from the panels.

The first option is potentially confusing and effectively requires double verification (i.e. that the untreated panel was E1 or better and that the coated, overlaid or veneered panel is then 50% / 65% E1 or better). It would be simpler to only require that any wood-based panels comply with the 50% / 65% E1 emission limits, which is covered in points ii) and iii) above. Consequently, requirement i) has been deleted, which should simplify the criteria text slightly.

### **3.2.3 Plastics criteria changes**

The requirement for plastic marking has been revised. The need for marking was questioned given that most plastic recyclers use automated systems based on infra-red technology and/or separation by floatation and/or sedimentation of plastics based on their densities. Feedback from plastic recyclers confirmed that this was the case. However, they also stated that problems could arise in the automated sorting of plastics that contain significant percentages (>10% w/w) of additives such as fillers, flame retardants or plasticisers because this would affect the density of the plastic and may result in the plastic contaminating other polymer streams. Consequently, the requirement for marking has now been adjusted to only apply to i) those plastics that are of particular value during manual pre-sorting (i.e. >100g) and ii) those plastics which contain a combined total of at least 10% w/w of fillers or other additives. The marking standard to follow is ISO 1043 because these specifically mention the quantities of fillers and if any plasticisers or flame retardants are used and because ISO 11469 is very limited in scope..

Industry stakeholders expressed serious concerns about the proposal to exclude PVC from EU Ecolabel furniture. Consequently, PVC is no longer proposed to be expressly excluded from EU Ecolabel furniture but, due to its unique characteristics (high chlorine content) when compared to other plastics, its use is proposed to be permitted subject to certain conditions linked to the main hotspot of its lifecycle, which is the production stage. A further optional criterion is proposed to stakeholders regarding a take-back commitment for PVC components.

### **3.2.4 Upholstery covering materials**

Criterion 6 has been restructured. Instead of being of the order:

- Leather → physical quality → chemical residues → production process RSL
- Textiles → physical quality → chemical residues → production process RSL
- Coated fabrics → physical quality → chemical residues → production process RSL

The criteria are now structured as follows:

- Physical quality → leather / textiles / coated fabrics
- Chemical residues → leather / textiles / coated fabrics
- Production process RSL → leather / textiles / coated fabrics

The new approach avoids some unnecessary duplication.

Due to the interest of some stakeholders in criteria supporting the use of organic or integrated pest management cotton in EU Ecolabel furniture upholstery, a separate criterion has now been included for this, fully aligning with the requirements set out in Decision 2014/350/EU for EU Ecolabel textiles.

As PVC is not excluded from the scope, additional criteria have been included for PVC-based coated fabrics.

### **3.2.5 Glass criteria**

Minimum safety requirements for glass have been reintroduced after it was discovered that furniture is not generally CE marked and so compliance with the General Product Safety Directive cannot be assumed by default.

This requirement is not included with the general list of standards in Appendix V because safety is not considered as a true environmental criteria unlike strength, durability and arguably ergonomic criteria. Stakeholder opinions on this general point are welcome. An exception is made for safety criteria for glass simply due to the seriousness of potential consequences with the use of inappropriate glass parts in furniture.

### **3.2.6 Final product "fitness for use" requirements**

Due to potential concerns with costs of testing to small and medium enterprises, and especially with low-production volume furniture, it is proposed to allow applicants a choice between demonstrating compliance with all relevant standards or providing an extended guarantee, coupled with a repair or replacement guarantee.

It is proposed to reduce the number of standards listed in Appendix V down to the bear minimum that only directly relate to the fitness for use criteria set out in Criterion 9.1. At present this is restricted to minimum requirements for durability, strength and ergonomics where relevant and in force EN standards can be found for the furniture product in question.

For relevant standards, reference shall only be made to the specification standard. If tests in other standards are required, these will be mentioned where practical in the pass conditions, but not as a new entry in the table 28.

### **3.2.7 Final product VOC emission requirements**

A great deal of interest in this area was expressed by stakeholders regarding this topic. There was general support for this criterion but concern was expressed regarding the extremely high costs of testing.

The criteria have been structured to allow applicants to essentially avoid testing by careful choice of materials and any coatings used. Ultimately, testing would only be required by default for leather or coated-fabric upholstered products. Even in these cases, the potential for cost savings is permitted by the option to only test the upholstery material (leather or coated fabric) alone in small chambers. General test parameters and VOC emission limits proposed are aligned with those set out by relevant Blue Angel criteria.

### **3.2.8 Old appendix IV summarised and brought directly into criterion 6.3**

In the previous version (TR 3.0), the RSL for hazardous substances used during the manufacture of leather, textiles or coated fabrics was listed in three separate tables in Appendix IV. In order to improve readability, and going beyond the minimum requirements of criterion 2, these tables have been summarised down essentially to restricting hazardous substances that would not normally be tested for in the final product (i.e. criterion 6.2) and are now listed in criterion 6.3.

### **3.2.9 New Appendix VI listing VOCs of concern**

In line with the more detailed criterion text for VOC emissions from the final product, to help clarify the requirements for analysis during testing, a list of carcinogenic VOCs and a list of all VOCs that currently have EU-LCI values has been included.

## **3.3. Criteria removed in TR 3.1**

The text in this section groups together different criteria that have been removed from previous versions of the TR and provides a brief explanation of the rationale for their removal.

### **Packaging criterion removal**

In the TR 2.0, in line with select other EU Ecolabel criteria, it was proposed to have a requirement for a minimum recycled content of 80% for cardboard or paper and that the paper should not have been bleached with chlorine gas.

Recycled contents of 75% for plastics and 50% were required for any other materials.

Both arguments for and against packaging criteria were stated at the 2<sup>nd</sup> AHWG meeting. The arguments for packaging criteria focus on the importance of packaging to the initial impressions on customers and the fact that these criteria are achievable and bring some environmental benefits.

Arguments against packaging focus on possible scenarios where packaging is only a small fraction (< 5%) of the overall weight of the packaged product and may have an even smaller fraction of the overall environmental impact of a product. In such a case, where packaging criteria are maintained, we could have an example where a sofa that complies with all the detailed criteria for wood, padding, upholstery covers and so on could actually fail the EU

Ecolabel application assessment simply because the cardboard packing did not have a high enough recycled content, would be absurd.

Manufacturers argued that the local availability of recycled materials is outwith the control of the market and large quantities of recycled materials are often being sent back in shipping containers that would otherwise be empty to China, which has an extremely high demand for raw materials of any kind. An ambitious requirement on recycled content packaging may be considered as more difficult to comply with for small enterprises rather than large ones, who can negotiate more specific conditions with suppliers due to larger contracts.

According to summaries of the overall life cycle impacts of furniture presented in the Preliminary report, packaging has a relatively minor overall impact in terms of overall environmental impact.

### **Metal criteria removal**

In the TR 2.0, three other sub-criteria for metals were included that are no longer present in TR 3.0 or TR 3.1. The rationale behind their removal is given here.

The "Description of metal used" sub-criteria was criticised for requiring extra workload for applicants and Competent Bodies for limited extra value in terms of information to the consumer and negligible benefit to the environment. Although it was also stated that furniture manufacturers should be perfectly aware of the materials they use to manufacture their products, due to the little added value of this criteria and the fact that criteria should try to only focus on the main environmental impacts of products, it has been removed.

The "recyclable metals" criterion was removed because it was quite reasonably stated that the metal recycling market and scrap dealing infrastructure is already well established in the EU and economic drivers are sufficient to ensure that metals are recovered at end of life rather than a piece of information that was made available to the consumer when he or she originally bought the product.

The "recycled metal content" criterion was removed although this was subject to some mixed opinions amongst stakeholders. Those in favour of retaining the criterion stated that materials with recycled metal content have a significantly lower embodied energy than those made with virgin metal. While this is very true, the counter-argument was that in a market where metal recycling rates are already around 90% and where general demand for metal outstrips the recycled material available then all that happens by specifying recycled metal in EU Ecolabel products is that you prevent it ended up in a different product. Regardless, it would have been recycled anyway.

From Life Cycle Assessment studies, if the system boundary is focussed on a single product then the benefit of recycled metal content is clear. However, if the boundary is expanded to the entire market, then the net benefit is negligible.

Mixed opinions were also expressed about the 50% metal recycled content with applications for the Nordic Ecolabel for furniture and fittings with it being stated that licences have been awarded but with others saying that the recycled contents were extremely difficult to verify due to the continuous/semi-continuous way in which metal smelters operate and the fact that furniture manufacturers very rarely would directly specify metal from a smelter but instead

buy it from an intermediate supplier. The use of average annual recycled metal throughput (% w/w basis) of a particular smelter was considered as the means of determining average recycled content. It was pointed out that in the absence of recycled metal content criteria, the EU Ecolabel furniture criteria seems very lenient on metal, stricter on plastic and stricter still on wood and wood-based materials, which may not seem very logical since wood is generally considered as the lower environmental impact material of the three.

### **Leather criteria removal**

The original text in TR 2.0 did not specify a cut-off threshold above which certain sub-criteria apply and went into some detail about the leather supply chain, including criteria about animal origin, final effluents discharged from the tannery site and the final leather properties. The approach was initially aligned with the leather EU Ecolabel criteria being developed for footwear, but because the EU Ecolabel furniture criteria are already complex, it is desirable to simplify the requirements relating to leather as far as is practical, otherwise the workload for applicants and Competent Bodies may become excessive. This has been reflected by several stakeholder comments.

The criterion for animal origin has been removed after an industry representative stated at the 2<sup>nd</sup> AHWG meeting that due to size requirements for leather pieces in furniture, virtually all leather used is of bovine origin.

The criterion related to tannery effluent quality has been removed because, although it is a relevant environmental impact from the life-cycle of leather material, the overall impact on the environmental footprint of a furniture product is considerably less than it would be on leather footwear products. Demonstrating compliance with such a criterion would not have been straight-forward in cases where leather is bought via intermediate traders.

A more pragmatic approach has been attempted here in TR 3.0 where some basic and fundamental requirements that can be tested in the final material apply if the leather accounts for less than 1% w/w and, only if this content is exceeded, then some more detailed investigation into the chemicals used during the production process are required, which will be aligned in part with the EU Ecolabel criteria being developed simultaneously for footwear..

### **Rationale for changes in glass criteria:**

Compared to the original criteria for glass proposed in TR 2.0, significant changes have been made to the criteria for glass. A requirement for a minimum recycled content was removed due to doubts about the market availability of glass recyclates of suitable quality and also doubts about the potential for achieving recycled contents in the various different types of glass that can potentially be used in furniture.

Support was expressed for criteria to focus on good quality glass, the replacibility of glass, the restriction of heavy metals in glass and informing the customer about the correct disposal of the glass, since furniture glass is not compatible with typical post-consumer glass from food and beverage containers collected in kerbside schemes.

## 4 PRODUCT GROUP NAME, SCOPE AND DEFINITIONS

Table 2. Summary of proposed changes in scope and definition for furniture

Old scope and definition 2009/894/EC	Scope and definition in TR 2.0	Scope and definition in TR 3.0 and 3.1
<p>The product group of 'wooden furniture' shall comprise free-standing or built-in units, which are used for storing, hanging, lying, sitting, working and eating of domestic furniture, whether for indoor or outdoor use, or used indoors for business purposes. Business purposes shall include office and school furniture as well as furniture for restaurants and hotels.</p> <p>The following conditions shall be fulfilled:</p> <p>(a) The product shall be made of at least 90 % w/w solid wood or wood-based materials. Glass, if easily replaceable in case of damage or breakage, may be excluded from the weight calculation as technical equipment and fittings.</p> <p>(b) The weight of any individual material, other than solid wood and wood-based materials, shall not exceed 3 % of the total weight of the product. The total combined weight of such materials shall not exceed 10 % of the total weight of the product."</p> <p><u>Exemptions:</u></p> <p>i. Materials, other than solid wood and wood-based materials, and other than those covered by the criteria for surface treatments and for the assembly of furniture, which account for less than 3 % of the total weight of the eco-labelled product may be exempt from compliance with "wood and wood-based material requirements".</p> <p>ii. Materials, other than fixtures, such as screws and nails, and metal hardware for sliding doors and drawers are exempt from compliance with all criteria on materials.</p>	<p>"The product group "furniture" shall comprise free-standing or built-in units, which are used for storing, hanging, lying, sitting, eating or working purposes both in domestic or business premises and including both indoor and outdoor furniture. Business purposes shall include all kinds of furniture whose primary function is to be used as furniture, for instance furniture for offices, schools, restaurants, hotels, libraries, theatres, cinemas, etc.</p> <p>Products whose primary function is not to be used as 'furniture', for example: streetlights, bike-parks, playground equipment, carpets, sanitary equipment and building products – such as steps, doors, window frames, floor coverings, wall panels.</p> <p>Exemptions from the criteria shall apply to:</p> <ol style="list-style-type: none"> <li>i. Mechanical fixtures and fittings, such as screws, nails, wheels and hinges are exempt from compliance with all criteria on materials.</li> <li>ii. Wood, wood-based materials, hard plastics and metals if they do not account for more than 3 % of the total furniture product weight (excluding packaging).</li> </ol>	<p>The product group "furniture" shall comprise free-standing or built-in units, whose primary function is to be used for the storage, placement or hanging of items and/or to provide surfaces where users can rest, sit, eat, study or work, whether for indoor or outdoor use. The scope extends to domestic furniture and contract furniture items used in domestic or non-domestic environments. Bed frames, legs, bases and headboards are included in the scope but not bed mattresses, which are covered by the criteria established by Decision 2014/391/EU<sup>3</sup>.</p> <p>The product group shall not comprise the following products:</p> <ol style="list-style-type: none"> <li>(a) Products whose primary function is not to be used as furniture. Examples include but are not limited to: streetlights, railings and fences, ladders, clocks, playground equipment, stand-alone or wall-hung mirrors, electrical conduits, road bollards and building products such as steps, doors, windows, floor coverings and cladding.</li> <li>(b) Second-hand, refinished, refurbished or remanufactured furniture products.</li> <li>(c) Furniture fitted into vehicles used for public or private transit.</li> </ol>

<sup>3</sup> JO L 184, 25.6.2014, p. 18



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### ***Rationale for changes in product scope and definition***

Stakeholders generally agreed on the extension of the scope to other materials and wanted to see the maximum limits for non-wood based materials removed and the minimum limit of 90% for wood/wood-based materials removed. This change remains common to both proposals in TR 2.0 and TR 3.0.

Some stakeholders opined that the reason behind the low number of companies with licenses for Ecolabel furniture (1 in Poland and 1 in Italy) was at least partly related to the very high minimum limit of 90% for wood/wood-based material content. According to the results of a market questionnaire<sup>4</sup> answered by two European furniture associations representing over 2900 furniture manufacturers, only a few products are composed of at least 90 % by weight of wood/wood-based materials. Consequently it can be assumed that the removal of the maximum and minimum limits for materials will mean that the number of furniture products potentially eligible for the EU Ecolabel application process increases greatly.

Support was expressed for the inclusion of specific criteria for plastics, glass and metals as well as for upholstery materials based on textiles, padding or leather. Furniture is an especially important market for leather producers, accounting for around 14% of global production.

Nonetheless, caution was noted that meaningful ecological criteria must be set for other materials because wood generally has a better environmental profile than other materials used in furniture, provided that the wood originates from certified sustainable sources. The general exemption that applied to glass in the old scope was requested to be removed since glass may contribute significantly to the overall environmental footprint of the product.

The potential expansion of the furniture product group scope to include second-hand, refinished, refurbished or remanufactured furniture was discussed but the general consensus amongst representatives was that this would require a large amount of further investigation and may be very difficult to develop adequate criteria that are not open to misinterpretation.

Other concerns regarding the specific wording of the draft scope and definition that were commented by stakeholders included:

- Would criteria be developed for stone-like materials? For example ceramic kitchen tops?  
→ These type of materials had been considered as outside of the scope from the beginning and no background work had been carried prior to the 2<sup>nd</sup> AHWG meeting. Due to the considerable amount of work this could entail, it was proposed to continue excluding these materials. It was mentioned that a possible basis for future criteria on these materials could be taken from that of EU Ecolabel hard coverings<sup>5</sup> but the product group has no direct relevance to kitchen top materials.
- Whether or not hospital furniture and street furniture, as in road bollards etc., were included in the scope?

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<sup>4</sup> For more information see details in "Background document", available online at the project's website: <http://susproc.jrc.ec.europa.eu/furniture/whatsnew.html>

<sup>5</sup> 2009/607/EC Commission decision of 9 July 2009 on establishing the ecological criteria for the award of the Community eco-label to hard coverings

- The replacement of specific examples of public places (schools, restaurants etc.) with the generic term "contract furniture".

→ The introduction of the generic term "contract furniture" implies the inclusion hospital furniture within the scope and specific reference was made to road bollards in the list of excluded products. The term can broadly be interpreted to cover any contractually bound transaction between two businesses relating to furniture items.

- That it would be more appropriate to use the term "cladding" instead of "wall panels" when referring to excluded products.

- A more specific mention of beds and parts thereof, to make it clear that, with the exception of bed mattresses, these are included in the scope.

→ The text has been altered to make these changes as requested.

- That the exemption for materials in the product that account for less than 3% of the total product weight, as it was worded in TR 2.0, was open to misinterpretation and could present a route for hazardous substances into Ecolabelled products.

→ The original 3% exemption has been removed from the scope to avoid possible misinterpretation.

Finally, it is important to specifically exclude from the furniture product scope those products that are already included under separate EU Ecolabel criteria and Decisions. Examples include textile floor coverings<sup>6</sup>, wooden floor coverings<sup>7</sup> and bed mattresses<sup>8</sup>.

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<sup>6</sup> 2009/967/EC: Commission decision of 30 November 2009 on establishing the ecological criteria for the award of the Community Ecolabel for textile floor coverings,

<sup>7</sup> 2010/18/EC Commission decision of 26 November 2009 on establishing the ecological criteria for the award of the Community Ecolabel for wooden floor coverings.

<sup>8</sup> 2014/391/EC Commission decision of 23 June 2014 on establishing the ecological criteria for the award of the EU Ecolabel for bed mattresses.

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## 5 EU ECOLABEL CRITERIA FOR FURNITURE

The criteria for EU Ecolabel furniture is described in the sections below and is split as follows:

### **Criterion 1: Product description**

Technical drawings that illustrate the assembly of components in the product and its dimensions shall be provided to the Competent Body along with a bill of materials for the product that shall state the total weight of the product itself and how this is split between the following different materials: solid wood / wood-based materials, plastics, metals, leather, coated fabrics, textiles, glass and padding/filling materials. A similar bill of materials shall also be presented for packaging.

#### **Assessment and verification:**

The applicant shall provide documentation to the Competent Body containing:

- Technical drawings that illustrate the different components and sub-components used in the assembly of the product;
- An overall bill of materials stating the total weight of the product unit and how the weight is split amongst solid wood/wood-based materials, plastics, metals, leather, textiles, coated fabrics, glass and padding/filling materials. Weights of different materials shall be expressed as grams or kilograms and as a percentage of the total product unit weight.
- A similar bill of materials shall also be provided for packaging and the overall contribution of packaging mass to the total mass of the packaged product shall be expressed.

Applications that go into further detail, for example expressing the type of metal, the type or plastic polymer, recycled contents and/or distinguishing between solid wood, bamboo and wood-based panels for example shall be encouraged but are optional.

#### **Rationale:**

The product description proposed was generally accepted by the stakeholders. With the extension of the product scope to include other materials, and in much higher quantities, it will be important to describe which materials are used, together with their respective weights. All materials used in the product should be reported, including replaceable parts, e.g. glass elements or textile parts.

Where certain materials are only present in small amounts in a furniture product, it may be argued that their overall contribution to the environmental impact of the product is small, and that they could be exempted from certain criteria. The information provided in the product description could quickly inform Competent Bodies about whether a certain material exceeds any minimum content thresholds that would trigger certain content specific criteria to become applicable.

Finally the product description criterion could act as a useful indicator of the typical composition of EU Ecolabel furniture in the future and help shape later revisions of criteria.

## Criterion 2: General hazardous substance requirements

Note: Any articles or homogenous parts of complex articles used in the final furniture product that: (i) weigh less than 25 g and that (ii) do not come into direct contact with users during normal use shall be considered exempt from the requirements set out in this criterion.

The final product shall not contain functional substances meeting the criteria for classification with the group 1, 2 or 3 hazard statements as specified in Table 3 in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council or substances referred to in Article 57 of Regulation (EC) No 1907/2006.

The most recent classification rules adopted by the European Union shall take precedence over the listed hazard classification and risk phrases. The hazard classifications generally refer to substances however, if information on substances cannot be obtained, the classification rules for mixtures apply. The applicant shall therefore ensure that any classifications are based on the most recent classification rules.

Table 3. Grouping of Candidate List SVHCs and CLP hazards

<p><b>Group 1 hazards</b> <i>Hazards that identify a substance as being within Group 1:</i></p> <ul style="list-style-type: none"><li>○ Substances that appear on the Candidate List for Substances of Very High Concern (SVHC)</li></ul>
<p><b>Group 2 hazards</b> <i>Hazards that identify a substance as being within Group 2:</i></p> <ul style="list-style-type: none"><li>○ Category 2 Carcinogenic, Mutagenic or toxic to reproduction (CMR): H341, H351, H361f, H361d, H361fd, H362</li><li>○ Category 1 aquatic toxins: H400, H410</li><li>○ Category 1 and 2 acute toxins: H300, H310, H330, H304</li><li>○ Category 1 Specific Target Organ Toxicity (STOT): H370, H372</li></ul>
<p><b>Group 3 hazards</b> <i>Hazards that identify a substance as being within Group 3:</i></p> <ul style="list-style-type: none"><li>○ Category 2, 3 and 4 aquatic toxins: H411, H412, H413</li><li>○ Category 3 acute toxins: H301, H311, H331, EUH070</li><li>○ Category 2 Specific Target Organ Toxicity: H371, H373</li><li>○ Category 1 Skin Sensitiser H317</li><li>○ Category 1 Respiratory Sensitiser H334</li></ul>

### 2.1 Group 1 hazards - Substances of very high concern

Substances that have been identified as substances of very high concern and included in the list provided for in Article 59(1) of Regulation (EC) No 1907/2006, shall not be present in the final product or homogenous parts thereof, above the generic concentration limit of 0.10% w/w (weight by weight). Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall apply in cases where those specific limits are lower than 0.10% w/w of the final product, article or homogenous part thereof.

Reference to the latest list of substances of very high concern shall be made on the date of application.

The use of substances or mixtures which change their properties upon processing (e.g. become no longer bioavailable or undergo chemical modification) so that the identified

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hazards no longer apply in the final product or homogenous part thereof, may be exempted from the above requirements.

**Assessment and verification:**

The applicant shall provide a declaration of compliance signed by the material supplier and copies of relevant Safety Data Sheets for substances or mixtures in accordance with Annex II to Regulation (EC) No 1907/2006. Substances and formulations used at each production stage shall be screened against the latest version of the candidate list published by ECHA. The applicant shall compile declarations of compliance from each production stage supported by screening documentation.

If substances or mixtures used in the manufacture of the furniture product, article or homogenous parts thereof, contain substances of very high concern, the applicant shall provide satisfactory evidence that the substances undergo chemical modification such that they are no longer bioavailable or undergo chemical modification and that any impurities do not amount to more than 0.10% w/w of the final furniture product, article or homogenous part thereof.

Suitable evidence of such chemical modification may be provided by: toxicological studies by ECHA Peer Agencies or other Governmental regulatory bodies; an expert review of the scientific literature and test data; new test data using methods approved by ECHA and carried out by independent laboratories or a report prepared prepared by a toxicologist accredited to an independent hazard assessment scheme based on the GHS or CLP hazard classification scheme in accordance with the guidelines in Annexes I and II of ISO 17065.

No assessment and verification for this criterion shall be required for any textile based component parts of the furniture product if the applicant can provide a copy of the EU Ecolabel certification with a proof that this was awarded in accordance with Commission Decision 2014/350/EU.

## **2.2. Group 2 and 3 hazardous substances and mixtures**

### **a) Minimum screening requirements**

As a minimum, the applicant shall verify the non-presence in the final product of restricted hazardous substances, with hazard statements listed in Groups 2 and 3 of Table 3, that fall under the scope of following functional groups.

- Biocides and preservatives
- Flame retardants
- Dyestuff (including pigments and varnishes);
- Auxiliary carriers, stabilisers, levelling, blowing and dispersing agents;
- Plasticisers;
- Water, dirt, and stain repellents.

The non-presence of these substances or mixtures shall be considered as them not being present in the final furniture product or homogenous parts thereof as follows:

- Substances meeting the criteria set out in points (a), (b) or (c) of Article 57 of Regulation (EC) No 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008. Where specific concentration limits are determined, they shall prevail over the generic ones.
- Concentration limits for substances meeting the criteria set out in points (d), (e) or (f) of Article 57 of Regulation (EC) No 1907/2006 shall not exceed 0.10% w/w.
- For substances listed in Annexes IV and V to Regulation (EC) No 1907/2006, which are exempted from registration obligations under points (a) and (b) of Article 2(7) of that Regulation, no maximum threshold limit shall apply.

#### **b) Derogation from the restrictions in part a)**

Based on assessment that reflects the technical progress to ensure product functionality and quality and in accordance with Article 6(7) of Regulation (EC) No 66/2010, the substance groups listed in Table 4 are derogated from the requirements specified in part a), subject to compliance with the respective specific derogation conditions also set out in Table 4. For each group of functional substances all derogation conditions shall be met for the specified hazard classifications.

Table 4. Derogations to the hazard restrictions in Table 3 and applicable conditions

Functional substance group	Applicability	Derogated classification(s)	Derogation conditions
(a) Biocides / Preservatives	Treatment of wooden materials and components to be used directly in the final product	All group 2 and group 3 hazards as listed in Table 3	Only permitted when the following conditions apply: <ul style="list-style-type: none"> <li>i. That the furniture product is clearly marketed for outdoor use.</li> <li>ii. That the untreated wood does not meet durability class I or II according to EN 350 requirements.</li> <li>iii. That any wood preservation formula and active substance(s) are approved for use under Product Type 8 or 18 as per the requirements of the Biocidal Products Regulation (EU) No 528/2012.</li> </ul>
(b) Biocides / Preservatives	Storage and transport of raw hides and semi-finished leather products	All group 2 and group 3 hazards as listed in Table 3	Only permitted when the following conditions apply: <ul style="list-style-type: none"> <li>i. When the raw hides or semi-finished leather need to be transported during periods of more than 3 days between sites.</li> <li>ii. That the biocide or preservative formulas and active substance(s) have been approved for use under Product Type 9 as per the requirements of the Biocidal Products Regulation (EU) No 528/2012.</li> <li>iii. That no further preservatives are added during finishing operations to the leather material for a final disinfective effect.</li> </ul>

(c) Biocides / Preservatives	Use in textiles or coated fabrics used in outdoor furniture	All group 2 and group 3 hazards as listed in Table 3	Only permitted when the following conditions apply: i. The furniture product is clearly marketed for outdoor use. ii. The the biocide or preservative formulas and active substance(s) have been approved for use under Product Type 6 (for polymers and plastics) or Product Type 9 (for textiles).
(d) Biocides / Preservatives	In-can preservatives in paints and varnishes	H317, H331, H400, H410, H411, H412	Only permitted when condition i. or conditions ii. and iii. apply: i. The effective concentration of the active substances can be considered to be below 0.10% w/w of the coated article. ii. The formulation and any active substance(s) present are approved under Product Type 6 as per the requirements of the Biocidal Products Regulation (EU) No 528/2012. iii. Any H400 or H410 preservatives shall be non-bioaccumulative, with a Log Kow $\leq$ 3.2 or a bioconcentration factor $\leq$ 100.
(e) Biocides / Preservatives	Dry-film preservatives in coatings for wooden components in outdoor furniture	H317, H400, H410, H411, H412	Only permitted when condition i. or conditions ii., iii. iv and v. apply: i. That the effective concentration of the active substances can be considered to be below 0.10% w/w of the coated article. or ii. That the furniture product is clearly marketed for outdoor use. iii. That the uncoated wood does not meet the durability class I or II according to EN 350 requirements. iv. That the coating substance shall have a score of 0 for fungal resistance and 0 for algal resistance according to the requirements of EN 15457 and EN 15458 respectively. v. The formulation and any active substance(s) present are approved under Product Type 7 as per the requirements of the Biocidal Products Regulation (EU) No 528/2012.
(f) Flame retardants		H317(1B), H373, H411, H412, H413	The product must be intended to be used in applications in which it is required to meet fire protection requirements for ISO, EN, Member State or public sector procurement standards and regulations.
(g) Flame retardants / Antimony Trioxide (ATO)	Furniture upholstery materials*	H351	The product must be intended to be used in applications in which it is required to meet fire protection requirements in ISO, EN, Member State or public sector procurement standards and regulations. Emissions to air in the workplace where the flame retardant is applied to the textile product shall meet an eight hour occupational exposure limit value of 0,50 mg/m <sup>3</sup> .

(h) Heavy metals / Nickel	Metal components	H317, H351, H372	Only permitted when used in stainless steel components and where the Nickel release rate from the stainless steel is shown to be less than 0.5µg/cm <sup>2</sup> /week according to EN 1811.
(i) Heavy metals / Zinc and zinc compounds		H412	Only permitted when used in the electroplating or hot-dip galvanising of metal components which are not considered to come into prolonged skin contact*
(j) Dyestuff for dyeing and non-pigment printing	Textiles, leather and coated fabrics in furniture upholstery covering materials.	H301, H311, H331, H317, H334	Dust free dye formulations or where automatic dosing and dispensing of dyes shall be used by dye houses and printers to minimise worker exposure.
		H411, H412, H413	Dyeing processes using reactive, direct, vat, sulphur dyes with these classifications shall meet a minimum of one of the following conditions: <ul style="list-style-type: none"> <li>•Use of high affinity dyes;</li> <li>•Achievement of a reject rate of less than 3,0 %</li> <li>•Use of colour matching instrumentation;</li> <li>•Implementation of standard operating procedures for the dyeing process;</li> <li>•Use of colour removal to treat wastewater**</li> </ul> The use of solution dyeing and/or digital printing are exempted from these conditions.
(k) Optical brighteners	Textiles, leather and coated fabrics in furniture upholstery covering materials.	H411, H412, H413	Optical brighteners may only be applied in the following cases: <ul style="list-style-type: none"> <li>• In white coloured printing;</li> <li>• As additives during the production of acrylic, polyamide or polyester with a recycled content.</li> </ul>
(l) Water, dirt and stain repellents	Use in any surface treatments of furniture components	H412, H413	The repellent or varnish and its degradation products shall be readily biodegradable and non-bioaccumulative <sup>†</sup> in the aquatic environment, including aquatic sediment.
(m) Stabilisers and varnishes	Use in coated fabric production	H411, H412	Automatic dosing and/or personal protective equipment must be used to minimise worker exposure. At least 95% of these additives must be eliminable in wastewater treatment systems according to the OECD 303A/B and/or ISO 11733 standards.
(n) Auxiliaries (comprising carriers, levelling agents, dispersing agents, surfactants, thickeners and binders)	Use in treatment of furniture upholstery covering materials (textiles, leather or coated fabrics).	H301, H371, H373, H334, H411, H412, H413, EUH070	Only permitted when recipes shall be formulated using automatic dosing systems and processes shall follow standard operating procedures.
		H311, H331, H317(1B)	Only permitted when it can be shown that substances classified with H311, H331 or H317(1B) are not present in the final product at concentrations greater than 1.0% w/w.



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\*prolonged skin contact is currently defined by CARACAL<sup>9</sup> as 10 minutes on three or more occasions within a two week period or 30 minutes on one or more occasions during a two week period.

\*\*Colour removal in wastewater treatment shall be considered as taking place when effluents from the dyehouse meets the following spectral coefficients: (i) 7m<sup>-1</sup> at 436nm, 5m<sup>-1</sup> at 525nm and 3m<sup>-1</sup> at 620nm.

† Derogation conditions aligned with those set out in Decision 2014/350/EU on establishing the EU Ecolabel criteria for textile products.

### **Assessment and verification:**

Applicants shall provide evidence of screening of materials or component parts in the furniture product by means of declarations from suppliers that state that none of the functional substances listed in part a) and that possess any of the hazard statements lists in groups 2 or 3 of Table 3 have been intentionally added to those materials or component parts and that in any case are not present in concentrations above those limits stated in part a).

The applicant shall further declare that during final manufacture and assembly of the furniture product, none of the functional substances listed in part a) and that possess any of the hazard statements lists in groups 2 or 3 of Table 3 have been intentionally added.

Where functional substances that fall under the list of categories defined in part a) are used, the following technical information shall be provided to support declarations of the hazard classification or non-classification for each substance identified as being used:

- (i) The substance's CAS number;
- (ii) Harmonised CLP hazard classifications;
- (iii) Self-classification entries in ECHA's REACH register.

Where a classification is recorded as 'data lacking' or 'inconclusive' according to ECHA's REACH register database, or where the substance has not yet been registered under the REACH system, toxicological data shall be provided that is sufficient to support conclusive self-classifications in accordance with Annex II of the CLP Regulation and ECHA's supporting guidance. In the above mentioned cases self-classifications shall be verified, with the following information sources being accepted:

- (i) A Safety Data Sheet fully completed in accordance with Section 2,3,9,10, 11 and 12 of Annex I of the CLP Regulation;
- (ii) Toxicological studies by ECHA Peer Agencies or other Governmental regulatory bodies;
- (iii) An expert review of scientific literature and existing testing data, where necessary supported by results from new testing using methods approved by ECHA and carried out by independent laboratories;
- (iv) A report prepared by a toxicologist accredited to an independent hazard assessment scheme in accordance with the guidelines in Annexes I and II of ISO 17065. Schemes shall be based on the GHS or CLP hazard classification system;

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<sup>9</sup> See: [http://ec.europa.eu/enterprise/sectors/chemicals/reach/caracal/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/chemicals/reach/caracal/index_en.htm) .

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Information on the hazardous properties of substances may be generated by means other than tests, for instance through the use of alternative methods such as in vitro methods, by quantitative structure activity models or by the use of grouping or read-across in accordance with Annex XI to the REACH Regulation.

Where derogated hazardous substances are present in the product, the applicant shall provide supporting evidence showing how the derogation conditions have been met.

No assessment and verification for this criterion shall be required for any textile based component parts of the furniture product if the applicant can provide a copy of the EU Ecolabel certification with a proof that this was awarded in accordance with Commission Decision 2014/350/EU.

**Rationale:**

For Group 1 hazardous substances - SVHCs

Article 6(6) of EU Ecolabel Regulation 66/2010<sup>10</sup> requires that certain types of substances are not present in products:

*"The EU Ecolabel may not be awarded to goods containing substances or preparations/mixtures meeting the criteria for classification as toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction (CMR), in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures nor to goods containing substances referred to in Article 57 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency".*

Given the potential complexity of applying this criterion to furniture products it is important that the approach proposed is practical to implement and reflects industry best practice. The environmental improvement potential must also be balanced against the relative importance of the other EU Ecolabel criteria and the capacity of industry to respond. Guidance from ECHA emphasizes the need to minimize testing, preferring disclosure by suppliers instead. The notion of avoiding the use of hazardous substances at source should be prioritised.

The basic approach proposed requires manufacturers to screen the Hazard Statements of their production recipes based primarily on Safety Data Sheet information. The Safety Data Sheet addresses substances and mixtures used during production process. However, the requirements should refer to the final product. It was felt therefore that the criterion could be framed in a way that it does not restrict the use of important chemicals that are fundamental to certain processes, and focus on the production stages of main relevance. For this reason the following clause is maintained in the criteria text:

*"If substances or mixtures used in the manufacture of the furniture product, or homogenous parts thereof, contain substances of very high concern, the applicant shall provide satisfactory evidence that the substances undergo chemical modification such that they are no longer*

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<sup>10</sup> OJ L 27, 30.1.2010, p. 1–19

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*bioavailable or undergo chemical modification and that any impurities do not amount to more than 0.10% w/w of the final furniture product or homogenous part thereof."*

Consequently a number of hazardous chemicals used in production processes can potentially be disregarded if it can be demonstrated that they fundamentally alter their properties during the production process.

#### Group 2 and 3 hazardous substances (non-SVHC)

However, the exemption would not strictly apply to many functional substances that remain in the final product and so the scope non-SVHC hazardous substances is limited to specific screening requirements and derogations that are provided so that the applicant (and Competent Bodies) can realistically progress through the hazardous substance criteria.

#### Allowance in A+V for "data-lacking" or unregistered substances

The complete picture of a substance's hazard classification may not be readily available. Based on the discussions with ECHA it has been identified that this may be the case because of a number of factors:

- Substances are progressively being registered under REACH and so a substance may not be registered yet;
- Data gaps may exist in the hazard classifications for a substance and these may only be filled once testing proposals have been evaluated and agreed by ECHA;
- Where a substance has not been registered there may only be self-classifications to use as a reference point. These can be divergent depending on the state/form of the substance and, moreover, depending on the knowledge/expertise of the notifier they may not correspond to the final EU classification;
- Joint submissions and entries in the REACH registration database tend to provide greater confidence in the hazard classification because, as is encouraged by the REACH system, test data is shared by manufacturers;
- Harmonised classifications are only made where Member States or stakeholders make a proposal, as a result harmonisation may only focus on specific hazards associated with a substance.
- Adaptations to Technical Progress (ATPs) have resulted in changes to the classification rules, which may mean that self-classifications are incorrect.
- Data for low tonnage bands may more limited so, for example, there is the potential for gaps for hazards such as CMR which require longer term test data.

Because of these factors it may not therefore be possible to make a clear decision on a substances classification. It was therefore decided that, with input from ECHA, a decision making tool should be developed in order support the process. The resulting decision tree is presented in Figure 1.

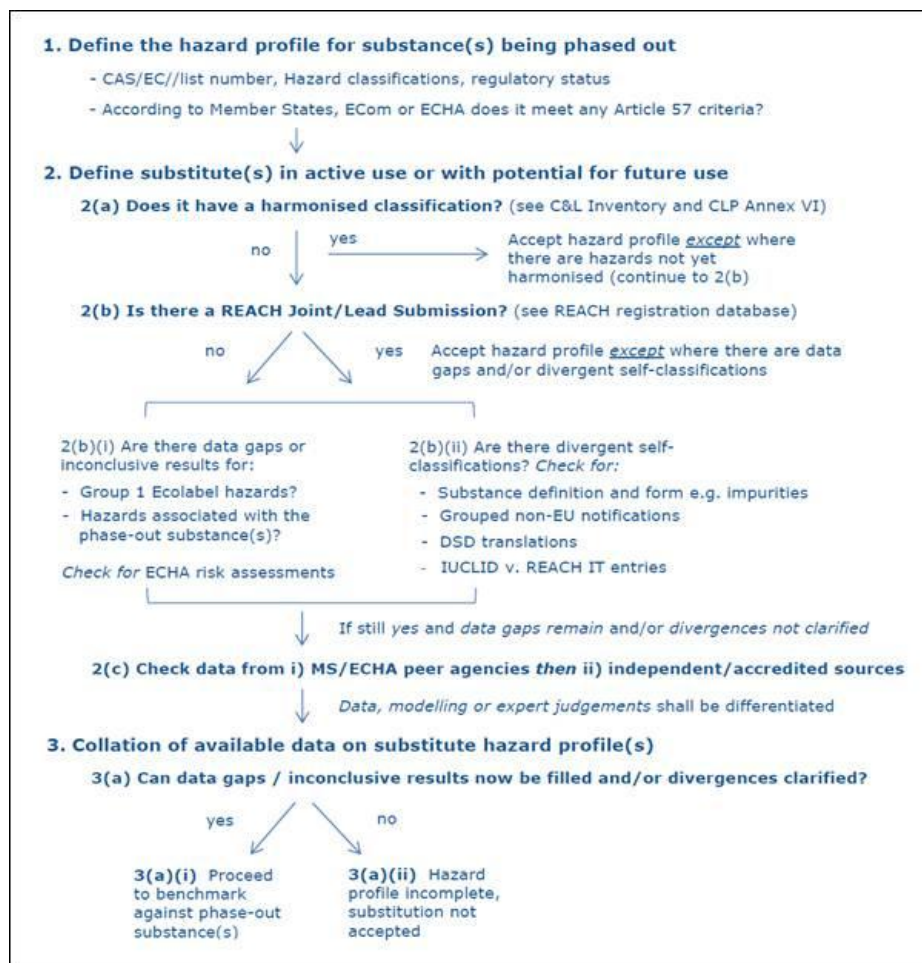


Figure 1. Decision tree used to determine hazard classifications

The applicant should provide information from the product screening against the latest classification, followed by verification of the REACH registered data base. In case of data missing the number of options is given to provide information sufficient to conclude on the classifications. Accordingly, assessment and verification text was adapted. Whilst the option exists to accept the self-classifications made, cross checking a hazard assessment by an ECHA peer agency provides a potential means of filling the classification gaps and also highlights potential discrepancies in the self-classification for certain end-points.

### **Rationale for derogations for certain functional hazardous substances**

#### **Biocides**

A number of derogation conditions appear in Table 4 for biocides or preservatives but it should be noted that all of these either refer to wooden components in outdoor furniture or to the extending the "shelf-life" of substances or raw materials that are used in the finishing or production of furniture components. It was recently requested that the use of biocides should also be permitted in textiles, coated fabrics or leather in outdoor furniture since, as is the case with wood in outdoor furniture, this may be important for prolonging the useful life of the product. In all cases compliance with the Biocidal Products Regulation (EU) No 528/2012 is required for the relevant Product Type and in all cases the concentration of

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active biocidal substance is likely to be well below any 0.1% w/w limit of component parts. Nonetheless, they are included in the criterion since their use should be identified if possible during the hazardous substance screening work carried out by the applicant under criterion 2.2a).

*Flame retardants, Dyestuff, Optical brighteners, Auxiliaries and water repellents*

Derogation for ATO was opposed by some stakeholders but is considered necessary because of the fact that it is already derogated for use in EU Ecolabel textiles under certain conditions. Identical derogation conditions apply for furniture so that no situation could arise in which EU Ecolabel textiles could be found to be unsuitable for use in EU Ecolabel furniture.

The same logic applies for the hazard classifications that are derogated for general flame retardants, dyestuff, optical brighteners, auxiliaries and water / dirt /stain repellents.

It was recently requested that derogation for H411 and H412 stabilisers and varnishes should be granted for coated fabric manufacture since the use of these chemicals cannot be avoided.

*Nickel*

With nickel, the derogation for its use in stainless steel has been justified in many previous EU Ecolabel criteria due to the fact that nickel in stainless steel simply does not behave as pure nickel. Nonetheless, its use in stainless steel was restricted to those components that can be shown to only have low nickel release rates. Studies have shown that the level of 0.5µg/cm<sup>2</sup>/week for nickel release is considered to be sufficient to prevent skin sensitization in the vast majority of subjects in studies who were already known to be sensitive to nickel and this is recognized as the threshold below which stainless steels can have their classification as a skin sensitizer removed under the CLP Regulation. In TR 3.0 it had been proposed to also provide a derogation for nickel plated carbon steels. The rationale for this was provided by industry stakeholders and is based on the fact that corrosion prevention of steel can be achieved by alloying with nickel at high levels around 10% w/w (i.e. stainless steel) or by nickel plating of cheaper carbon steel using quantities of nickel that are much lower (around 1% w/w). Thus much lower quantities of a toxic heavy metal are required in the first place. However, since the nickel plating is likely to show much higher nickel release rates than that of stainless steel, its use would only be permitted in components which can be considered not to come into prolonged skin contact during normal use. A definition of "prolonged skin contact" agreed by CARACAL is provided to aid applicants and competent bodies in this assessment.

However, one of the main reasons for nickel plating is to improve scratch resistance, which is most important in those components that have a higher probability of skin contact, and so it is questionable if this derogation would be practical. For this reason the derogation for nickel has been limited to nickel used in stainless steels along with a condition that nickel release rates are below a certain threshold – in line with similar criteria for other EU Ecolabel product groups.

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## **Criterion 3: Wood and wood-based materials**

*Note: Sub-criteria 3.1, 3.2e) and 3.3 shall only apply when the content of wood or wood-based materials in the final furniture product (excluding packaging) exceeds 5% w/w.*

### **3.1 Sustainable wood**

Solid wood, wood chips and wood fibres may originate from virgin or recycled material.

Virgin material shall be covered by valid sustainable forest management and chain of custody certificates issued by an independent third party certification scheme.

However, where certification schemes allow mixing of uncertified material with certified and/or recycled materials in a product or product line, a minimum of 70% of the wood shall be sustainable certified virgin material and/or recycled material.

Uncertified material shall be covered by a verification system which ensures that it is legally sourced and meets any other requirements of the certification scheme with respect to uncertified material.

The certification bodies issuing forest and/or chain of custody certificates shall be accredited/recognised by that certification scheme.

#### **Assessment and verification:**

The applicant shall provide valid, independently certified chain of custody certificates and demonstrate that the at least 70% of the wood material originates from forests managed according to Sustainable Forestry Management principles and/or from recycled sources that meet the requirements set out by the relevant independent chain of custody scheme. FSC, PEFC or equivalent schemes shall be accepted as independent third party certification.

If the product or product line includes uncertified material, proof should be provided that the content of uncertified material does not exceed 30 % and is covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material.

#### **Rationale**

The requirement to prove the legal origin of the wood in a separate sub-criterion has been removed because is already explicitly mentioned in the sustainable wood criterion. The main reason for including a separate criterion for legal wood in the first place was the fact that a number of loopholes exist in the EU Timber Regulation (No. 995/2010) for certain furniture items and components. However, it can be considered that these loopholes are well covered by the sustainable wood criterion. Both the FSC and PEFC schemes have recently adapted their own criteria to align closely with the EU Timber Regulation and require that all certified wood is legally sourced. Due to several concerns expressed about the length and complexity of the EU Ecolabel criteria for furniture, the removal of a sub-criterion on legal wood is one clear opportunity to simplify the requirements.

The wording of the criterion for sustainable wood is largely based on a text previously agreed upon by the EUEB and used in Decision 2014/256/EU for EU Ecolabel converted paper products, but with the limits set from the opposite perspective. Instead of setting maximum

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limits for "unsustainable" wood, minimum limits are instead given for "sustainable" wood content. A cut-off limit of 5% w/w, below which this criterion would not apply, has been proposed. The aim of this approach is to avoid disproportionate assessment and verification efforts for wood sourcing in furniture where wood is only of minor importance. In all cases, the EU Timber Regulation should assure that almost all wood in furniture products available on the EU market are from legal sources anyway.

Some opposition to the wording of this proposal was expressed, saying that the criterion was too vague to lay readers who are not familiar with the principles of the FSC and PEFC certification schemes and instead should refer directly to some common sustainable management principles in the criterion text and then only to FSC or PEFC in the assessment and verification text. Further doubts were expressed about the relevance of the term "FSC, PEFC or equivalent" when even FSC and PEFC do not recognise each other as equivalent.

An example of a definition of sustainable forest management at the European level, provided by Forest Europe, is as follows:

*"the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national and global levels and that does not cause damage to other ecosystems."*

However, sustainable forest management principles are quite broad and difficult to legally verify. The major advantage of the FSC and PEFC schemes is that they describe not only principles but also systems that audit and verify the forests as well as traders in the timber supply chain and link this to clear labelling of the final product. These two schemes are the dominant certification schemes for sustainable forest management and covered approximately 10% of global forests in 2014. When a Competent Body is attempting to verify the claims that the wood or wood-based material in an EU Ecolabel product is indeed of sustainable origin then the verification process is greatly simplified by the fact that final and intermediate products can be FSC or PEFC labelled. If the certificate number on the label is from an approved trader or producer (this can be checked on a publically available database online) then compliance with the EU Ecolabel criteria is essentially confirmed and a starting point for any further enquiries is clearly defined.

Any attempt to list the sustainable forest management principles that are common to FSC and PEFC would be complicated. This is due to the fact that each scheme has around 10 such principles and around 70 related sub-criteria (see Appendix I). Furthermore, because FSC and PEFC are private, stakeholder driven schemes, there is the possibility that their principles may change at any time and fall out of alignment with any concrete text drafted into EU Ecolabel criteria. The proposed text was generally accepted because it allows for changes in FSC or PEFC criteria to be taken into account without potentially rendering EU Ecolabel criteria obsolete.

Recycled wood is also explicitly mentioned in the criteria since it can be considered as at least equal to sustainably sourced virgin wood in terms of its environmental footprint. Both the FSC and PEFC schemes make allowances for recycled wood content.

The minimum requirement of 70% sustainable wood (or recycled wood) is not raised higher because this limit aligns well with the current labelling systems in place for both FSC and PEFC schemes, in particular "FSC mix" and "PEFC certified". A total of 5 labels currently exist between the schemes (see Figure 2).

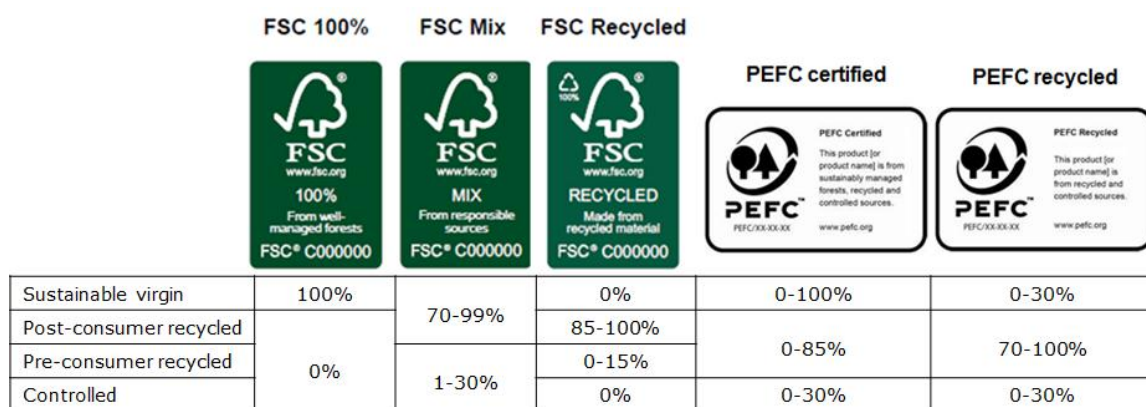


Figure 2. Illustration of the 5 current labels from FSC and PEFC.

Basically for all labels, wood is either virgin material sourced from sustainably managed forests, recycled material or controlled material. All labels have a common denominator in that at least 70% of all wood must be either sustainable certified virgin material or recycled material. The FSC recycled and FSC 100% labels go beyond this requirement.

Controlled wood can be considered as the weak point of the FSC and PEFC schemes but because even this type of wood must be legally sourced, it is considered that the requirement for sustainable wood, renders a separate requirement for legality of wood obsolete.

According to an evaluation by NEPCON<sup>11</sup>, the requirements for FSC and PEFC can be considered as equivalent for the following aspects:

- Controlled wood should be legally harvested
- Controlled wood should not come from forests being converted into plantations or other non-forest use.
- Wood shall not be from genetically modified organisms.

Both schemes also have further conditions for controlled wood that are related to threats to high conservation value forests and indigenous people although the NEPCON comparison study considered these as non-equivalent, with FSC requirements being more extensive.

Although it is unusual to refer directly to private schemes in EU Ecolabel criteria, almost all wood from sustainably managed forests that is available on the market currently falls under FSC or PEFC certification. The use of the term "or equivalent" is necessary when referring to FSC or PEFC since these are indeed private schemes and the EU Ecolabel criteria should not explicitly exclude other potential schemes that may arise in the future.

Some questioned whether the availability of certified wood was sufficient to satisfy demand. This could be a valid point in some EU Member States. For example, from FSC's own data, in

<sup>11</sup> NEPCON, 2012, "Comparative analysis of the PEFC system with the FSC Controlled Wood requirements"



some Member States well over 50% of all forests are FSC certified whereas in others less than 10% are certified.

Regarding the type of wood certified, in Europe the availability of softwood from certified forestry is generally high, whereas the availability of hardwood is significantly lower. However, processing techniques exist, such as treatment with alcohol in a pressurized vat and drying at 110 °C, which can improve the properties of softwood and make them suitable for applications traditionally reserved for hardwood.

### 3.2 Restricted substances

In addition to the general conditions on hazardous substances set out in criterion 2, the following conditions shall specifically apply to any furniture components made of wood or wood-based materials:

#### a) Contaminants in recycled wood

Any recycled wood fibres used in the manufacture of wood based panels included in the final furniture product must have been tested in accordance with the EPF standard for delivery conditions of recycled wood<sup>12</sup> and comply with the limits for contaminants as listed in Table 5 below.

Table 5. Restricted substances in recycled wood

Chemical contaminant	Limit value (mg/kg recycled wood)
Arsenic (As)	25
Cadmium (Cd)	50
Chromium (Cr)	25
Copper (Cu)	40
Lead (Pb)	90
Mercury (Hg)	25
Fluorine (F)	100
Chlorine (Cl)	1000
Pentachlorophenol (PCP)	5
Creosote (Benzo(a)pyrene)	0.5

#### Assessment and verification:

The applicant shall provide either:

- a declaration from the wood-based panel manufacturer that no recycled wood fibres were used in the panel, or
- a declaration that all recycled wood fibres used have been tested in accordance with the 2002 "EPF Standard conditions for the delivery of recycled wood", supported by appropriate test reports that demonstrate compliance of the recycled wood samples with the limits specified in Table 5.

<sup>12</sup> "EPF Standard for delivery conditions of recycled wood", October 2002. Can be viewed online at: <http://www.europanel.org/upload/EPF-Standard-for-recycled-wood-use.pdf>

## Rationale

During the uncertain history of post-consumer wood, possible treatment with any of a number of hazardous preservatives and fungicides may have occurred. Even after careful pre-treatment, traces of these substances may still remain in the recycled wood fibres and it is necessary to test these materials prior to their re-use in any new products, particularly EU Ecolabel ones.

The EPF has developed a standard for delivery conditions of recycled wood that defines limit values for certain elements and substances that are at particular risk of being present in recycled wood due to treatment with fungicides, paints and varnishes. The initial limits appear to have been aligned with specifications for modelling clay in the Toys Directive (EN 71-3:1994) but now this Directive has been revised (2013) and splits limit values into three categories: i) dry, brittle, powder-like or pliable materials, ii) liquid or sticky materials and iii) scraped off materials. As per Table 31 in the Preliminary report, a comparison of the EPF and the new Toys Directive reveals some discrepancies in values. However, the direct relevance between the two sets of standards can be questioned since a) most toys are not wooden and b) wooden toys are highly unlikely to use post-consumer recycled wood fibres from 3<sup>rd</sup> party sources.

### Outcomes of stakeholder meetings

Although some stakeholders questioned the need to refer to an already widely accepted standard practice in Europe as an EU Ecolabel criterion, to ensure product safety, it is worth specifying these limits again for the benefit of any non-EU suppliers of recycled wood fibres or panels containing recycled wood.

One stakeholder suggested that stricter limits in place in Germany should be used rather than those defined by the EPF. However, care must be taken that these stricter limits would not essentially exclude large quantities of available recycled wood from being reused. Consequently, it is not proposed to require any stricter limits for contaminants in recycled wood for the time being until this information can be obtained.

## b) Polyvinyl chloride foils

If PVC foils are used in the coating of wood-based panels, compliance with the vinyl chloride monomer (VCM) emission limits set out in Table 6 shall be demonstrated via independent third party auditing.

Table 6. VCM emission limits for PVC production

	<b>Suspension process (S-PVC)</b>	<b>Emulsion process (E-PVC)</b>	<b>Combined process (E+S PVC)*</b>
Total VCM emissions	< 100g / ton S-PVC		
Total VCM air emissions		< 1000g / ton E-PVC	
VCM concentration in aqueous effluents	< 1g / m <sup>3</sup> effluent	< 1g / m <sup>3</sup> effluent and < 10g / ton E-PVC	< 1g / m <sup>3</sup> effluent and < 5g / ton E+S-PVC
VCM concentration in final regular product	< 1g / ton S-PVC	< 1g / ton E-PVC	

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\* The combined process applies to where aqueous effluents from separate emulsion and suspension processes are combined prior to any treatment and final discharge.

**Assessment and verification:**

The following declarations shall be provided to the Competent Body:

- A declaration from the applicant stating that PVC foils have not been used in wood-based panels in the furniture product;

or

- A declaration from the applicant stating that PVC foils have been used in wood-based panels, together with a declaration from the PVC producer stating that the PVC was produced in accordance with the VCM emission limits set out in Table 6. The declaration of the PVC producer shall:

- Specify whether PVC was produced using the Emulsion Process or the Suspension Process and if aqueous effluent is treated for single or combined plants.
- Include third party verified evidence of compliance with the relevant VCM emission limits specified in Table 6.
- Include third party verified evidence of compliance with the limit for residual VCM in the final PVC material via independent laboratory test reports of representative samples following the EN ISO 6401 standard or equivalent methodology.

**Rationale:**

Although PVC is effectively a non-hazardous material, environmental hazards are mainly associated with its production. Historically, PVC manufacture has been linked to cases of angiosarcoma<sup>13</sup> (a rare form of liver cancer) amongst workers that were most exposed to Vinyl Chloride Monomer (VCM, CAS No. 75-01-4). Consequently VCM has been classified as a Category 1A carcinogen (known human carcinogen) and is a major issue in PVC manufacture because VCM is the major feedstock used to manufacture PVC. Modern plants following best available techniques make serious efforts to minimize the emission of VCM from reaction chambers in order to reduce exposure to workers and the wider environment.

The criterion proposed aligns closely with the current best practice from PVC producers in Europe and the VCM emission limits are taken from the Charter published by the European Council of Vinyl Manufacturers (ECVM)<sup>14</sup>. The limits are also linked to the type of production process used, because of technical differences that affect the degree of VCM emission reduction that is practically achievable. It is important not simply to specify VCM concentration limits in emissions but rather total emissions based on production volume because concentration limits can easily be manipulated by dilution of effluents.

**c) Plasticisers in plastic foils**

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<sup>13</sup> IARC Monographs Volume 97, p.311-443

<sup>14</sup> See: <http://www.pvcinfo.be/bestanden/S-PVC%20charter.pdf> and <http://www.pvcinfo.be/bestanden/E-PVC%20charter.pdf>

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Any plastic foils on wood-based panels shall not have been produced using any phthalate plasticisers that are REACH classified with any of the hazards listed in Article 57 of the REACH Regulation (EU) No 1907/2006.

**Assessment and verification:**

The following declarations shall be provided to the Competent Body:

- A declaration from the manufacturer of the wood-based panel stating that plastic foils were not used.

or

- A declaration from the manufacturer of the wood-based panel stating that plastic foils were used and that none of the phthalates plasticisers classified with group 1 or 2 hazards as listed in Table 3 have been used in the plastic foil.

In the absence of a suitable declaration and where plastic foils are used, the foil materials can be tested for phthalates according to the ISO 14389 or ISO 8214-6 standards. In either case, non-use of the phthalates shall be considered as the total sum of the listed phthalates amounting to less than 0.10 % of the plastic foil weight (1000 mg/kg).

**Rationale:**

Normally this criterion would be considered as already covered by the horizontal approach for functional hazardous substances set out in criterion 2.2a). However, because the PVC foil, when used, represents a small fraction of the total coated panel weight, it is possible that a supplier of wood-based panels could argue that their PVC foil coated product complies with the 0.1% w/w threshold for non-declaration of SVHCs (i.e. restricted phthalates).

This coupled with the fact that PVC foils on wood-based panels are likely to come into prolonged skin contact would be the main reasons for having such a sub-criterion here.

However, there is no need to take this approach for pure PVC components or PVC-based coated fabrics because phthalates would be used in quantities well above 0.10% w/w of any homogenous component or article.

**d) Heavy metals in paints and varnishes**

Paints or varnishes used on wood or wood-based materials shall not contain additives based on cadmium, lead, chromium VI, mercury, arsenic or selenium, at concentrations exceeding 0.010% w/w for each individual metal in the in-can paint or varnish formulation.

**Assessment and verification:**

The applicant shall declare that the paint or varnish formulations do not contain the aforementioned heavy metals in concentrations > 0.010% w/w and provide the respective SDS from the suppliers of the coating substances used.

**Rationale**

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The previous version of this criterion essentially reflected the restrictions in place for heavy metals in Decision 2014/312/EU on EU Ecolabel criteria for paints and varnishes. The level of 0,010% refers to the paint product itself and is often used as an arbitrary cut off limit for unintentionally included impurities in EU Ecolabel mixtures.

A number of stakeholders expressed concerns about the complexity of the previous general hazardous substance criterion, in particular the number of derogations. Some of these derogations were related to barium, antimony and cobalt additives in paints and varnishes. These additives are now simply permitted based on the idea that they do not need to be derogated since derogations for general hazardous substances criteria for furniture should apply to the % content in the final furniture product or % content of homogenous components thereof and not to the % content in substances applied to components of the furniture. When considered as a % of the furniture product (or homogenous components thereof) these additives will be far below the 0.1% w/w arbitrary cut-off limit that has been widely used for EU Ecolabel articles.

However, the criterion remains here, going beyond the requirements of criterion 2, in order to expressly prohibit the use of paints or varnishes that include the remaining heavy metals (i.e. cadmium, lead, chromium VI, mercury, arsenic and selenium) because:

- Many of the additive compounds based on these heavy metals are REACH restricted,
- Even if additive compounds based on these metals are non-hazardous, or change their properties during processing to become non-hazardous, the presence of these metals would complicate recycling of the wooden materials at end-of-life if the EPF standard for delivery conditions of recycled wood is considered (see criterion 3.3a),
- If materials containing these metals are incinerated, regardless of the hazard profile of the original additive, the metals may be transformed into more toxic and/or bioavailable forms and either remain in fly ash, bottom ash, air pollution control residues or be released directly to the atmosphere.

#### **e) VOC content in paints and varnishes**

If coated wood or wood-based materials account for more than 5% w/w of the final furniture product (excluding packaging), any paints or varnishes used shall have a total VOC content (in-can concentration)  $\leq 5\%$ .

If higher VOC content coatings are used, it shall be demonstrated that either:

- The total quantity of VOCs applied is less than 30g/m<sup>2</sup> of the coated surface area, or
- The final coated panel component, or entire assembled furniture product complies with the VOC emission limits as specified in criterion 9.3.

#### **Assessment and verification:**

The applicant shall provide the SDS of any coating substances used on wood-based materials and state the proportion of the total furniture product that consists of coated wood-based materials as % w/w.

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If the furniture product consists of at least 5% w/w of coated wood-based materials and the VOC content of the coating substance exceeds 5%, then the applicant shall either:

- Provide calculations demonstrating that the effective quantity of VOCs applied to the coated surface area of the final assembled furniture product is < 30g/m<sup>2</sup>, in accordance with the guidance provided in Appendix II.
- Provide a test report demonstrating compliance with criterion 9.3 for the coated wood-based materials or for the entire assembled product.

### **Rationale**

To avoid overly burdensome assessment and verification requirements, a cut-off limit of 5% w/w, below which this sub-criterion would not apply, has been proposed. This follows the same approach as the Nordic Ecolabel and it can be reasonably assumed that if coated components account for less than 5% of the total product mass, then their contribution to potential VOC emissions is limited.

VOCs include a wide variety of compounds, including aldehydes, ketones and other light hydrocarbons that have been linked to human health problems in numerous studies. The coating of furniture materials normally takes place in semi-automated facilities where occupational health and safety concerns for workers and the environment are covered by EU legislation. However, many furniture products are assembled by small to medium enterprises that may not have such tight controls on VOC exposure to workers. The use of organic solvent-based coating materials involve very high VOC contents and a series of hazardous chemicals such as toluene, phenol, formaldehyde, xylene, ethylbenzene, methyl methacrylate, butyl methacrylate, heptane and ethyl acetate. These are generally volatile, flammable and harmful to humans by inhalation and skin contact.

Furthermore, VOC emissions from the coated furniture product continue after it leaves the factory. VOCs are considered as an important factor in the indoor air quality and have been linked to the phenomenon of "sick building syndrome".

Although VOC testing is of interest, it is recognized that such tests are expensive and time-consuming and may be biased against smaller businesses. If coated panels are supplied to furniture manufacturers, who add no further coatings themselves, data from the coated panel supplier may be used. A flexible approach is allowed where the use of low VOC coatings and materials is sufficient to avoid the need for VOC chamber emission testing. However, this shall become clearer when reading the criteria 9.3 which applies to the final product.

A flexible approach is provided to give the manufacturer the option to simply use low VOC coatings or, where surface quality is an important issue, higher VOC content coatings can be used so long as the total VOC applied or emitted is restricted.

The first way is the most simple and is associated with the use of coatings with low (<5%) VOC content. This was strongly supported by some industrial representatives during the consultation process. For low VOC content coatings (<5%) it is only necessary to demonstrate that the SDS of the coating shows that the VOC concentration is <5%. A significant number of coating substances and techniques that are widely regarded to be environmentally friendly

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are included in the <5% VOC content category such as powder coatings and many UV cured coatings. Once cured, these coatings have virtually zero VOC emissions.

However, it is appreciated that in some cases the use of higher VOC concentration coatings may be desirable for durability, aesthetic or other practical reasons with certain components. The sequential criterion does allow for the use of higher VOC concentration coatings (no upper limit for VOC concentration of the coating substance is set) so long as the total quantity of VOC applied or emitted is restricted. This restriction can be applied in one of two ways the preferred method may depend on how the coating is applied.

- i. The first option for restriction is to show that less than 30g VOCs are applied per m<sup>2</sup> of coated surface area. This option is well suited for mass production lines where identical pieces are coated using automated coating techniques and the consumption and is an approach that can be assessed and verified by the manufacturer at little additional cost or effort. Due to the potential for cost optimization, it is likely that monitoring of coating substance consumption is undertaken.
- ii. The second option for restriction applies where either a higher quantity of VOCs are applied (>30g/m<sup>2</sup>) or where the manufacturer does not attempt or is not able to calculate the quantity of VOCs applied to the coated surface. In this case, it is necessary that the coated product or component complies with the VOC emission limits set out in criterion 9.3. This approach is particularly well suited for processes where VOC emissions are greatly reduced due to the drying and curing process used after application of the coating. Although VOC emission testing of the final coated component/product may represent a significant extra cost and effort on behalf of the manufacturer, it is the most realistic assessment of potential exposure of users to VOC emissions from new products.

The overall effect of this criterion should be to shift producers towards using low VOC concentration coatings (<5%) in EU Ecolabel products, but without expressly excluding the use of higher VOC content coatings in certain cases so long as other restrictions are respected.

The reason for changing the VOC quantity threshold from 35g/m<sup>2</sup> to 30g/m<sup>2</sup> is to align with one of the requirements set out in the equivalent Nordic Ecolabel criteria for furniture and fitments (Version 4.9).

### 3.3 Formaldehyde emissions

All wood-based panels used in the final furniture product using formaldehyde-based resins or finishing agents shall either:

- Have formaldehyde emissions that are lower than 50% of the threshold value allowing them to be classified as E1<sup>15</sup>. In the case of MDF (Medium Density Fibreboard) panels, formaldehyde emissions shall be lower than 65% of the E1 threshold limit.

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<sup>15</sup> E1 is a threshold emission limit originally introduced in 1985 in the EU due to concerns over adverse health effects due to formaldehyde exposure. The emission limits are defined in Annex B of EN 13986 and correspond to steady state background levels of 0.1ppm formaldehyde after 28d in a chamber test according to EN 717-1.

- Have formaldehyde emissions that are lower than the limits set out in the CARB Phase II or the Japanese F-3 star or F-4 star standards.

**Assessment and verification:**

The assessment and verification of low formaldehyde emission panels shall vary depending on the certification scheme it falls under. The different requirements are included in Table 7.

Table 7. Assessment and verification of low formaldehyde emission panels

Certification scheme	Assessment and verification
50% or 65% E1 (EU)	A declaration from the wood-based panel supplier, stating that the panel is compliant with 50% of E1 emission limits or, in the case of MDF panels, with 65% of E1 emission limits, supported by test reports carried out according to either EN 717-1, EN 717-2 or EN 120
CARB Phase II (US)	a declaration from the wood-based panel supplier, supported by third party verified test results according to ASTM E1333 or ASTM D6007, demonstrating panel compliance with the formaldehyde Phase II emission limits defined in the California Composite Wood Products Regulation 93120 <sup>16</sup> . Optionally, the wood-based panel may be labelled in accordance with Section 93120.3(e), containing details in respect of the manufacturer's name, the product lot number or batch produced, and the CARB assigned number for the third party certifier (this part is not required if the products were made using no-added formaldehyde or certain ultra-low emitting formaldehyde-based resins).
F-3 or 4 star (Japan)	the applicant shall provide a declaration from the panel supplier of compliance with the formaldehyde emission limits as per JIS A 5905 (for fibreboard) or JIS A 5908:2003 (for particleboard and plywood), supported by third party verified test data according to the JIS A 1460 desicator method.

In all cases, the furniture manufacturer should also declare that no further formaldehyde-based surface treatment was applied to supplied panels and that the panels were not modified in any other way that would compromise compliance with the formaldehyde emission limits set out in the European, American or Japanese schemes.

**Rationale:**

Wood-based panels represent more economical alternatives to solid wood and have become widely established in many furniture products. These materials have a positive environmental impact in the sense that they reduce the demand for solid wood and represent higher quality end-uses for wood chips and wood fibres that are often co-products of logging and sawmilling operations which would typically be burned for heat recovery.

A crucial component in the wood-based panel industry has been the development and optimization of thermosetting resins to bind the wood chips or fibres together to produce solid boards with useful technical properties. Almost all the resins used are formaldehyde based; urea-formaldehyde (UF), melamine-urea-formaldehyde (MUF), melamine-formaldehyde (MF) and phenol-formaldehyde (PF). The only significant non-formaldehyde-based resin used is methylene diisocyanate (MDI).

The specific manufacturing processes used for each type of wood-based panel are tailored according to the behavior of the resin and it is not straightforward to simply change from one

<sup>16</sup> Regulation 93120 "Airborne toxic control measure to reduce formaldehyde emissions from composite wood products" California Code of Regulations.



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type of resin to another. Given that the most important environmental impact associated with these resins is formaldehyde emissions from the final product, their use is permitted in EU Ecolabel furniture so long as the final emission criteria are complied with.

Formaldehyde is currently classified as a Category 2 carcinogen (H351 - suspected of causing cancer) and is due to be reclassified as a Category 1B carcinogen (H350 - may cause cancer) in 2015<sup>17</sup>. However, the use of formaldehyde-based resin formulations remains the most common method of produced wood-based panels.

The European industry (via the European Panel Federation-EPF) has helped develop the E1 standard for formaldehyde emissions. A framework for testing of wood-based panels is given in EN 13986 (Annex B) where quicker methods (EN 120 or EN 717-2) can be used in conjunction with a standard 28 day chamber test (EN 717-1). Each of these methods provides test results with different numerical values but which can be translated into the E1 standard value. Industry stakeholders stated on several occasions that they considered the E1 requirements to be sufficiently ambitious.

In TR 2.0, due to concerns by industry about the market availability and technical performance of 50% E1 panels, it was proposed to simply require that panels comply with the E1 formaldehyde emission requirement.

However, the ambition level of this criterion was criticised by a number of stakeholders and further research into the subject requested. It is a fact that the E1 limits were initially introduced almost 30 years ago and proposals to shift to a more stringent "E1-plus" standard, that would set limits at around 65% of the current E1 limit, have yet to be agreed upon or even discussed in detail at the EU level. Today many ecolabel initiatives such as the Nordic Ecolabel, Blue Angel and French NF 217, require emissions that are 50% of the E1 limit. The most prominent non-EU initiatives to go beyond E1 requirements are the California Air Resources Board (CARB) and the Japanese F-star rating system (for 3-star and 4-star rated panels). To simply stick with E1 requirements was criticised as unambitious by several stakeholders since this is already a mandatory requirement in 6 MSs (Italy, Germany, Sweden, Austria, Denmark and the Czech Republic).

A direct comparison of formaldehyde emission limits between the CARB, JIS F-star and E1 systems is difficult to make due to the fact that they each use different testing methods. However, research published in the literature where the same products are tested by different methods and the numerical values correlated can allow for an approximate comparison as illustrated in Figure 3.<sup>18,19</sup>

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<sup>17</sup> See the following link for specific changes to formaldehyde classification (entry 605-001-00-5): [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ-JOL\\_2014\\_167\\_R\\_0004&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ-JOL_2014_167_R_0004&from=EN)

To be included in part 3 of Annex VI of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures.

<sup>18</sup> Groah et al., 1991. Comparative response of reconstituted wood products to European and North American test methods for determining formaldehyde emissions. *Envi. Sci. Technol.*, Vol. 25, p.117-122.

<sup>19</sup> Risholm-Sundman et al., 2007. Formaldehyde emission – Comparison of different standard methods. *Atmospheric Environment*, Vol. 41, p.3193-3202.

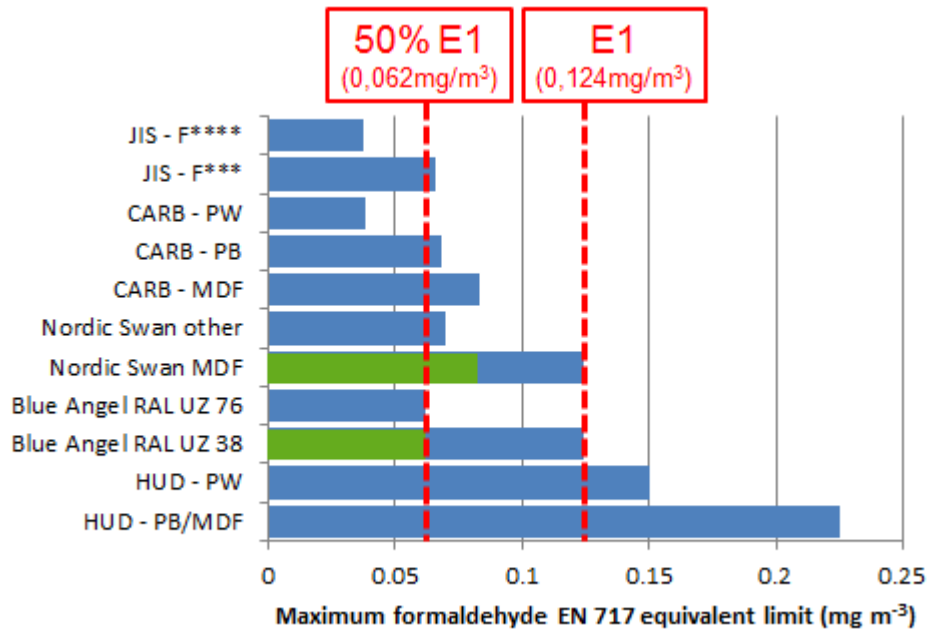


Figure 3. Comparison of formaldehyde emission ambition levels in different schemes for wood-based panels. PW = Plywood; MDF = Medium density fibreboard; PB = Particleboard

The HUD limits are the mandatory maximum formaldehyde emission limits stated in the Housing and Urban Development – Manufactured Home Construction and Safety Standard in place across the US. These are considerably less ambitious (about 80% higher) than E1 although the HUD requirement for plywood (PW) is much closer to the E1 requirement (about 20% higher).

The Blue Angel RAL UZ 38 criteria (Jan. 2013) for low emission wood based furniture and slatted frames permit the use of unfaced E1 panels so long as the final product formaldehyde emissions do not exceed 50% of E1 requirements. This is why two bars (one green and one blue) are plotted. However, with RAL UZ 76 criteria (Apr. 2011) for low emission composite wood panels it is simply stated that panels shall comply with the emission requirements of 50% of E1. It is uncertain if this also extends to unfaced panels or not. The Nordic Ecolabel criteria for furniture and fitments (Version 4.9), reveals an interesting discrepancy between medium density fibreboard panels (MDF) and other wood-based panels. Basically, the emission limit is for 50% of E1 except with MDF panels where, if the EN 120 test method is used, the emission limit is raised to around 62-63% of E1 – this is very similar to the proposed approach for EU Ecolabel criteria. However, the Nordic Ecolabel then states that if the MDF is tested according to EN 717-1, the maximum allowed emission is raised further up to E1 (i.e. 100% of E1). This is the reason for two bars (one green and one blue) being used. Feedback from stakeholders revealed that the distinction between MDF and other wood based panels is based on the practical experiences of a major Swedish furniture manufacturer which attempted to meet 50% of E1 for all wood-based panel products but found that this simply wasn't practical with certain MDF panels. The exact reason for this may be a combination of the fact that MDF is traditionally made using urea formaldehyde (the highest residual formaldehyde emitting resin type) and the fact that MDF panels can be of varying thicknesses. The thicker panels may struggle to meet the EN 717-1 limits because

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this test requires that only a fraction of the panel edges be sealed. This could lead to emissions from edges in thicker panels dominating the final result.

The CARB limits also distinguish between MDF and other panel types but go one step further by also distinguishing plywood from other panels. The CARB Phase II levels are very similar to the Nordic Ecolabel level of 62-63% E1 for MDF and are very close to 50% of E1 for particleboards. With plywood, a stricter limit of around 30% E1 is stated and this can be linked to the fact that plywood manufacture traditionally uses phenol formaldehyde, which has very low residual formaldehyde emissions due to the stability of the thermoset resin when it comes into contact with atmospheric humidity.

Finally, the Japanese requirements show that F-3 star levels are roughly equivalent to 50% E1 and the F-4 star level to around 30% E1. The F-4 star level is often considered as the most stringent level for wood based panels constructed with formaldehyde based resins.

In light of the above points, it is considered that the requirement for 50% of E1 is feasible and not overly ambitious but that some flexibility is required with MDF panels and for this reason they are permitted to reach up to 65% of the E1 emission threshold. Other non-EU initiatives are also permitted (i.e. CARB Phase II and Japanese F-3 and 4 star) since these have been demonstrated to be equivalent or better than the 50% / 65% E1 emission limit requirements.

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## Criterion 4: Plastics

The requirements set out in the present criterion only apply to components that are made entirely of plastic and not to foils, thermosetting resins or materials used in upholstery, which are covered by criteria 3.2b) and c), 3.3, 6.2, 6.3, 7.1, and 7.2.

### 4.1 Marking of plastic components

All plastic parts with a weight >100g shall be visibly marked according to ISO 1043-1.

Additionally, plastic parts with a weight >100g shall be visibly marked according to ISO 1043 parts 2, 3 and 4 if they meet the following conditions:

- consist of at least 10% w/w of fillers or other additives

and/or

- are based on halogenated polymers.

#### **Assessment and verification:**

The applicant shall provide a declaration listing all the plastic components >100g in weight in the final furniture product and stating whether or not any of these components meet the requisites for labelling only according to ISO 1043-1 or also according to parts 2, 3 and 4. The declaration shall be supported by SDS or other information provided by the plastic component supplier(s).

In cases of doubt regarding the nature of the plastic for components >100g in weight and when suppliers do not provide information, laboratory test data using Infra-red or Raman spectroscopy or any other suitable analytical techniques to identify the nature of the plastic polymer and the quantity of fillers or other additives may be provided as evidence supporting the need or lack of need for marking according to parts 2, 3 and 4 of ISO 1043.

The marking of any plastic components shall be clearly visible upon visual examination of the plastic component.

#### **Rationale:**

In the TR 2.0 and at the 2<sup>nd</sup> AHWG meeting, it was proposed to require that all plastic parts ≥50 g be marked as per the ISO 11469 system. The same criteria are used in the Nordic Ecolabel criteria for furniture and fitments (Version 4.9) and are supported in the FEMB draft sustainability requirements for office furniture. The French NF 217 Ecolabel criteria for furniture go further and propose to require marking even for components that weigh less than 50 g if their total weight adds up to more than 100 g in the final product unit.

While the marking of plastics can indeed facilitate potential recycling at end of product life, feedback from the European plastic recycling industry has revealed that plastics are typically shredded and sorted according to infra-red sorting or separation according to their density floatation/sedimentation techniques. Neither of these sorting methods makes any use of plastic marking. Nonetheless, marking of plastic components may represent useful information for manual pre-sorting. However, manual pre-sorting typically only focuses on

large components, for this reason a higher labelling limit of 100g was chosen. This is particularly relevant to furniture, where products and components can be large.

The requirement for ISO 1043 marking is included instead of ISO 11469. The main reason for this is that ISO 11469 is very limited in its scope and is only practical for pure polymers and even then only for the 6 main polymer types: 1-PET, 2-HDPE, 3-PVC, 4-LDPE, 5-PP and 6-PS. Any other pure polymer or co-polymer is simply labelled as 7-Other. ISO 1043-1 provides an extensive coding system for almost all commercially used polymers and co-polymers. This would provide much more useful information for manual pre-sorting and also to consumers/end-users.

Plastic recyclers commented that the automated separation methods are not well suited for plastics that contain significant quantities of fillers. The presence of fillers, in quantities above 10% w/w of the compounded plastic, affect the density of the plastic and may lead to cross-contamination of different polymer streams. The densities of the most commonly produced plastics are summarised in the Table below:

Table 8. Typical densities for common polymers<sup>20</sup>

Polymer	Density (g/cm <sup>3</sup> )
HDPE	0.94 – 0.97
LDPE	0.91 – 0.93
PP	0.93 – 0.94
PS	1.04 – 1.10
PVC	1.39 – 1.40
PET	1.33 – 1.39
PMMA	1.19 – 1.20
Nylon-6,6	1.20 – 1.30

The table above shows that there are small differences between the densities of pure polymers such as PE and PP or PET and PVC. Although PE and PP are generally compatible since the both belong to the polyolefin family, PET and PVC are completely different polymer types and cross-contamination, especially of PVC in PET streams, can create technical problems during later processing and greatly reduce the value of the recycle batch.

Labelling of plastic pieces in such a manner that plastics with high (i.e. >10%) filler contents can be manually identified and separated during pre-sorting would be useful according to feedback from plastic recyclers. The ISO 11469 standard makes no provision for indicating the filler content, but ISO 1043 (part 2) standard provides a series of symbols to identify the types of filler used and most importantly, requires that a number be attached to any filler that indicates its % weight of the final compounded plastic. Parts 3 and 4 of ISO 1043 provide standard symbols for the identification of plasticisers and flame retardants used in compounded plastics and may also represent useful information for plastic recyclers during manual pre-sorting.

Marking according to ISO 1043 can potentially include significantly more information than marking of the same plastic according to ISO 11469. An extreme example for polypropylene plastic is shown below in Figure 4.

<sup>20</sup> From J. Aguado and D. Serrano, 1999, "Feedstock recycling of plastic wastes." published by the Royal Society of Chemistry, ISBN 0-85404-531-7

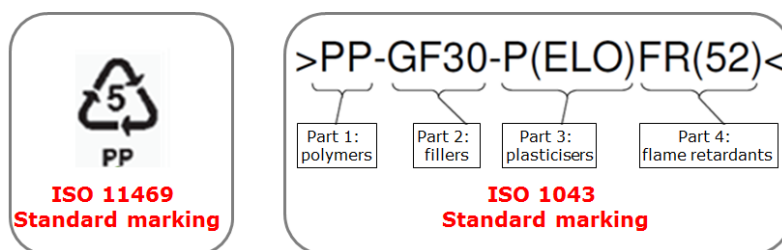


Figure 4. Comparison of the marking that would be required for a polypropylene plastic with 30% glass fibre filler content, epoxidised linseed oil plasticiser and red phosphorus flame retardant according to the ISO 11469 standard (left) and the ISO 1043 standard (right).

Although the example in Figure 4 is an extreme case, it is clear that marking according to ISO 1043 may require more space than that of ISO 11469. For this reason, the threshold weight above which plastics must be marked has been raised from 50g to 100g.

The requirement for labelling of halogenated plastic components is predominantly a reference to PVC. PVC is a unique plastic in the sense that it contains a very high proportion of chlorine (around 57% w/w in pure resin) and can often be used in rigid forms or forms that contain very high percentages of plasticisers (sometimes up to 80% by mass of the compounded plastic may be plasticiser). As mentioned previously, PVC contamination of PET recyclate is a serious technical issue for recycling processors. Some kerbside recycling schemes that accept post-consumer plastics do not accept PVC.

Once separated, the mechanical recycling of unplasticised PVC waste streams is relatively simple; where plastics are shredded and washed to produce clean granulate to be used as raw material in injection moulding or extrusion processes that produce new plastic products. A more complex mechanical recycling method may be required for plasticised PVC or composite materials containing PVC. An example is the patented VinyLoop™ process that selectively dissolves PVC from composite materials.

To ensure that rigid and plasticised PVC are able to be recycled appropriately, suitable marking is essential. The requirements for labelling of composite plastics or co-polymers is not well defined in ISO 11469 and these materials may simply be labelled as "7-other". However, marking according to ISO 1043 makes provision for a very wide range of commercially used co-polymers and provides guidance on how to make novel co-polymers or other blends of polymers.

## 4.2 Restricted substances

In addition to the general requirements for hazardous substances stated in Criterion 2, the conditions listed below shall apply for plastic components of >25g weight.

### a) Heavy metals in plastic additives

Bulk plastic components and any surface layers shall not be manufactured using compounds containing cadmium (Cd), chromium VI (CrVI), lead (Pb), mercury (Hg) or tin (Sn).

### Assessment and verification:

The assessment and verification of compliance with this criterion shall be achieved either by the provision of suitable declarations or by representative testing of the plastic components. The testing requirements are set out in Table 9 below.

Table 9. Assessment and verification of heavy metal impurities in plastics.

Plastic type	Assessment and verification	Testing (if required)			
		Metal	Method	Limit (mg/kg)	
Virgin material only or combined with pre-consumer recyclates from known sources and/or post-consumer PET, PP or PE from kerbside collection schemes.	The applicant shall provide a declaration from the supplier of the plastic component(s) that no additives containing cadmium, chromium VI, lead, mercury, tin or their compounds have been used in the manufacture of the plastic component(s) or were used with pre-consumer recyclates, supported by any relevant SDSs. If no suitable declaration is supplied, then the applicant shall provide test reports demonstrating compliance with the relevant limits set out in this table.			Virgin	Recyc.
		Cd	XRF or digestion	100	1000
		Pb	followed by ICP or AA	100	1000
		Sn	or other adequate	100	1000
		Hg	method for measuring total metal content.	100	1000
		CrVI*	EN 71-3	0.020	0.20
With pre-consumer or post-consumer recyclates from mixed sources	The applicant shall provide test reports demonstrating compliance with the relevant limits set out in this table.	XRF – X-Ray Fluorescence, testing can be destructive or non-destructive. ICP – Inductively coupled plasma spectroscopy. AA – Atomic absorption spectroscopy (especially suitable method for mercury measurement using cold vapour process) *limits refer to extractable CrVI only.			

Where testing is required as proof of compliance, test reports of representative samples from independent laboratories that state the analytical method used and demonstrate compliance with the limits set out in Table 9 shall be provided.

**Rationale:**

In the TR 2.0, no criteria for heavy metal pigments in plastics were proposed and this was later included in TR 3.0 following a review of similar ecological criteria for furniture. The Nordic Ecolabel for furniture and fitments prohibits the use of pigments and additives based on lead, tin, cadmium, chromium VI and mercury. The French NF 217 criteria for furniture (Jan. 2014) prohibit the use of pigments in plastics that contain cadmium, chromium VI or mercury.

Multiple entries exist in the REACH Candidate List and Annexes XIV and XVII of REACH for substances based on cadmium, chromium VI, lead, mercury and tin and their compounds.

In the US, under the ASTM Children's Safety Standard, any product intended for use by children that is directly accessible to the child may not contain more than 100 mg/kg lead.

The use of heavy metal based pigments, stabilisers and other types of additives used to impart specific physical properties to compounded plastics has been widespread and is now beginning to be regulated more strictly. In the EU, Regulation 494/2011 effectively restricts the total cadmium content in plastics to 100 mg/kg unless the plastic contains recovered PVC (in which case a derogation applies up to 1000 mg/kg).

Substitution of lead-based stabilisers in PVC by less hazardous calcium-based stabilisers has already been widely adopted in the EU and an EU-wide phase-out is expected around 2015 as part of a voluntary EU industry commitment. However, these developments do not extend

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to plastics produced outside of the EU and some specific EU Ecolabel criteria are necessary to make this requirement clear to non-EU based plastic suppliers. Furthermore, the EU Ecolabel criterion does not only apply to stabilisers but also to pigments and other additives.

The choice of 0.01% w/w (100 mg/kg) as an arbitrary cut-off limit for impurities is a compromise between possible impurities that can arise in other additives and the quantitative detection limits of simple, rapid and relatively low-cost analytical techniques (i.e. XRF) to be used. If lower impurity limits were to be introduced, for example 10 mg/kg, this would then require more complex wet-chemical analytical methods where the entire sample may need to be digested and the digestate analysed by means of atomic absorption spectrophotometry or inductively coupled plasma spectrophotometry.

The exception to this approach is with chromium VI. This was necessary because many analytical methods (including XRF) do not distinguish between different oxidation states of the same metal (i.e. non-hazardous Cr III and highly toxic Cr VI). For this reason a very specific and standardized analytical technique that prevents the conversion of non-hazardous chromium III to chromium VI is specified. The EN 71-3 method well adapted for use with plastics. Although the method refers to extractable Cr VI and not total Cr VI, by referring to the Category I limit in EN 71-3, it is considered that this could be an acceptable proxy measure for non-use of Cr VI additives.

Industry representatives have continually argued against strict requirements for impurities in recycled plastics because some plastics such as PVC may have very long service lives (i.e. pipes could be used for 50 years) and strict requirements on impurities could present barriers to recycling. The higher impurity limit of 1000 mg/kg for cadmium in cases where recycled PVC is used follows on from the provision made in Regulation (EU) 494/2011. This is because cadmium-based heat stabilisers have historically been used in PVC. Although these compounds have been banned in the EU for a number of years, cadmium could easily still be introduced via recycled PVC. The same logic for cadmium also applies to lead, although there is no specific EU Regulation for lead impurities in plastics. Lead-based heat stabilisers used with PVC are currently being phased out under a voluntary agreement with EU industry but they could still be introduced to EU Ecolabel plastics as impurities via recycled PVC.

In response to industry concerns, it should be highlighted that any limits on heavy metals in plastics in EU Ecolabel products does not prevent plastics being recycled per se, but simply require that they may be limited in use in EU Ecolabel products if they contain significant quantities of hazardous impurities. It should also be emphasized that any requested derogation for increasing limits beyond 0.1% w/w, of the above listed heavy metals present above this concentration in plastics may come into conflict with the EUEB interpretation of Article 6(6) of the EU Ecolabel Regulation and the general hazardous substance criterion.

## **b) Polyvinyl chloride**

If PVC components are used in the final furniture product, compliance of vinyl chloride monomer (VCM) emission limits set out in Table 6 shall be demonstrated via independent third party auditing.



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### **Assessment and verification:**

The following shall be provided to the Competent Body:

- A declaration from the applicant stating that PVC components have not been used in the final furniture product;

or

- A declaration from the applicant stating that PVC components have been used in the final furniture product, together with a declaration from the PVC producer stating that the PVC was produced in accordance with the VCM emission limits set out in Table 6. The declaration of the PVC producer shall:

- Specify whether PVC was produced using the Emulsion Process or the Suspension Process and if aqueous effluent is treated for combined plants.
- Include third party verified evidence of compliance with the relevant VCM emission limits specified in Table 6.
- Include third party verified evidence of compliance with the limit for residual VCM in the final PVC material via independent laboratory test reports of representative samples following the EN ISO 6401 standard or equivalent methodology.

### **Rationale:**

In TR 3.0, it was proposed to effectively ban PVC in EU Ecolabel furniture. Although this proposal was actively supported by many Member States and is reflected in other Type I Ecolabel criteria for furniture and similar materials, it was strongly questioned by industry stakeholders, who argued that since PVC was not restricted by REACH, why should it be excluded from EU Ecolabel furniture.

Due to the fact that the main life-cycle based environmental impacts of PVC are associated with its production and disposal. It was deemed relevant to instead require that any PVC is produced according to current BAT. Further rationale behind the restrictions on VCM emissions during PVC production and from the final product can be found in the rationale for criterion 3.3d). The criterion for marking of any PVC plastics (criterion 4.1) should help ensure that PVC can be identified at EoL and recycled should this be possible in the local region.

## **4.3 Recycled plastic content**

If the total plastic content of the final furniture product (not including packaging) accounts for >20% of the product weight (not including packaging), then the following criteria shall apply:

- The average recycled content of plastic parts (not including packaging) shall be at least 30% w/w.
- Recycled plastic material may come from pre-consumer or post-consumer sources. However wastes that are or can be reused within the same processes that generated them shall not be considered as recycled material.

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- Traceability of the recycled plastic material should extend to the sorting centre(s) for any post-consumer plastic recyclates and to the waste plastic producer for any pre-consumer plastic recyclates.

**Assessment and verification:**

The applicant shall provide a declaration from the plastic manufacturer(s) stating the average recycled content in the final furniture product. Where plastic components come from different sources or manufacturers, the average recycled content shall be stated for each plastic source and the overall average recycled plastic content in the final furniture product shall be calculated.

The declaration of recycled content from the plastic manufacturer(s) shall be supported by traceability documentation for plastic recyclates. An example approach would be to provide batch delivery information as per the framework set out in Table 1 of EN 15343.

**Rationale:**

In TR 2.0, it was proposed that when the total plastic content exceeded 10% w/w that the minimum recycled plastic content would be 30% w/w for indoor furniture or 50% w/w for outdoor furniture. Feedback from one stakeholder stated that the requirement for 50% w/w recycled content was a significant challenge for applicants to the Nordic Ecolabel. With light coloured injection moulded plastics, concerns about the colour and aesthetics of the component may be raised. However, with extruded components, co-extrusion technology can allow an inner core of recycled plastic to be capped by a thin outer layer of virgin plastic. With higher recycled contents in resin batches, there is an increased risk of incompatibility between unknown additives in the recycled material and those of the virgin blend. Because previously we have had no experience with criteria for recycled plastic, it is preferred to have a lower requirement that may encourage furniture producers to see the use of recycled plastics as an opportunity to comply with EU Ecolabel criteria and then introduce progressively more ambitious requirements in subsequent revisions, if considered feasible.

These reasons as well as possible concerns with unexpected variations of the quality and quantity of recycled plastics available on the market are the main factors for having lowered the recycled content to 30% w/w for furniture products (both indoor and outdoor).

Because plastic is not recycled at high rates, and is often only downcycled into lower grade products such as bollards and plant pots, the specific requirement for a minimum recycled plastic content when plastics constitute more than 20 % of the product mass should help send a signal to the market for recycled plastic in higher end products. Recycled plastic has a substantially lower embodied energy than virgin plastic and offsets the consumption of non-renewable crude oil.

The potential for plastic recyclates to bring hazardous substances into the EU Ecolabelled product exists because it is simply not practical to test all batches of plastic recyclates delivered for each of the flame retardants and plasticisers that are REACH restricted.

These concerns are tackled in criterion 4.2a) which establishes testing for some of the heavy metal contaminants of most concern. Post-consumer plastics based on PP, PE and PET do not need to be tested since they are dominated by food and beverage grade plastic. Testing for

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flame retardants should not be an issue since these are mainly sourced from waste electrical and electronic equipment (WEEE) which is recovered via a specific network. Phthalates should not need to be tested since these are used in plasticised PVC, which is not widely recycled at all and if it was recycled via a technique such as VinyLoop™, then phthalate contaminants should be removed.

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## Criterion 5: Metals

In addition to the general requirements for hazardous substances stated in Criterion 2, the conditions listed below shall apply for metal components in the furniture product.

### 5.1 Electroplating restrictions

Only components subject to heavy physical wear (i.e. nuts, bolts, nails, screws, hinges, brackets, runners, gas lifts and wheels) or components not subject to prolonged skin contact may be electroplated.

Chromium VI or cadmium compounds shall not be used for electroplating operations of any metal components used in the final furniture product. Zinc may be used for electroplating or hot-dip galvanising so long as the derogation conditions in Table 4 are respected.

#### **Assessment and verification:**

The applicant shall provide a declaration from the supplier of the metal component(s) that no plating treatments involving chromium VI or cadmium substances have been used. Where the furniture manufacturer has used zinc coated components, either electroplated or hot-dip galvanised, evidence of compliance with the relevant derogation conditions in Table 4 shall be provided.

#### **Rationale:**

Aluminium and stainless steels are inherently corrosion resistant while most electroplated metals will be carbon steels. Feedback from stakeholders revealed that electroplating is not a serious obstacle to metal (i.e. steel) recycling. With regards to the allowance of plating in parts subject to heavy physical wear, unless a specific list of components is clearly defined, this tends to lead to prolonged discussions between applicants and competent bodies regarding precisely what is and what is not heavy physical wear. So a particular list of parts considered to be subject to physical wear has been introduced specifically in the criteria.

Electroplating metals can easily account for more than 0.1% w/w of the plated component. The criteria has been restructured by specifically banning chromium VI and cadmium electroplating at any total content in material specific sub-criteria while mentioning the derogated use of nickel (in stainless steel) and zinc (electroplating or hot-dip galvanising) for corrosion resistance purposes so long as the conditions in Table 4 are respected.

Coating with chromium can greatly improve the appearance, corrosion resistance or hardness of metal parts. The coating processes can be set up to use either chromium III or VI compounds. Due to the high toxicity of chromium VI, it is required that any chrome plated metals be based on chromium III only. Feedback from metal industry representatives stated that the use of chromium III resulted in less satisfactory colour finishes but was a more robust process and consumed lower amounts of energy.

Cadmium is an excellent corrosion inhibitor but due to its toxic properties, it has been banned from use (for example in the EU End of Life Vehicle Directive 2000/53/EC) or is being phased out where less toxic alternatives exist. For metal used in furniture, a number of viable alternative plating techniques exist, in particular processes based on zinc plating.

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## 5.2 Heavy metals in paints and primers

Paints or primers used on metal components shall not contain additives based on cadmium, lead, chromium VI, mercury, arsenic or selenium, at concentrations exceeding 0,010% w/w for each individual metal in the in-can paint or primer formulation.

### **Assessment and verification:**

The applicant shall declare that the paint or primer formulation does not contain additives based on cadmium, lead, chromium VI, mercury, arsenic or selenium in concentrations > 0,010% w/w and provide the respective SDS from the suppliers of the coating substances used.

### **Rationale:**

The exact same rationale stated for criterion 3.2d) applies here.

## 5.3. VOC content in paints and primers

If coated metal components account for more than 5% w/w of the final furniture product (excluding packaging), any paints or varnishes used shall have a total VOC content (in-can concentration)  $\leq$  5%.

If higher VOC content coatings are used then it shall be demonstrated that either:

- The total quantity of VOCs applied shall be less than 30g/m<sup>2</sup> of the coated surface area, or
- The final coated panel components, or entire assembled furniture product, shall comply with the VOC emission limits as specified in criterion 9.3.

### **Assessment and verification:**

The applicant shall provide the SDS of any coating substances used on metal components and state the proportion of the final furniture product that consists of coated metal components as % w/w. If the VOC content of the coating substance exceeds 5% and the furniture product consists of at least 5% w/w of coated metal components, then the applicant shall either:

- Provide calculations demonstrating that the effective quantity of VOCs applied in the coated surface area of the final assembled furniture product is < 30g/m<sup>2</sup>, in accordance with the guidance provided in Appendix II.
- Provide a test report demonstrating compliance with criterion 9.3 for the coated metal components or for the entire assembled product.

### **Rationale:**

The rationale is essentially the same as stated previously in criterion 3.2e).

## Criterion 6. Upholstery Covering Materials

### 6.1 Physical quality requirements

Any leather used as upholstery covering material shall comply with the physical quality requirements stated in Appendix III.

Any textiles used as upholstery covering material shall comply with the physical quality requirements stated in Table 10.

Any coated fabrics used as upholstery covering material shall comply with the physical quality requirements stated in Table 11.

Table 10. Physical requirements for textile fabric covering materials in furniture upholstery.

Test factor	Method	Removable and washable coverings	Non-removable and washable coverings
Dimensional changes during washing and drying	Domestic washing: ISO 6330 + EN ISO 5077 (three washes at temperatures as indicated in the product with tumble drying after each washing cycle) Commercial washing: ISO 15797 + EN ISO 5077 (at minimum of 75 °C)	+/- 3.0% for woven fabrics +/- 6.0% for non-woven fabrics	N/A
Colour fastness to washing	Domestic washing: ISO 105-C06 Commercial washing: ISO 15797 + ISO 105-C06 (at minimum of 75 °C)	≥ level 3-4 for colour change ≥ level 3-4 for staining	N/A
Colour fastness to wet rubbing*	ISO 105 X12	≥ level 2-3	≥ level 2-3
Colour fastness to dry rubbing*	ISO 105 X12	≥ level 4	≥ level 4
Colour fastness to light	ISO 105 B02	≥ level 5**	≥ level 5**
Fabric resistance to pilling and abrasion	Knitted and non-woven products: ISO 12945-1 Woven fabrics: ISO 12945-2	ISO 12945-1 result >3 ISO 12945-2 result >3	ISO 12945-1 result >3 ISO 12945-2 result >3

\* does not apply to white products or products that are neither dyed nor printed

\*\* A level of 4 is nevertheless allowed when furniture covering fabrics are both light coloured (standard depth < 1/12) and made of more than 20 % wool or other keratin fibres, or more than 20 % linen or other bast fibres.

Table 11. Physical requirements for coated fabric covering materials in furniture upholstery

Property	Method	Requirement
Tensile strength	ISO 1421	CH ≥ 35daN and TR ≥ 20daN
Tear resistance of plastic film and sheeting by the trouser tear method	ISO 13937/2	CH ≥ 2,5daN and TR ≥ 2daN
Colour fastness to artificial weathering – Xenon arc fading lamp test	EN ISO 105-B02	Indoor use ≥ 6; Outdoor use ≥ 7
Textiles – abrasion resistance by the Martindale method	ISO 5470/2	≥ 75,000
Determination of coating adhesion	EN 2411	CH ≥ 1,5daN and TR ≥ 1,5daN

Where: daN = deca Newtons, CH = Warp and TR = Weft

### Assessment and verification:

The applicant shall provide a declaration from the leather supplier, textile fabric supplier or coated fabric supplier as appropriate, supported by relevant test reports, that the upholstery covering material meets the physical requirements for leather, textile fabrics or coated fabrics as specified in Appendix III, Table 10 or Table 11 respectively.

If textile fabrics have been awarded the EU Ecolabel, as established in Commission Decision 2014/350/EU, it will be considered as compliant with the present requirement on physical quality of textile fabric covering material.

**Rationale:**

The physical requirements for upholstery covering materials are of paramount importance to the product. Poor quality covering materials are likely to tear and even small damage will grow into more serious damage with continued normal use if the covering material is not repaired. Damage to upholstery covering materials is highly visual and may (correctly) lead to consumer association with low quality products and perhaps result in premature end-of-life of the entire product.

For leather, the testing standards and minimum requirements set out in Appendix III are identical to those currently specified *EN 13336: Leather – Upholstery leather characteristics – Guide for selection of leather for furniture*. Leather producers and furniture manufacturers are already familiar with these requirements and they are considered to represent good quality leather and fit for use.

For textiles, the physical quality requirements align with those set out in Decision 2014/350/EU for textile fabrics. For this reason, verification may also be demonstrated by showing that the textile fabrics have been awarded the EU Ecolabel.

For coated fabrics, the physical quality requirements have been developed in collaboration with industry representatives. The values stated in Table 11 are considered to represent very high quality coated fabrics that would effectively prevent the use of much cheaper and lower quality coated fabrics being used in EU Ecolabel furniture.

**6.2 Chemical testing requirements**

This criterion applies to the upholstery covering materials in the final treated form that they are to be used in the furniture product. In addition to the general conditions on hazardous substances set out in criterion 2, the following conditions listed in Table 12 shall specifically apply to upholstery covering materials:

Table 12. Chemical testing requirements for leather, textiles and coated fabric covering material.

Chemical	Test Method	Conditions for compliance
Restricted arylamines from cleavage of azodyes*	EN ISO 17234-1 (for leather)	Results ≤ 30 mg/kg for each amine* (see Table 26 in Appendix IV for a full listed of the arylamines to be tested)
	EN ISO 14362-1 and 14362-3 (for textiles and coated fabrics)	
Chromium VI	EN ISO 17075 (for leather only)	Results < 3 mg/kg**
Free formaldehyde	EN ISO 17226-1 (for	Results ≤ 75 mg/kg

	leather)	
	EN ISO 14184-1 (for textiles and coated fabrics)	
Extractable heavy metals	EN ISO 17072-1 (for leather)	Results: Arsenic $\leq$ 1.0 mg/kg; Antimony $\leq$ 30.0 mg/kg; Chromium $\leq$ 200 mg/kg; Nickel $\leq$ 1.0 mg/kg; Cadmium $\leq$ 0.1 mg/kg, Cobalt $\leq$ 4.0 mg/kg; Lead $\leq$ 1.0 mg/kg, Copper $\leq$ 50.0 mg/kg; and Mercury $\leq$ 0.02 mg/kg
	EN ISO 105-E04 (for textiles and coated fabrics)	Results: Arsenic $\leq$ 1.0 mg/kg; Antimony $\leq$ 30.0 mg/kg; Chromium $\leq$ 2.0 mg/kg; Nickel $\leq$ 1.0 mg/kg; Cadmium $\leq$ 0.1 mg/kg; Cobalt $\leq$ 4.0 mg/kg; Lead $\leq$ 1.0 mg/kg; Copper $\leq$ 50.0 mg/kg and Mercury $\leq$ 0.02 mg/kg
Chlorophenols	EN ISO 17070 (for leather)	Pentachlorophenol $\leq$ 1 mg/kg Tetrachlorophenol $\leq$ 1 mg/kg
Alkylphenols	EN ISO DIS 18218-1 (for leather)	Nonylphenol, mixed isomers (CAS No. 25154-52-3); 4-Nonylphenol (CAS No. 104-40-5) 4-Nonylphenol, branched (CAS No. 84852-15-3) Octylphenol (CAS No. 27193-28-8) 4-Octylphenol (CAS No. 1806-26-4) 4-tert-Octylphenol (CAS No. 140-66-9)
	Solvent extraction followed by LCMS (for textiles and coated fabrics)	<u>Alkylphenoethoxylates (APEOs) and their derivatives:</u> Polyoxyethylated octyl phenol (CAS No. 9002-93-1) Polyoxyethylated nonyl phenol (CAS No. 9016-45-9) Polyoxyethylated p-nonyl phenol (CAS No. 26027-38-3)  <b>Sum Total limit value <math>\leq</math> 25mg/kg - textiles /coated fabric <math>\leq</math> 100mg/kg - leathers</b>
Polycyclic Aromatic Hydrocarbons	ZEK 01.2-08 (for coated fabrics or leather treated with plastic coatings)	Naphthalene (CAS No. 91-20-3) Acenaphthylene (CAS No. 208-96-8) Acenaphthene (CAS No. 83-32-9) Fluorene (CAS No. 86-73-7) Phenanthrene (CAS No. 85-1-8) Anthracene (CAS No. 120-12-7) Fluoranthene (CAS No. 206-44-0) Pyrene (CAS No. 129-00-0) Chrysene (CAS No. 218-01-9) Benzo[a]anthracene (CAS No. 56-55-3) Benzo[b]fluoranthene (CAS No. 205-99-2) Benzo[k]fluoranthene (CAS No. 207-08-9) Benzo[a]pyrene (CAS No. 50-32-8) Dibenzo[a,h]anthracene (CAS No. 53-70-3) Indeno[1,2,3-c,d]pyrene (CAS No. 193-39-5) Benzo[g,h,i]perylene (CAS No. 191-24-2) Benzo[j]fluoranthene (CAS No. 205-82-3) Benzo[e]pyrene (CAS No. 192-97-2)  <b>Sum Total limit = 10 mg/kg Individual limit = 1 mg/kg for Benzo[a]pyrene</b>
N,N-Dimethylacetamide (CAS No. 127-19-5)	Solvent extraction followed by GCMS or LCMS (for elastane and/or acrylic based textile fabrics only)	Result $\leq$ 0.005% w/w ( $\leq$ 50mg/kg)
Chloralkanes	EN ISO DIS 18219 (for leather)	C10-C13 (SCCP) chloralkanes $\leq$ not detectable C14-C17 (MCCP) chloralkanes $\leq$ 1000 mg/kg;



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\*A total of 22 arylamines listed in Entry 43 of Annex XVII of REACH plus two other compounds are listed also in Appendix IV. Not detectable is considered as values lower than 30mg/kg according to the EN ISO 17234-1 method.

\*\* The detection limit for the EN ISO 17075 is generally assumed to be 3mg/kg.

### **Assessment and verification:**

The furniture manufacturer shall provide a declaration that the leather, textile fabric or coated fabric upholstery covering material complies with the above limits, supported by results from the relevant referred test methods either commissioned by the manufacturer themselves or the material supplier.

If textile fabrics have been awarded the EU Ecolabel, this shall be considered as sufficient evidence of compliance with this criterion for textile fabric chemical testing requirements.

### **Rationale:**

Upholstery covering materials come in to direct contact with users and the potential presence of hazardous substance is an obvious concern. Where skin contact is possible, the extractability of substances can be estimated using artificial sweat solutions. This is reflected in the development of EU Ecolabel criteria for textiles and OEKO-TEX 100 standards for artificial sweat extractable heavy metals. Other hazardous substances that can remain as residues from production processes and that have been addressed in other Ecolabel schemes are formaldehyde, arylamine dyes and alkylphenols. The limits have generally been set to align with those in Decision 2014/350/EU for textiles where relevant and for leather, as far as possible a common approach is being taken with the residual hazardous substance criteria currently under development for EU Ecolabel footwear. Regarding alkylphenols, a higher limit of 100 mg/kg was necessary due to the fact that other substances present in leather can result in higher background noise and possible false positive test results during analysis.

Formaldehyde is a chemical residue that is often left after finishing treatments. The most serious hazard classification it has is H351 (suspected of causing cancer) and it is also classified as H317 (skin sensitiser), which is of concern in furniture textiles that come into direct and prolonged skin contact with users. The free formaldehyde limit of 75ppm aligns with the requirements set out in the OEKO-TEX 100 standards for textiles that come into skin contact. The OEKO-TEX standard is generally referred to in Blue Angel criteria although it should be noted that the Nordic Ecolabel criteria for textiles, hides/skins and leather (Version 4.0, Dec. 2012) state a much more ambitious limit of 20ppm. In the EU Ecolabel for textiles (Decision 2014/350/EU), the limit of 75ppm refers to interior textiles, which furniture textiles can be considered as (at least for indoor furniture).

Regarding limits on ecoparasiticide concentrations in wool, after examining in detail the EU Ecolabel criteria set for textiles in Decision 2014/350/EU, it became evident that placing a simple limit on ecoparasiticide concentrations could easily be interpreted as being more strict than the EU Ecolabel textile criteria, which would not be justifiable. This situation arises due to the fact that alternative means of verification can be accepted, such as compliance with maximum COD emissions in effluents from wool scouring operations or demonstrating value recovery from certain wastes generated by the wool scouring operation. These criteria would be extremely difficult for furniture manufacturers to verify and are considered unrealistic from so far down the supply chain. Furthermore, the testing specified for residual

ecoparasiticide levels is specified for raw wool prior to scouring, not the final textile product. The processing of the wool may dramatically decrease the ecoparasiticide concentrations and render these limits irrelevant.

Where standard tests exist, they are quoted for the particular material type in question (i.e. leather, textiles or coated fabrics). Coated fabric industry representatives confirmed that the standards referred to in Table 12 can also be applied to coated fabrics.

### 6.3 Restricted substance list during production processes

If the upholstery covering materials account for more than 1.0% w/w of the total furniture product weight (excluding packaging) the supplier of the material shall comply with the following restrictions on the use of hazardous substances during production.

Table 13. Restricted substances used in leather, textile and coated fabric production stages

<b>1-Hazardous substances used in different production stages</b>	
<b>a) Surfactants, softeners and complexing agents</b>	
<p><b>Applicability:</b> To dyeing and finishing process stages in textile, leather or coated fabric production.</p>	<p>All non-ionic and cationic surfactants must be readily biodegradable under anaerobic conditions.</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration from the leather, textile or coated fabric producer, supported by a declaration from their chemical supplier(s) and by relevant SDSs and results of EN ISO 11734 or ECETOC No 28 OECD 311 tests.</p> <p>The latest revision of the Detergents Ingredients Database should be used as a reference point for biodegradability and may, at the discretion of the Competent Body, be accepted as an alternative to providing test reports.</p> <p><a href="http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf">http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf</a></p>
	<p>Long chain perfluoroalkyl sulfonates (<math>\geq C6</math>) and perfluorocarboxylic acids (<math>\geq C8</math>) shall not be used in the production processes.</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration from the leather, textile or coated fabric producer, supported by a declaration from their chemical supplier(s) and by relevant SDSs of the non-use of these substances for each production stage.</p>
<b>b) Auxiliaries (used in preparations, formulations and adhesives)</b>	
<p><b>Applicability:</b> Intermediate materials and final leather, textile or coated fabric product.</p>	<p>The following substances shall not be used in any preparations or formulations within the supply chain:</p> <ul style="list-style-type: none"> <li>• bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC)</li> <li>• distearyl dimethyl ammonium chloride (DSDMAC)</li> <li>• di(hardened tallow) dimethyl ammonium chloride (DHTDMAC)</li> <li>• ethylene diamine tetra acetate (EDTA),</li> <li>• diethylene triamine penta acetate (DTPA)</li> <li>• 4-(1,1,3,3-tetramethylbutyl)phenol</li> <li>• Nitrilotriacetic acid (NTA)</li> </ul> <p><b>Assessment and verification:</b> The applicant shall provide a declaration from the leather, textile or coated fabric supplier, supported by declarations from chemical supplier(s) and relevant SDSs,</p>

	that these compounds have not been used in any of the production stages for leather, textiles or coated fabrics, ..
<b>c) Solvents</b>	
<p><b>Applicability:</b> Intermediate materials and final leather, textile or coated fabric product.</p>	<p>The following substances shall not be used in any preparations or formulations during leather, textile or coated fabric production or any part thereof</p> <ul style="list-style-type: none"> <li>•2-Methoxyethanol</li> <li>•N,N-dimethylformamide</li> <li>•Bis(2-methoxyethyl) ether</li> <li>•4,4' - Diaminodiphenylmethane</li> <li>•1,2,3-trichloropropane</li> <li>•1,2-Dichloroethane; ethylene dichloride</li> <li>•2-Ethoxyethanol</li> <li>•Benzene-1,4-diamine dihydrochloride</li> <li>•Bis(2-methoxyethyl) ether</li> <li>•Formamide</li> <li>•N,N-dimethylacetamide (DMAC)</li> <li>•N-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone</li> <li>•Trichloroethylene</li> <li>•1-Methyl-2-pyrrolidone</li> </ul> <p><b>Assessment and verification:</b> The applicant shall provide a declaration from the leather, textile or coated fabric producer, supported by declarations from chemical suppliers and relevant SDSs, stating that these solvents have not been used in any of the leather, textile or coated fabric production processes.</p>
<b>2-Dyes used in dyeing and printing processes</b>	
<p>i. Carriers used in dyeing process</p> <p><b>Applicability:</b> Dyeing and printing processes</p>	<p>Where disperse dyes are used, halogenated dyeing accelerants (carriers) shall not be used (Examples of carriers include: 1,2-dichlorobenzene, 1,2,4-trichlorobenzene, chlorophenoxyethanol).</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration, supported by declarations of leather, textile or coated fabric producers, their chemical supplier(s) and any relevant SDSs, that states the non-use of any halogenated carriers during the dyeing process of any leather, textiles or coated fabrics used in the furniture product.</p>
<p>ii. Chrome mordant dyes</p> <p><b>Applicability:</b> Dyeing and printing processes</p>	<p>Chrome mordant dyes shall not be used.</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration, supported by declarations of leather, textile or coated fabric producers, their chemical supplier(s) and any relevant SDSs, that states the non-use of any chrome mordant dyes during the dyeing process of any leather, textiles or coated fabrics used in the furniture product.</p>
<p>iii. Pigments</p> <p><b>Applicability:</b> Dyeing and</p>	<p>Pigments based on cadmium, lead, chromium VI, mercury, arsenic and antimony shall not be used.</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration, supported by declarations of leather, textile or coated fabric producers, their chemical supplier(s) and any</p>

printing processes	relevant SDSs, that states the non-use of any pigments based on the mentioned heavy metals during dyeing or printing processes with any leather, textiles or coated fabrics used in the furniture product.
<b>3-Fluorinated Compounds</b>	
<b>Applicability:</b> Upholstery covering materials with integrated water or stain repellent function	<p>(i) Fluorinated water, stain and oil repellent treatments shall not be impregnated into furniture covering material finishes. This restriction includes treatments with perfluorinated and polyfluorinated substances. Only non-fluorinated treatments using substances that are readily biodegradable and non-bioaccumulative in the aquatic environment shall be permitted.</p> <p><b>Assessment and verification:</b> The applicant shall provide a declaration, supported by declarations from leather, textile or coated fabric producers, declarations from chemical suppliers and any relevant SDSs, that state non-use of perfluorinated or polyfluorinated substances in leather, textile or coated fabric finishing operations.</p> <p>In the absence of an acceptable declaration, the Competent Body may further request testing of the covering material according to the methods defined by CEN/TS 15968:2010.</p> <p>For non-fluorinated treatments, readily biodegradability properties may be demonstrated by tests conducted according to the following methods: (OECD 301 A, ISO 7827, OECD 301 B, ISO 9439, OECD 301 C, OECD 301 D, ISO 10708, OECD 301 E, OECD 301 F, ISO 9408).</p> <p>Non-bioaccumulative properties may be demonstrated by tests that show partition coefficients (Log Kow) of <math>\leq 3</math> or Bioconcentration Factors (BCF) <math>\leq 100</math> according.</p> <p>With non-fluorinated treatments, the latest revision of the Detergents Ingredients Database should be used as a reference point for biodegradability and may, at the discretion of the Competent Body, be accepted as an alternative to providing test reports.</p> <p><a href="http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf">http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf</a></p>

**Assessment and verification:**

The applicant shall compile all relevant declarations, SDSs and optional supporting test reports from leather, textile or coated fabric producers, or their suppliers, that are relevant to demonstrate compliance with the requirements for non-use of the hazardous substances listed in Table 13.

If upholstery covering materials are made of textiles that have been awarded the EU Ecolabel as established in Decision 2014/350/EU, it will be considered compliant with this criterion for non-use of the listed hazardous substances during production processes.

**Rationale:**

The general criteria for hazardous substances in criterion 2 apply the exclusion of SVHCs in the final product and to certain functional hazardous substances that are likely to remain in the final product. Allowance for these substances is permitted so long as certain derogation conditions are respected and can be verified.

However, criterion 6.3 is somewhat independent of the general criterion on hazardous substances and beyond its scope because it does not specifically relate to substances that are likely to remain in the final material in significant concentrations. For this reason it is included as a sub-criterion for upholstery covering materials and not in criterion 2. The criterion should be relatively simple to verify. The main effort in demonstrating compliance will come from the leather, textile or coated fabric manufacturer who should already be in possession of all the necessary information. It should not be necessary to actually test

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commercially marketed chemicals or active substances for properties such as biodegradability because this information should be available already, either in SDSs, REACH dossiers or similar literature. Specific test methods are mentioned in some requirements in case this may help manufacturers if they need to contact suppliers of chemical formulations to seek clarification of any doubts.

For the avoidance of doubt, a declaration of non-use should only extend to the chemical formulations actually used directly in the treatment of leather, textile or coated fabrics and should in no cases extend to chemicals used in the production of any basic chemical feedstocks, as this could quickly become not only burdensome but also unworkable and irrelevant. This approach aims to align closely with the currently-under-revision EU Ecolabel criteria for footwear.

The main impact of this criterion is to send a signal to leather, textile and coated fabric producers to avoid the use of hazardous substances in their production processes and will in turn send a signal to chemical suppliers to either focus on developing less hazardous alternatives or making it clearer that their products avoid the use of these substances. This signal should be especially significant for leather producers if the criteria for footwear and furniture are well aligned. Furniture alone accounts for around 14% of all leather production.

This text was previously summarised in 3 tables in Appendix IV of TR 3.0 but has now been combined into a single table and brought directly into the criteria text.

#### **6.4 Cotton and other natural cellulosic seed fibres**

If the total content of cotton and other natural cellulosic seed fibres (hereinafter referred to as cotton) used in the textile covering materials accounts for more than 1.0% of the total weight of the furniture product (excluding packaging), then conditions a,b&d, a,c&d or a,b,c&d shall be complied with for the cotton material:

- a) All cotton shall be of non genetically modified varieties.
- b) A minimum of 10% of the cotton shall consist of traceable organic cotton grown according to the requirements laid down in Council Regulation (EC) No 834/2007<sup>21</sup>, the US National Organic Programme (NOP) or equivalent legal obligations set by trade partners of the EU. The organic cotton content may include organically grown cotton and transitional organic cotton. Organic cotton shall be traceable from the point of verification of the production standard up until, as a minimum, greige fabric production
- c) A minimum of 20 % of the cotton shall consist of traceable cotton grown according to Integrated Pest Management (IPM) principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme or Integrated Crop Management (ICM) systems incorporating IPM principles. IPM cotton shall be traceable from the point of verification of the production standard up until, as a minimum, greige fabric production

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<sup>21</sup> Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 (OJ L 189, 20.7.2007, p. 1).

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d) Conventional or IPM cotton shall be grown without the use of the following pesticides: Alachlor, aldicarb, aldrin, campheclor (toxaphene), captafol, chlordane, 2,4,5-T, chlordimeform, chlorobenzilate, cypermethrin, DDT, dieldrin, dinoseb and its salts, endosulfan, endrin, glyphosulfate, heptachlor, hexachlorobenzene, hexachlorocyclohexane (total isomers), methamidophos, methyl-o-demeton, methylparathion, monocrotophos, neonicotinoids (clothianidine, imidacloprid, thiametoxam), parathion, phosphamidon, pentachlorophenol, thiofanex, triafanex, triazophos. The total combined content of the pesticides listed shall not exceed 0.5 mg/kg in any IPM, ICM or conventional cotton.

**Assessment and verification:**

If upholstery covering materials are made of textiles that have been awarded the EU Ecolabel, (Decision 2014/350/EU) this shall be considered as sufficient evidence of compliance with this criterion for cotton.

Otherwise:

a) Compliance with the requirements for non-genetically modified varieties shall be verified in conformity with Regulation (EC) No 1830/2003 of the European Parliament and of the Council<sup>22</sup>.

b) Compliance with the organic content requirement should be certified by an independent control body to have been produced in conformity with the production and inspection requirements laid down in Regulation (EC) No 834/2007 the US National Organic Programme (NOP) or those set by other trade partners.. Verification shall be provided on an annual basis for each country of origin.

The applicant shall demonstrate compliance with the minimum cotton content requirement either for the annual volume of cotton purchased or for the blend of cotton used to manufacture the final product(s) and according to each product line:

(i) On an annualised basis: Transaction records and/or invoices shall be provided that document the quantity of cotton purchased on an annual basis from farmers or producer groups, and/or the total weight of certified bales, up until greige fabric production, or

(ii) On a final product basis: Documentation shall be provided from the spinning and/or fabric production stages. All documentation shall reference the Control Body or certifier of the different forms of cotton.

c) Compliance with the IPM content requirement shall be demonstrated by providing evidence that the cotton has been grown by farmers that have participated in formal training programmes of the UN FAO or Government IPM and ICM programmes and/or that have been audited as part of third party certified IPM schemes. Verification shall

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<sup>22</sup> Regulation (EC) No 1830/2003 of the European Parliament and of the Council of 22 September 2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC (OJ L 268, 18.10.2003, p.24)

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either be provided on an annual basis for each country of origin or on the basis of certifications for all IPM cotton bales purchased to manufacture the product.

The applicant shall demonstrate compliance with the minimum cotton content requirement either for the annual volume of cotton purchased or for the blend of cotton used to manufacture the final product(s) and according to each product line:

(i) On an annualised basis: Transaction records and/or invoices shall be provided that document the quantity of cotton purchased on an annual basis from farmers or producer groups, and/or the total weight of certified bales, up until greige fabric production, or

(ii) On a final product basis: Documentation shall be provided from the spinning and/or fabric production stages. All documentation shall reference the Control Body or certifier of the different forms of cotton.

d) Compliance with the pesticide restriction shall not be required for schemes that prohibit use of the substances listed in part iv. and where either testing is carried out or declarations of non-use are obtained from farmers and/or farmer producer groups that are verified by site visits carried out by control bodies accredited by either national governments or recognised organic or IPM certification schemes.

Cotton shall be tested for the listed substances. A test report shall be provided based on the following test methods, as appropriate:

— US EPA 8081 B (organo-chlorine pesticides, with ultrasonic or Soxhlet extraction and apolar solvents (iso- octane or hexane)),

— US EPA 8151 A (chlorinated herbicides, using methanol),

— US EPA 8141 B (organophosphorus compounds),

— US EPA 8270 D (semi-volatile organic compounds).

Tests shall be made on samples of raw cotton from each country of origin and before it passes through any wet treatment. For each country of origin testing shall be carried out on the following basis:

(i) Where only one lot of cotton is used per year a sample shall be taken from a randomly selected bale;

(ii) If two or more lots of cotton are used per year composite samples shall be taken from 5 % of the bales. Cotton is not required to be tested where it has been certified as organic or by an IPM scheme that prohibits the use of the listed substances.

**Rationale:**

Support was expressed by several Competent Bodies and NGO stakeholders for requirements for a minimum organic cotton or IPM cotton content in EU Ecolabel criteria for furniture. The main environmental impacts are due to pesticide and fertiliser contamination of the wider environment, worker exposure risks to pesticides and the considerable energy invested in the manufacture of these substances. Conventional cotton is one of the most intensively treated

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crops, accounting for 2.5% of the world's cultivated land but 16% of insecticide consumption<sup>23</sup>.

Since such criteria have recently been adopted in Decision 2014/350/EU for EU Ecolabel textiles, the same approach has been introduced for furniture.

Different minimum organic cotton contents (10% or 95%) and minimum IPM cotton contents (20% or 60%) are stated in EU Ecolabel textile criteria depending on the nature of the final product. The higher limits were principally for textiles in products that come into close and prolonged skin contact during normal use, such as t-shirts, socks and underwear. By choosing the lower minimum requirements, it can be ensured that any cotton material that is EU Ecolabel awarded can be used in EU Ecolabel furniture. Additional reasons why the lower requirements for organic or IPM cotton contents are the facts that furniture upholstery should not come into as much direct skin contact as clothes items such as t-shirts and underwear and also that only 1% of current cotton production was estimated to be certified as organic in 2009<sup>24</sup>

### **6.5 PVC-based coated fabrics**

If PVC is used in coated fabrics, compliance of vinyl chloride monomer (VCM) emission limits set out in Table 6 shall be demonstrated via independent third party auditing.

#### **Assessment and verification:**

The following declarations shall be provided to the Competent Body:

- A declaration from the applicant stating that PVC-based coated fabrics have not been used in the final furniture product; or

- A declaration from the applicant stating that PVC-based coated fabrics have been used in the furniture product, together with a declaration from the producer of the PVC-based coated fabric stating that the PVC-based coated fabric was produced in accordance with the VCM emission limits set out in Table 6. The declaration of the PVC producer shall:

- Specify whether PVC was produced using the Emulsion Process or the Suspension Process and if aqueous effluent is treated for combined plants..
- Include third party verified evidence of compliance with the relevant VCM emission limits specified in Table 6.
- Include third party verified evidence of compliance with the limit for residual VCM in the final PVC material via independent laboratory test reports of representative samples following the EN ISO 6401 standard or equivalent methodology.

#### **Rationale:**

The same rationale as stated in criterion 3.2b) and 4.2b) apply here.

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<sup>23</sup> E.J.F. (2007). *The deadly chemicals in cotton*. Environmental Justice Foundation in collaboration with Pesticide Action Network UK: London, UK. ISBN No. 1-904523-10-2

<sup>24</sup> Textile Exchange, *Organic cotton farm and fibre report* 2009/10



## Criterion 7. Upholstery padding materials

### 7.1. Latex foam

#### a) Restricted substances

The concentrations in the latex foam of the substances listed below shall not exceed the values shown in Table 14.

Table 14. Restricted substances in latex foams used in furniture upholstery

Group of substances	Substance	Limit value (ppm)	Assessment and verification conditions
Chlorophenols	mono- and di-chlorinated phenols (salts and esters)	1	A
	Other chlorophenols	0.1	A
Heavy metal	As (Arsenic)	0.5	B
	Cd (Cadmium)	0.1	B
	Co (Cobalt)	0.5	B
	Cr (Chromium), total	1	B
	Cu (Copper)	2	B
	Hg (Mercury)	0.02	B
	Ni (Nickel)	1	B
	Pb (Lead)	0.5	B
	Sb (Antimony)	0.5	B
Pesticides*	Aldrin	0.04	C
	o,p-DDE	0.04	C
	p,p-DDE	0.04	C
	o,p-DDD	0.04	C
	p,p-DDD	0.04	C
	o,p-DDT	0.04	C
	p,p-DDT	0.04	C
	Diazinone	0.04	C
	Dichlorfenthion	0.04	C
	Dichlorvos	0.04	C
	Dieldrin	0.04	C
	Endrin	0.04	C
	Heptachlor	0.04	C
	Heptachlorepoxyde	0.04	C
	Hexachlorobenzene	0.04	C
	Hexachlorocyclohexane	0.04	C
	α-Hexachlorocyclohexane	0.04	C
	β-Hexachlorocyclohexane	0.04	C
	γ-Hexachlorocyclohexane (Lindane)	0.04	C
	δ-Hexachlorocyclohexane	0.04	C
Malathion	0.04	C	
Methoxichlor	0.04	C	
Mirex	0.04	C	
Parathion-ethyl	0.04	C	
Parathion-methyl	0.04	C	
Other specific substances that are restricted	Butadiene	1	D

\* Only for foams composed of natural latex for at least 20 % by weight.

#### Assessment and verification:

**A.** For chlorophenols the applicant shall provide a report presenting the results of the following test procedure. 5 g of sample shall be milled and chlorophenols shall be extracted in the form of phenol (PCP), sodium salt (SPP) or esters. The extracts shall be analysed by means of gas chromatography (GC). Detection shall be made with mass spectrometer or electron capture detector (ECD).

**B.** For heavy metals the applicant shall provide a report presenting the results of the following test procedure. Milled sample material is eluted in accordance with DIN 38414-S4 or equivalent in a ratio of 1:10. The resultant filtrate shall be passed through a 0.45 µm membrane filter (if necessary by pressure filtration). The solution obtained shall be examined for the content of heavy metals by inductively coupled plasma optical emission spectrometry (ICP-OES), also known as inductively coupled plasma atomic emission spectrometry (ICP-AES), or by atomic absorption spectrometry using a hydride or cold vapour process.

**C.** For pesticides the applicant shall provide a report presenting the results of the following test procedure: 2 g of sample is extracted in an ultrasonic bath with a hexane/dichloromethane mixture (85/15). The extract is cleaned up by acetonitrile agitation or by adsorption chromatography over florisil. Measurement and quantification are determined by gas chromatography with detection on an electron capture detector or by coupled gas chromatography/mass spectrometry. The testing on pesticides is requested for latex foams with a content of at least 20 % natural latex.

**D.** For butadiene the applicant shall provide a report presenting the results of the following test procedure. Following milling and weighing of the latex foam, headspace sampling shall be performed. Butadiene content shall be determined by gas chromatography with detection by flame ionisation.

**Rationale:**

The same criteria were presented in TR 2.0 and no comments were added by stakeholders during the 2<sup>nd</sup> AHWG or expressed on the Batis online system during the subsequent feedback period.

Latex foam, together with polyurethane foam, account for around 90% of all padding/filling materials used in furniture and so specific criteria should predominantly focus on these materials. Following the same approach as EU Ecolabel criteria set out for bed mattresses in Decision 2014/391/EC, the criteria align with that Decision on restricted hazardous substances and VOC emissions.

The criteria for bed mattresses were only recently published (June 2014) and it is possible that furniture criteria are during the second half of 2015, so the criteria may run in parallel for several years and should align as best as possible in order to simplify the process for applicants who may manufacture both bed mattresses as well as upholstered furniture items.

**b) 24h VOC emissions**

Chamber concentrations of the substances reported below shall not exceed the following values after a period of 24 hours shown in Table 15.

Table 15. VOC emission limits for latex foams

Substance	Limit value (mg/m <sup>3</sup> )
1,1,1 – trichloroethane	0.2
4-Phenylcyclohexene	0.02
Carbon Disulphide	0.02
Formaldehyde	0.005
Nitrosamines*	0.0005

Styrene	0.01
Tetrachloroethylene	0.15
Toluene	0.1
Trichloroethylene	0.05
Vinyl chloride	0.0001
Vinyl cyclohexene	0.002
Aromatic hydrocarbons (total)	0.3
VOCs (total)	0.5
* N-nitrosodimethylamine (NDMA), N-nitrosodiethylamine (NDEA), N-nitrosomethylethylamine (NMEA), N-nitrosodi-i-propylamine (NDIPA), N-nitrosodi-n-propylamine (NDPA), N-nitrosodi-n-butylamine (NDBA), N-nitrosopyrrolidinone (NPYR), N-nitrosopiperidine (NPIP), N-nitrosomorpholine (NMOR).	

**Assessment and verification:**

The applicant shall provide a report presenting the results of chamber test analysis carried out by an accredited laboratory in accordance with ISO 16000-9.

The wrapped sample shall be stored at room temperature at least for 24 hours. After this period the sample shall be unwrapped and immediately transferred into the test chamber. The sample shall be placed on a sample holder, which allows air access from all sides. The climatic factors shall be adjusted according to ISO 16000-9. For comparison of test results, the area specific ventilation rate ( $q=n/l$ ) shall be 1. The ventilation rate shall be between 0.5 and 1. The air sampling shall be done  $24\pm 1$  h after loading of the chamber during 1 hour on DNPH cartridges for the analysis of formaldehyde and other aldehydes and on Tenax TA for the analysis of other volatile organic compounds. Sampling duration for other compounds may be longer but shall be completed before 30 hours.

The analysis of formaldehyde and other aldehydes shall comply with the standard ISO 16000-3. Unless specified differently, the analysis of other volatile organic compounds shall comply with the standard ISO 16000-6.

Testing following the standard CEN/TS 16516 shall be considered as equivalent to those of the ISO 16000 series of standards.

The analysis of nitrosamines shall be done by means of gas chromatography in combination with a thermal energy analysis detector (GC-TEA), in accordance with the BGI 505-23 method (formerly: ZH 1/120.23) or equivalent.

**Rationale:**

The same rationale as with the previous sub-criteria for latex foam applies.

VOC testing is permitted on smaller samples of foam materials to permit testing in smaller emission chambers which are cheaper and more widely available.

**7.2 Polyurethane (PUR) foam**

**a) Restricted substances**

The concentrations in the PUR foam of the substances listed below shall not exceed the values shown in Table 16.

Table 16. List of restricted substances in PUR

Substance group	Substance (acronym, CAS number, element symbol)	Limit value	Method
Biocides		Not added intentionally	A
Flame retardants		Not added intentionally	A
Heavy Metals	As (Arsenic)	0.2 ppm	B
	Cd (Cadmium)	0.1 ppm	B
	Co (Cobalt)	0.5 ppm	B
	Cr (Chromium), total	1.0 ppm	B
	Cr VI (Chromium VI)	0.01 ppm	B
	Cu (Copper)	2.0 ppm	B
	Hg (Mercury)	0.02 ppm	B
	Ni (Nickel)	1.0 ppm	B
	Pb (Lead)	0.2 ppm	B
	Sb (Antimony)	0.5 ppm	B
Se (Selenium)	0.5 ppm	B	
Plasticizers	Di-iso-nonylphthalate (DINP, 28553-12-0)	0.01 % w/w (sum)	C
	Di-n-octylphthalate (DNOP, 117-84-0)		
	Di (2-ethylhexyl)-phthalate (DEHP, 117-81-7)		
	Di-iso-decylphthalate (DIDP, 26761-40-0)		
	Butylbenzylphthalate (BBP, 85-68-7)		
	Dibutylphthalate (DBP, 84-74-2)		
Phthalates	Not added intentionally	A	
TDA and MDA	2,4 Toluenediamine (2,4-TDA, 95-80-7)	5.0 ppm	D
	4,4'-Diaminodiphenylmethane (4,4'-MDA, 101-77-9)	5.0 ppm	D
Tinorganic substances	Tributyltin (TBT)	50 ppb	E
	Dibutyltin (DBT)	100 ppb	E
	Monobutyltin (MBT)	100 ppb	E
	Tetrabutyltin (TeBT)	-	-
	Monooctyltin (MOT)	-	-
	Dioctyltin (DOT)	-	-
	Tricyclohexyltin (TcyT)	-	-
	Triphenyltin (TPHT)	-	-
	Sum	500 ppb	E
Other specific substances that are restricted	Chlorinated or brominated dioxins or furans	Not added intentionally	A
	Chlorinated hydrocarbons: (1,1,2,2-Tetrachloroethane, Pentachloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethylene)	Not added intentionally	A
	Chlorinated phenols (PCP, TeCP, 87-86-5)	Not added intentionally	A
	Hexachlorocyclohexane (58-89-9)	Not added intentionally	A
	Monomethyldibromo-Diphenylmethane (99688-47-8)	Not added intentionally	A
	Monomethyldichloro-Diphenylmethane (81161-70-8)	Not added intentionally	A
	Nitrites	Not added intentionally	A
	Polybrominated Biphenyls (PBB, 59536-65-1)	Not added intentionally	A
	Pentabromodiphenyl Ether (PeBDE, 32534-81-9)	Not added intentionally	A
	Octabromodiphenyl Ether (OBDE, 32536-52-0)	Not added intentionally	A
	Polychlorinated Biphenyls (PCB, 1336-36-3)	Not added intentionally	A
	Polychlorinated Terphenyls (PCT, 61788-33-8)	Not added intentionally	A
	Tris(2,3-dibromopropyl) phosphate (TRIS, 126-72-7)	Not added intentionally	A
	Trimethylphosphate (512-56-1)	Not added intentionally	A
	Tris-(aziridinyl)-phosphin oxide (TEPA, 545-55-1)	Not added intentionally	A
	Tris(2-chloroethyl)-phosphate (TCEP, 115-96-8)	Not added intentionally	A
Dimethyl methylphosphonate (DMMP, 756-79-6)	Not added intentionally	A	

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**Assessment and verification:**

For methods B, C, D and E where analysis is required, 6 composite samples shall be taken from a maximum depth of up to 2 cm from the surface faces of the material sent to the relevant accredited laboratory. Where testing is required, the applicant shall provide the test results and demonstrating compliance with the limits in Table 16.

**A.** For biocides, phthalates and other specific substances that are restricted the applicant shall provide a declaration supported by declarations from manufacturers of the foam confirming that the listed substances have not been added intentionally to the foam formulation.

**B.** For heavy metals the applicant shall provide a report presenting the results of the following test procedure. Milled sample material is eluted in accordance with DIN 38414-S4 or equivalent in a ratio of 1:10. The resultant filtrate shall be passed through a 0.45 µm membrane filter (if necessary by pressure filtration). The solution obtained shall be examined for the content of heavy metals by atomic emission spectrometry with inductively coupled plasma (ICP-AES or ICP-OES) or by atomic absorption spectrometry using a hydride or cold vapour process.

**C.** For the total amount of plasticizers the applicant shall provide a report presenting the results of the following test procedure. Extraction shall be performed using a validated method such as the subsonic extraction of 0.3 g of sample in a vial with 9 ml of t-Butylmethylether during 1 hour followed by the determination of phthalates by GC using a single ion monitoring mass selective detector (SIM Modus).

**D.** For TDA and MDA the applicant shall provide a report presenting the results of the following test procedure. Extraction of a 0.5 g composite sample in a 5ml syringe shall be performed with 2.5 ml of 1 % aqueous acetic acid solution. The syringe is squeezed and the liquid returned to the syringe. After repeating this operation 20 times, the final extract is kept for analysis. A new 2.5ml of 1% aqueous acetic acid is then added to the syringe and another 20 cycles repeated. After this, the extract is combined with the first extract and diluted to 10 ml in a volumetric flask with acetic acid. The extracts shall be analysed by high-performance liquid chromatography (HPLC-UV) or HPLC-MS. If HPLC-UV is performed and interference is suspected, reanalysis with high performance liquid chromatography–mass spectrometry (HPLC-MS) shall be performed.

**E.** For tinorganic substances the applicant shall provide a report presenting the results of the following test procedure. A composite sample of 1-2 g weight shall be mixed with at least 30ml of extracting agent during 1 hour in an ultrasonic bath at room temperature. The extracting agent shall be a mixture composed as it follows: 1750 ml methanol + 300 ml acetic acid + 250 ml buffer (pH 4.5). The buffer shall be a solution of 164 g of sodium acetate in 1200 ml of water and 165 ml acetic acid, to be diluted with water to a volume of 2000 ml. After extraction the alkyl tin species shall be derivatized by adding 100 µl of sodium tetraethylborate in tetrahydrofuran (THF) (200 mg/ml THF). The derivative shall be extracted with n-hexane and the sample shall be submitted to a second extraction procedure. Both hexane extracts shall be combined and further used to determine the organotin compounds by gas chromatography with mass selective detection in SIM modus.

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**Rationale:**

Polyurethane is by far the most commonly used upholstery padding material in furniture and so specific and relevant criteria are necessary.

In the same manner as with latex foam criteria, and for the same reasons, the polyurethane foam criteria have been copied directly from the criteria set out in Decision 2014/391/EU for bed mattress EU Ecolabel criteria. The criteria for polyurethane in EU Ecolabel Bed Mattresses are basically the same as those developed by the European CertiPUR scheme, which focuses on the quantities of hazardous substances in the foam material and VOC emissions from small and representative samples of the foam product. By aligning with the CertiPUR criteria it is assured that producers will be familiar with the requirements and that a network of experienced testing laboratories is already in place.

Some further experimental details were requested from representatives of the EuroPUR scheme so that non-CertiPUR certified laboratories would in principle be able to carry out the test. These are now included in the revised text for EU Ecolabel furniture. The details that specifically specified the analysis of phthalates with soxhlet apparatus and dichloromethane have been removed after it was communicated that this particular method can have problems with blank results showing detectable levels of phthalates. During discussions with EuroPUR representatives, it was discovered that there are some slight differences in the requirements of the CertiPUR scheme in the US and that promoted in Europe. However, it is much more relevant to align fully with the EuroPUR promoted requirements since all EU Ecolabel furniture will be most likely manufactured using PU foams produced in Europe.

**b) 72h VOC emissions**

Chamber concentrations of the substances reported below shall not exceed the following values after a period of 72 hours shown in Table 17.

Table 17. 72-hour VOC emission limits for PUR foams.

Substance (CAS number)	Limit value (mg/m <sup>3</sup> )
Formaldehyde (50-00-0)	0.005
Toluene (108-88-3)	0.1
Styrene (100-42-5)	0.005
Each detectable compound classified as categories C1A or C1B according to the Regulation (EC) No 1272/2008 of the European Parliament and of the Council	0.005
Sum of all detectable compound classified as categories C1A or C1B according to Regulation (EC) No 1272/2008	0.04
Aromatic hydrocarbons	0.5
VOCs (total)	0.5

**Assessment and verification:**

The applicant shall provide test results that show compliance with the limits stated in Table 17. The test sample/chamber combination shall be either:

- 1 sample of 25x20x15 cm dimensions is placed in a 0.5 m<sup>3</sup> test chamber or
- 2 samples of 25x20x15 cm dimensions are placed in a 1.0 m<sup>3</sup> test chamber.

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The foam sample shall be placed on the bottom of an emission test chamber and conditioned for 3 days at 23 °C and 50 % relative humidity, applying an air exchange rate  $n$  of 0.5 per hour and a chamber loading  $L$  of  $0.4 \text{ m}^2/\text{m}^3$  (= total exposed surface of sample in relation to chamber dimensions without sealing edges and back) in accordance with ISO 16000-9 and ISO 16000-11.

Sampling shall be done  $72 \pm 2$  h after loading of the chamber during 1 hour via Tenax TA and DNPH cartridges for VOC and formaldehyde analysis respectively. The emissions of VOC are being trapped on Tenax TA sorbent tubes and subsequently analysed by means of thermo-desorption-GC-MS in accordance to ISO 16000-6.

Results are semi-quantitatively expressed as toluene equivalents. All specified individual components are reported from a concentration limit  $\geq 1 \mu\text{g}/\text{m}^3$ . Total VOC value is the sum of all components with a concentration  $\geq 1 \mu\text{g}/\text{m}^3$  and eluting within the retention time window from n-hexane (C6) to n-hexadecane (C16), both included. The sum of all detectable compounds classified as categories C1A or C1B according to Regulation (EC) No 1272/2008 is the sum of all these substances with a concentration  $\geq 1 \mu\text{g}/\text{m}^3$ . In case the test results exceed the standard limits, substance specific quantification needs to be performed. Formaldehyde can be determined by collection of the sampled air onto DNPH cartridge and subsequent analysis by HPLC/UV in accordance to ISO 16000-3.

Testing following the standard CEN/TS 16516 shall be considered as equivalent to those of the ISO 16000 series of standards.

**Rationale:**

The same as mentioned for the previous polyurethane foam sub-criteria. In particular the use of small representative samples, as with latex foam, facilitates the use of more widely available and cheaper small chamber tests.

### 7.3. Other padding materials

Other materials may be permitted to be used as padding in furniture upholstery so long as the following conditions are met:

- That the general requirements for hazardous substances set out in criterion 2 and the restricted substances conditions set out in Appendix IV are respected.
- Feathers or down shall not be used as padding/filling material either alone or in blends.
- Criteria 7.1 for latex foam shall apply if the padding/filling material uses coconut fibre rubberised using latex.

**Assessment and verification:**

The applicant shall provide a declaration stating:

- The nature of the padding/filling material used and any other blended materials;
- That the material does not contain any SVHCs or other hazardous substances with functional properties that are not specifically derogated in Table 4.
- That down or animal feathers have not been used in the filling/padding material, either alone or in blends.

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- If coconut fibres have been rubberised with latex, then compliance with criterion 7.1 for restricted substances and VOC emissions shall be demonstrated.

**Rationale:**

Other textile fibres such as cotton, wool, polyester and blends thereof can be used by producers as padding materials in furniture upholstery.

The original proposal was to generally align with the relevant EU Ecolabel criteria already set out for textiles in Decision 2014/350/EU, but it was argued that this could greatly increase the complexity of furniture criteria and prove burdensome for EU Ecolabel furniture applicants. Furthermore, criteria should not be too detailed for materials that ultimately only represent a small fraction of the total product weight and that do not come into direct skin contact with the user during normal use. The textile EU Ecolabel criteria set out in Decision 2014/350/EU were designed considering that textile is the dominant material in the product and generally comes into direct skin contact with the user.

With wool, a review of the criteria in Decision 2014/350/EU revealed that it would be difficult to set simple criteria for residual ecoparasiticide levels without the potential argument arising that the criteria in EU Ecolabel furniture for wool is more strict than that for wool in EU Ecolabel textiles. This is because the textile criteria set limits for these ecoparasitocides but also go into alternative means of demonstrating compliance which would be unrealistic to expect of furniture manufacturers.

Feathers and down are excluded from EU Ecolabel furniture due to ethical reasons associated with the inhumane plucking of down and feathers from live animals. This criteria was specifically requested by one stakeholder and reflects the requirements of the Nordic Ecolabel for textiles, hides/skins and leather (Version 4.0, Dec. 2012). Since there is no practical method by which it can be guaranteed that down or feathers have not been plucked from a live bird that it is simplest to exclude them.

The requirement for rubberised coconut fibres follows the same logic as set out in Decision 2014/391/EC for bed mattresses.



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## Criterion 8. Glass

This criterion applies to any glass-material included in the final furniture product regardless of the weight fraction it presents.

### 8.1. Use of heavy metals in glass.

Any glass used in the furniture product shall comply with the following conditions:

- i. Not contain leaded glass.
- ii. Not contain lead, mercury or cadmium impurities at levels  $\geq 100$  mg/kg per metal.
- iii. For mirror glass, any coatings or varnishes used on the backing shall have a lead content  $< 2000$  mg/kg on an as metal basis (of the in-can substance).

### Assessment and verification

- i. The applicant shall provide a declaration from the glass supplier stating that no leaded glass is present in the final furniture product. In the absence of a suitable declaration, the Competent Body may request analysis of glass in the final furniture product via a non-destructive method using a portable X-Ray Fluorescence instrument.
- ii. The applicant shall declare that the glass present in the furniture product does not contain lead, mercury or cadmium impurities at levels exceeding 100 mg/kg (0,01% w/w). In the absence of a suitable declaration, the Competent Body may request testing of these metals in the glass by X-Ray Fluorescence according to the principles of the ASTM F2853-10 standard or equivalent.
- iii. The applicant shall provide a declaration from the manufacturer of the varnish formulation used on any mirror backing and that the formulation is lead-free or contains less than 2000 mg/kg lead (0.2 % w/w). The declaration shall be supported by a relevant SDS or similar documentation.

### Rationale:

Leaded glass is used for decorative purposes but can contain very high contents of lead (18-40% as the oxide PbO). Although the lead is not mobile in the glass matrix, its production requires the mining and processing of lead ores and at the end of life the lead could potentially be mobilised if the glass is ground to a powder and used as fine aggregate or especially if it ends up in municipal waste and being sent to an incinerator.

A brief review of the decorative glass industry revealed that such glass can potentially contain undesirable heavy metals in the glass matrix or use solvent based adhesives and tin-oxide primers in substrates used to bind coloured polyethylene emulsions that may contain various heavy metal based pigments to the glass surface. Due to the lack of expert input from stakeholders and industry, it is best to simply request that three of the heavy metals most commonly associated with glass (lead, cadmium and mercury) are not present in levels beyond the arbitrary limit of 0.01% w/w (100mg/kg) for impurities. Further research in this area may be relevant in future revisions of this criteria.

With mirror glass, a reflective metal backing, often aluminium, is joined to transparent glass. Lead-based paints are often used to protect the metal backing from corrosion, which would

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end up impairing the functionality of the mirror. However, lead-free alternatives do exist. Both the Nordic Ecolabel criteria for furniture and fitments (Version 4.9 Mar. 2011) and the French NF 217 Ecolabel for furniture have criteria that restrict the lead content in protective varnishes to 0.2% w/w (2000mg/kg). From the wording of those criteria, it is uncertain if the 0,2% limit referred to the in-can varnish product or the final coating layer. **The most practical approach is to specify that the limit applies to the concentration of the in-can varnish formulation, which is simpler to assess and verify. It is highly unlikely that the lead content would be sufficiently high in the mirror backing to be restricted by the general hazardous substance criterion (i.e. >0.1% w/w of the coated article).**

## **8.2. Information to the consumer**

The applicant shall provide information about the type of glass used within any user manual or similar literature that is supplied to the customer along with the product. **This information shall include any relevant safety information as well as its suitability for contact with other hard materials such as glass, metal or stone.** Where the glass type is not suitable for disposal along with post-consumer glass containers (such as drinks bottles and glass jars), this shall be clearly and explicitly stated.

### ***Assessment and verification:***

The applicant shall provide a copy of any user manual or similar literature to be supplied to the customer, highlighting the text that refers to the type of glass used, **relevant safety information, its suitability for contact with other hard materials** and how it should be disposed of.

### ***Rationale:***

Although post-consumer glass containers are widely recycled across the EU, these schemes are not compatible with the glass used in furniture. This is mainly due to different chemical compositions that lead to different melting points. The incorrect disposal of small amounts of furniture glass in containers for post-consumer glass can contaminate entire batches of post-consumer glass.

Consequently there is a need for better efforts to be made for furniture glass recycling and this criterion also allows for take-back schemes and the identification of suitable 3<sup>rd</sup> parties – this information also being communicated to the consumer. The difficulty with true recycling of furniture glass is the reason why an allowance has also be made for “downcycling” to glass aggregate. Considerable experience exists with the use of glass aggregates in Portland cement-based materials.

The Nordic Ecolabel criteria for furniture and fitments excludes crystal glass and wire reinforced glass, presumably on the proviso that such glass is difficult to recycle. However, given the range of different glass types that can be used in furniture and the fact that no collection schemes for furniture glass types are available to the public, it is likely that any furniture glass will end up in landfill where it should remain relatively inert, being incinerated where it will form molten slag and ultimately incinerator bottom ash or being crushed and the millet being used as a fine aggregate (downcycling). These three probable routes for furniture

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glass are more or less the same for each type. For example, with laminated glass, the laminate would be burned off in the incinerator or separated during crushing to form fine aggregate. With wire reinforced glass, the metal wire may be recovered during crushing to form fine aggregate. With mirror glass, the coated backing layer would no doubt be separated during crushing to form fine aggregates.

### **8.3. Glass safety**

Any glass used in the furniture product shall meet the minimum requirements for safety glass and any minimum EN standard requirements relevant to particular uses of glass in specific types of furniture.

#### **Assessment and verification:**

The applicant shall provide test reports as requested under the general requirements of EN 14072 or 12600 which demonstrate that the mode of breakage of any glass used in the furniture is either as Type B (numerous cracks appear, but the fragments hold together and do not separate) or Type C (disintegration occurs, leading to a large number of small particles that are relatively harmless).

Where the furniture product is a table, the applicant shall provide test reports demonstrating compliance with any relevant drop test requirements for safety glass in:

- EN 12521 for domestic tables (140 or 180 mm depending on size of glass used)
- EN 15372 for non-domestic tables (240 mm – considered adequate for severe<sup>25</sup> uses)

#### **Rationale:**

Most furniture products do not carry a CE marking and so general compliance with the General Products Safety Directive, although highly relevant to glass containing furniture, should not be assumed.

In general, safety considerations are not considered within the scope of environmental criteria except where exposure to hazardous chemicals is the main safety issue. However, due to the seriousness of potential accidents that can occur with glass, it is considered prudent to require that all glass used in Ecolabel furniture to meet the requirements of safety glass.

Ordinary or annealed glass can be cut, processed and edge worked as necessary but safety glass (toughened glass) cannot. However, it should be noted that ordinary glass, once cut, drilled and/or shaped to the required form, can then be converted into safety glass by heating followed rapid cooling. Consequently there are no real technical barriers caused by requiring that all glass in furniture be safety glass.

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<sup>25</sup> Examples include in night clubs, police stations, transport terminals, hospital public areas, casinos, homes for the elderly, sports changing rooms, prisons and barracks.

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## Criterion 9. Final product requirements

This requirement refers to the final assembled furniture product. For furniture that is sold disassembled where the customer is responsible for subsequent assembly, the manufacturer must still demonstrate compliance with these requirements for correctly assembled products.

### 9.1. Fitness for use

EU Ecolabel furniture shall be considered as fit for use if it meets at least one of the following requirements:

- a) Complies with the minimum requirements of the applicable EN standard listed in Appendix V related to the durability, strength or ergonomic performance of the particular furniture product or component thereof. Where the standard is not simply pass or fail, the minimum limit specified in Appendix V shall be complied with.
- b) The furniture producer shall provide a 5 year guarantee of product performance under normal use and the provision of a repair service and/or replacement part service during the guarantee period and at a cost that is proportional to the part of the furniture product being repaired or replaced. .

#### **Assessment and verification:**

- a) The applicant shall provide a declaration stating compliance with any relevant EN standards, supported, as appropriate, by test reports from either the furniture manufacturer or component part suppliers. Any requirements for ergonomics only apply to office chairs, office tables/desks (EN 1335-1 and EN 527-1) and chairs/tables for use in educational institutions (EN 1729-1).
- b) The applicant shall provide a written guarantee for product performance under normal use for a period of at least 5 years from the date of purchase. The written text for consumers shall clearly include information on the company contact and details of any other relevant parties in relation to the repair or replacement part service. The guarantee text shall comply with any minimum requirements of national laws in the country or countries where the product is to be marketed.

#### **Rationale:**

Most stakeholders agreed that EN standards for furniture technical requirements should be followed where available. Consequently, a list of relevant EN standards from CEN/TC 207 is provided in Appendix V.

The list has been narrowed down, removing standards that were listed as non-ratified EN standards (i.e. all CEN/TS references) and standards that were either not currently in force or that did not refer to testing and minimum requirements. For example, all references related to terminology have been removed. Standards that are only related to safety have been removed since this is technically not an environmental issue and glass safety, which is arguably the biggest concern, is covered separately in glass sub-criteria.

Where a test goes beyond a simple pass/fail requirement and defines different levels of performance, a minimum performance level is now included in Appendix V.

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Some arguments arose regarding the relevance of ergonomics in Ecolabel criteria since this may be considered as a subjective quality. Furthermore, EU workplace directives provide a framework for minimum ergonomic requirements for office furniture. In Denmark and the Netherlands, office tables/desks and chairs must meet the highest type A requirement as specified in EN 527-1 and EN 1335-1. The relevance of criteria for ergonomics and technical performance in the EU Ecolabel are justified by reference to Article 6 of the Ecolabel Regulation No. 66/2010, which states:

*“...criteria shall include requirements intended to ensure that the products bearing the EU Ecolabel function adequately in accordance with their intended use.”.*

Ergonomic standards with tables/desks and chairs refers to the adjustability of desks and chairs and so helps ensure that a product will meet the requirements of a variety of end users and so could potentially extend its useful life. Type A requirements for office chairs and desks are designed to ensure that they are adjustable to an extent to meet comfort requirements for 95% of potential users.

Further research revealed that most furniture items are not CE marked and therefore compliance with relevant EN standards for product performance cannot be assumed.

Testing of furniture is not cheap and reference to the 2014 prices in the Italian version of the CATAS catalogue revealed that single tests generally cost slightly more than 100 Euros and can reach over 1000 Euros for more complex tests (although a 50% reduction in these costs would apply to CATAS members). Since the furniture industry is basically an assembly industry, it is likely that suppliers who mass produce panels or other component parts will have this information relevant to some of these tests. In these cases, no additional costs are passed on to the applicant. However, where standards refer to testing of the final assembled product, the costs could be very significant to smaller companies with lower sales volumes and so an alternative and simplified approach is allowed, which would be to provide a 5 year guarantee.

## **9.2. Design for disassembly**

- a) For furniture consisting of multiple components, the product shall be designed for disassembly and simple and illustrated instructions regarding the disassembly and replacement of damaged component parts shall be provided. Disassembly and replacement operations should be capable of being carried out using common and basic manual tools and unskilled labour.
- b) The furniture manufacturer shall make spare parts available to customers for a period of at least 5 years after the purchase of the furniture item. The cost (if any) of spare parts shall be proportional to the total cost of the furniture product.

### **Assessment and verification**

- a) The applicant shall provide technical drawings that illustrate how the furniture item can be assembled/disassembled using basic tools and unskilled labour. In the case of upholstery, such disassembly may include the use of zip fastenings and velcro to attach/detach sofa cushions from the frame and interior padding from covering

materials. If necessary, provision must be made for screw fittings that go directly into wood-based panels so that the screw can be re-inserted during reassembly at a different point than where it was removed from during disassembly.

- b) The applicant shall provide a declaration that spare parts shall be available for a period of at least 5 years from the date of purchase of the product. The parts shall be available for free during the guarantee period if the goods are found to be faulty during normal use or at a proportionate cost if the goods were damaged by misuse.

**Rationale:**

Many furniture components are durable and have a long life. The end-of life of a furniture product can arise simply due to user preferences or other logistical reasons. However, end-of-life of a multi-component furniture product can often be brought about by the failure of only one component part. In order to prevent such situations, the following aspects are needed:

- That the damaged component can easily be removed by the user.
- That appropriate spare parts are available and the user knows how to get them
- That the spare part is free or at least available at a reasonable cost
- That the user can easily assemble the new part to the furniture product.

This criterion aims to ensure that the 4 points above can be met with regards to EU Ecolabel furniture.

**9.3. VOC emissions**

If the furniture product contains any of the materials or components listed below, VOC emission testing shall be required.:

- Upholstery coverings made of leather
- Upholstery coverings made of coated fabrics
- Any components that account for >5% of the total furniture product weight (excluding packaging) and that have been treated with high VOC content (>5%) coating formulations that have been applied at rates >30g/m<sup>2</sup> of coated surface area or whose application rates have not been calculated.

Sample packaging, handling and conditioning, test chamber requirements and gas analysis methods shall follow the procedures described in the ISO 16000 set of standards.

Testing may be carried out on the entire furniture product (see conditions and limits in Table 18) or in smaller test chambers specifically for the component parts listed above (see conditions and limits in Table 19).

Table 18. Maximum VOC emission limit values for specific furniture products

Test parameter	Armchairs and Sofas	Office chairs	Other furniture items
Chamber volume	In the range of 2-10m <sup>3</sup>		
Loading rate	Product should occupy approximately 25% of chamber volume		*0.5-1.5m <sup>2</sup> /m <sup>3</sup>

Ventilation rate	4.0 m <sup>3</sup> /h		2.0 m <sup>3</sup> /h		*0.5-1.5h <sup>-1</sup>
<b>Substance</b>	<b>3d</b>	<b>28d</b>	<b>3d</b>	<b>28d</b>	<b>28d</b>
TVOC*	≤ 3.0 mg/m <sup>3</sup>	≤ 0.4 mg/m <sup>3</sup>	-	≤ 450 µg/m <sup>3</sup>	≤ 450 µg/m <sup>3</sup>
TSVOC	-	≤ 0.1 mg/m <sup>3</sup>	-	≤ 80 µg/m <sup>3</sup>	≤ 80 µg/m <sup>3</sup>
C-substances†	≤ 10 µg/m <sup>3</sup> (total limit)	≤ 1 µg/m <sup>3</sup> (per substance)	≤ 10 µg/m <sup>3</sup> (total limit)	≤ 1 µg/m <sup>3</sup> (per substance)	≤ 1 µg/m <sup>3</sup> (per substance)
R-value for LCI substances‡	-	≤ 1	-	≤ 1	≤ 1

\*although there is scope to vary the loading rate and ventilation rate, the ratio between the loading rate (m<sup>2</sup>/m<sup>3</sup>) and the ventilation rate (h<sup>-1</sup>) shall be maintained at 1.0.

Table 19. Maximum VOC emission limit values for targeted furniture materials/parts

Test parameter	Coated components		Leather or coated fabric upholstery coverings	
Minimum allowed chamber volume	200L for wood based components 20L for other components		20L	
Ventilation rate	0.5h <sup>-1</sup>		1.5 m <sup>3</sup> /m <sup>2</sup> .h	
<b>Substance</b>	<b>3d</b>	<b>28d</b>	<b>3d</b>	<b>28d</b>
TVOC*	≤ 3.0 mg/m <sup>3</sup>	≤ 0.4 mg/m <sup>3</sup>	-	≤ 450 µg/m <sup>3</sup>
TSVOC	-	≤ 0.1 mg/m <sup>3</sup>	-	≤ 80 µg/m <sup>3</sup>
C-substances†	≤ 10 µg/m <sup>3</sup> (total limit)	≤ 1 µg/m <sup>3</sup> (per substance)	≤ 10 µg/m <sup>3</sup> (total limit)	≤ 1 µg/m <sup>3</sup> (per substance)
R-value for LCI substances‡	-	≤ 1	-	≤ 1

\* TVOC – Total Volatile Organic Compounds, defined as those compounds eluting within the retention range of C<sub>6</sub> to C<sub>16</sub> (inclusive) on a capillary column coated with 5% phenyl / 95% methyl-poly-siloxane.

\*\* TSVOC – Total Semi-Volatile Organic Compounds, defined as those compounds eluting within the retention range of >C<sub>16</sub> to C<sub>22</sub> (inclusive) on a capillary column coated with 5% phenyl / 95% methyl-poly-siloxane.

† Carcinogenic VOC substances (see list in Appendix VI)

‡ R value = total of all quotients (C<sub>i</sub> / LCI<sub>i</sub>) < 1 (where C<sub>i</sub> = substance concentration in the chamber air, LCI<sub>i</sub> = LCI value of the substance as defined by the latest data defined under the European Collaborative Action "Urban air, indoor environment and human exposure". (see list of the substances that have been allocated interim LCI values in Appendix VI).

### Assessment and verification:

Where the furniture product is deemed to require final product VOC emission testing the applicant shall provide a test report or reports from an accredited laboratory from chamber tests carried according to the ISO 16000 series of standards. Tests carried out according to CEN/TS 16516 shall be considered as equivalent to ISO 16000.

Test data from up to 12 months prior to the Ecolabel application shall be valid for products or components so long as no changes to the manufacturing process or chemicals used have been made that would be considered to increase VOC emissions from the final product or relevant component parts.

Test data demonstrating compliance with the limits in Table 19 for relevant components that is provided directly by component suppliers, shall also be accepted if they are accompanied by a declaration from the component supplier.

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**Rationale:**

Testing approach taken – costs and availability of facilities

Considerable interest was expressed by some Competent Body representatives for VOC emission testing of the final product. However, setting emission limits for furniture products is not straightforward due to the immense range of possible products that may lie within the scope. Concerns were also expressed by industry that the cost of VOC emission testing is extremely expensive, especially for large chamber testing. Costs of up to 5000 Euros per product test were communicated at the meeting. A representative of testing laboratories confirmed that test prices could range as follows:

Table 20. Potential VOC emission test costs

	Small chambers (<1.0m <sup>3</sup> )		Large chambers (>1.0m <sup>3</sup> )	
	3d or 7d	14d or 28d	3d or 7d	14d or 28d
One time analysis	€1000-1500	€1500-2000	€1500-2500	€2000-3000

The main cost elements of the test are sample and chamber preparation and the extraction and analysis of gas samples. The number of VOCs to be analysed for is apparently not one of the main cost drivers and so there is no problem with requiring that long lists of VOCs be analysed in order to demonstrate compliance with the R-value or Carcinogenic substance limits. Some significant cost savings could be introduced by removing the requirements for testing after 3 days.

Due to the high cost of testing, a flexible approach has been proposed where manufacturers may completely avoid the requirement for VOC emission testing (for example by the non-use of coatings, the use of low VOC content coatings or the use of textiles instead of leather or coated fabrics for upholstery covering material).

If testing is required, then one of two approaches can be taken:

- i. Test only the targeted components of highest concern with regards to VOC emissions, or
- ii. Test the entire assembled furniture product.

Separate limits and test conditions are defined in Tables 18 and 19 depending on the approach to be taken. These align with the Blue Angel criteria and, according to the approach taken in those criteria, the limits for upholstery materials are set with the idea to limit the contribution of VOC content in indoor-air from EU Ecolabel furniture upholstery to less than 300µg/m<sup>3</sup> after 28 days in an average sized living room.

Significant savings (€500-1000 per test) may be made by using smaller test chambers if only one type of component needs to be tested. However, if different components need to be tested separately (because different emission limits and loading rates apply) then it may be no more expensive to test the entire assembled product in a large chamber.

Besides cost, another reason for allowing the approach to use small test chambers for targeted components is the availability of testing facilities. A representative of the testing industry estimated that there are approximately 1000 small test chambers available in Europe at the moment (split between 40-50 facilities) while there are only around 50 large test



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chambers in Europe (split between 10-20 facilities). Although almost half of all facilities are concentrated in France and Germany, the sample preparation methods detailed in ISO 16000 make allowance for long range delivery of samples.

Most importantly, by allowing testing of the most relevant components in small chambers, it may be practical for applicants to request the testing information from suppliers prior to purchasing components or agree to share costs of testing.

#### Testing approach taken – choice of limits and VOCs to analyse

The conditions set out in Tables 18 and 19 are generally aligned with requirements set out in the Blue Angel RAL UZ 38, RAL UZ 117 and RAL UZ 148 criteria for "Low emission furniture and slatted frames made of wood and wood-based materials", "Low emission upholstered furniture" and "Low emission upholstery leathers", respectively.

The R-value limit relates to VOCs with an assigned LCI value<sup>26</sup>. LCI values are the result of harmonising previously distinct values developed independently by ANSES<sup>27</sup> in France and AgBB<sup>28</sup> in Germany. This is an ongoing process and currently (December 2014) some 95 of the 180 identified VOCs of potential concern in indoor-air have still to be assigned LCI values at the EU level. A list of substances and currently ascribed LCI values is included in Appendix VI as well as an example calculation of how test results can be converted into R values.

Unlike in the previous Blue Angel criteria, no individual limit is set for formaldehyde, since this is already addressed in the general requirement for carcinogenic VOCs. The carcinogenic VOCs to be analysed are listed in Appendix VI. The limits for total aldehydes and total compounds with no-LCI value given in the Blue Angel criteria have not been transferred to the EU Ecolabel criteria for furniture since the aim here is to focus mainly on hazardous VOCs. However, a general limit for TVOC and TSVOC is included because this provides a general indication for manufacturers and users of the emissions that can be expected from the product and links to the previous sub-criteria for coatings used on wooden or metal components (criterion 3.2e) and 5.3) which only relate to total VOC contents also.

No requirements are set for VOC emissions from textile upholstery coverings partly because anecdotal evidence revealed that VOC emissions were significantly less than those of leather or coated fabrics and also because any requirement could possibly result in EU Ecolabel textiles having to undergo further testing and not being compliant by default. The current EU Ecolabel criteria for textiles impose limits for extractable formaldehyde rather than formaldehyde (and other VOC) emissions to air. This could lead to confusion amongst potential applicants if additional testing was required on EU Ecolabel textiles before they

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<sup>26</sup> LCI = Lowest Concentration of Interest (of individual VOCs). The LCI concept was first developed by the European Collaborative Action on 'Indoor Air Quality and its Impact on Man' when considering the best way to evaluate emissions from solid flooring materials. It was defined (see ECA Report No.18, 1997) as "the lowest concentration above which, according to best professional judgement, the pollutant may have some effect on people in the indoor environment".

<sup>27</sup> ANSES – French Agency for Food, Environmental and Occupational Health & Safety. See: [www.anses.fr](http://www.anses.fr)

<sup>28</sup> AgBB – German Committee for Health-related Evaluation of Building Products. See: <http://www.umweltbundesamt.de>

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could be used in EU Ecolabel furniture. Perhaps in future textile criteria the need to require VOC emission testing, at least for natural textiles that have been treated with easy-care finishes and any synthetic textiles could be introduced and aligned with requirements for furniture.

#### Choice of standard method

Reference is made to the use of CEN/TS 16516 even though it has not yet been formally ratified (expected end of 2016) because it will become the reference VOC emission test in Europe due to the fact that it has been developed as part of the Construction Products Regulation (CPR No. 305/2011), and more specifically "EC Mandate 366, a horizontal approach to indoor VOC emissions". The EN 16516 method attempts to improve the ISO 16000-base method by tightening the flexibility afforded in ISO 16000 in certain experimental variables in order to improve the reproducibility of results. At least until EN 16516 is adopted, testing according to ISO 16000 should be permitted. It should be noted that furniture does not lie within the scope of the CPR but any voluntary measures to target VOC emissions to indoor-air, such as the EU Ecolabel for furniture, should attempt to align with EN 16516 which will provide a framework to link results to the European standard reference room.

#### Other relevant approaches to VOC emissions

The French government has adopted a labelling scheme for VOC emission from construction products, with the following classes: A+, A, B and C. and DG-JRC is continuing to publish a series of reports under the European Collaborative Action on Urban Air, Indoor Environment and Human Exposure<sup>29</sup>. The values chosen above would correspond with the A class equivalent limits.

With regards to VOC emissions from furniture, significant work has been carried out by the FCBA in France summarised in their report "Contribution de Mobilier a la qualite de l'air interieur dans les creches" and other related reports.

In the US, the BIFMA scheme (ANSI/BIFMA M7.1-2011) has been set up for VOC emission testing of office furniture and defines two product groups "systems furniture", and "seating". Emissions are measured in a ventilated chamber test and a series of measurements are taken at periods between 3 and 14 days after placement in the chamber. Emission rates can be calculated ( $\mu\text{g}/\text{m}^2\cdot\text{h}$ ) or ( $\mu\text{g}/\text{m}^3\cdot\text{h}$ ) depending on how the product being tested is defined, and 7 day limits for TVOC, formaldehyde, total aldehydes and 4-phenylcyclohexane are set in the ANSI/BIFMA M7.1-2011 standard.

Although there is a global harmonised system in place for labelling the hazards present in packaged products there is no such harmonisation between what levels of VOC contaminants in indoor-air are considered to be of concern to human health. An example of threshold air concentrations of concern of select substances is shown in the table below.

Table 21. VOCs with emission limits defined under different systems

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<sup>29</sup> See: [http://ihcp.jrc.ec.europa.eu/our\\_activities/public-health/indoor\\_air\\_quality/eca/jrc-published-harmonisation-framework-health-based-evaluation-emissions](http://ihcp.jrc.ec.europa.eu/our_activities/public-health/indoor_air_quality/eca/jrc-published-harmonisation-framework-health-based-evaluation-emissions)

No.	Compound Name	CAS No.	CREL	EU-LCI	ANSES	AgBB
			(µg/m <sup>3</sup> )			
1	Acetaldehyde	75-07-0	140	1200	200	--
7	Dichlorobenzene (1,4-)	106-46-7	800	150	60	--
12	Ethylbenzene	100-41-4	2000	850	750	880
28	Styrene	100-42-5	900	250	250	860
30	Toluene	108-88-3	300	2900	300	1900
33	Xylenes, (m-, o-, p-xylene combined)	108-38-3, 95-47-6, 106-42-3	700	500	200	2200

CREL – Chronic Reference Exposure Level, defined by the Californian Office of Environmental Health Hazard Assessment, see: [http://www.oehha.ca.gov/air/chronic\\_rels/](http://www.oehha.ca.gov/air/chronic_rels/)

From the examples above it is clear that no significant or consistent trend exists amongst different agencies over what can be considered as a threshold air concentration of concern to human health.

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## **Criterion 10. Information appearing on the EU Ecolabel**

Box 2 of the Ecolabel may contain, where relevant, the following information:

- Wood from sustainable managed forests
- Restricted hazardous substances
- Low formaldehyde emission product
- Low VOC emission product
- Product with extended warranty
- Product designed for disassembly and ease of repair

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## Appendix I: List of FSC & PEFC principles & sub-criteria for reference

To illustrate how difficult it would be to concisely summarise EU Ecolabel criteria that aligns with that of the FSC and PEFC sustainable forest management certification schemes, the currently valid principles with each scheme are provided in the tables below for reference.

Table 22. FSC Principles and criteria (FSC-STD-01-001 V5.0)

No.	PRINCIPLE / criteria
<b>1 - COMPLIANCE WITH LAWS:</b> <i>The Organization*</i> shall comply with all <i>applicable laws*</i> , regulations and nationally- <i>ratified*</i> international treaties, conventions and agreements.	
1.1	<i>The Organization*</i> shall be a legally defined entity with clear, documented and unchallenged <i>legal registration*</i> , with written authorization from the <i>legally competent*</i> authority for specific activities.
1.2	<i>The Organization*</i> shall demonstrate that the <i>legal status*</i> of the <i>Management Unit*</i> , including <i>tenure*</i> and <i>use rights*</i> , and its boundaries, are clearly defined.
1.3	<i>The Organization*</i> shall have <i>legal*</i> rights to operate in the <i>Management Unit*</i> , which fit the <i>legal status*</i> of The Organization and of the Management Unit, and shall comply with the associated legal obligations in applicable <i>national and local laws*</i> and regulations and administrative requirements. The legal rights shall provide for harvest of products and/or supply of <i>ecosystem services*</i> from within the Management Unit. The Organization shall pay the legally prescribed charges associated with such rights and obligations.
1.4	<i>The Organization*</i> shall develop and implement measures, and/or shall engage with regulatory agencies, to systematically protect the <i>Management Unit*</i> from unauthorized or illegal resource use, settlement and other illegal activities.
1.5	<i>The Organization*</i> shall comply with the applicable <i>national laws*</i> , <i>local laws*</i> , <i>ratified*</i> international conventions and <i>obligatory codes of practice*</i> , relating to the transportation and trade of forest products within and from the <i>Management Unit*</i> , and/or up to the point of first sale.
1.6	<i>The Organization*</i> shall identify, prevent and resolve disputes over issues of statutory or customary law*, which can be settled out of court in a timely manner, through <i>engagement*</i> with <i>affected stakeholders*</i> .
1.7	<i>The Organization*</i> shall publicize a commitment not to offer or receive bribes in money or any other form of corruption, and shall comply with anti-corruption legislation where this exists. In the absence of anti-corruption legislation, The Organization shall implement other anti-corruption measures proportionate to the <i>scale*</i> and <i>intensity*</i> of management activities and the <i>risk*</i> of corruption.
1.8	<i>The Organization*</i> shall demonstrate a long-term commitment to adhere to the FSC <i>Principles*</i> and <i>Criteria*</i> in the <i>Management Unit*</i> , and to related FSC Policies and Standards. A statement of this commitment shall be contained in a <i>publicly available*</i> document made freely available.
<b>PRINCIPLE 2 – WORKERS RIGHTS AND EMPLOYMENT CONDITIONS:</b> <i>The Organization*</i> shall maintain or enhance the social and economic wellbeing of <i>workers*</i> .	
2.1	<i>The Organization*</i> shall <i>uphold*</i> the principles and rights at work as defined in the ILO Declaration on Fundamental Principles and Rights at Work (1998) based on the eight ILO Core Labour Conventions.
2.2	<i>The Organization*</i> shall promote gender <i>equality*</i> in employment practices, training opportunities, awarding of contracts, processes of <i>engagement*</i> and management activities.
2.3	<i>The Organization*</i> shall implement health and safety practices to protect <i>workers*</i> from occupational safety and health hazards. These practices shall, proportionate to <i>scale, intensity and risk*</i> of management activities, meet or exceed the recommendations of the ILO Code of Practice on Safety and Health in Forestry Work.
2.4	<i>The Organization*</i> shall pay wages that meet or exceed minimum forest industry standards or other recognized forest industry wage agreements or <i>living wages*</i> , where these are higher than the legal minimum wages. When none of these exist, The Organization shall through <i>engagement*</i> with <i>workers*</i> develop mechanisms for determining living wages.
2.5	<i>The Organization*</i> shall demonstrate that workers have job-specific training and supervision to safely and effectively implement the <i>management plan*</i> and all management activities.
2.6	<i>The Organization*</i> through <i>engagement*</i> with <i>workers*</i> shall have mechanisms for resolving grievances and for providing fair compensation to workers for loss or damage to property, <i>occupational diseases*</i> , or <i>occupational injuries*</i> sustained while working for The Organization.
<b>PRINCIPLE 3 – INDIGENOUS PEOPLES' RIGHTS:</b> <i>The Organization*</i> shall identify and <i>uphold*</i> <i>indigenous peoples*</i> legal and <i>customary rights*</i> of ownership, use and management of land, territories and resources affected by management activities.	

3.1	<i>The Organization*</i> shall identify the <i>indigenous peoples*</i> that exist within the <i>Management Unit*</i> or are affected by management activities. The Organization shall then, through <i>engagement*</i> with these indigenous peoples, identify their rights of <i>tenure*</i> , their rights of access to and use of forest resources and <i>ecosystem services*</i> , their <i>customary rights*</i> and legal rights and obligations, that apply within the Management Unit. The Organization shall also identify areas where these rights are contested.
3.2	<i>The Organization*</i> shall recognize and <i>uphold*</i> the legal and <i>customary rights*</i> of <i>indigenous peoples*</i> to maintain control over management activities within or related to the <i>Management Unit*</i> to the extent necessary to protect their rights, resources and lands and territories. Delegation by indigenous peoples of control over management activities to third parties requires <i>Free, Prior and Informed Consent*</i> .
3.3	In the event of delegation of control over management activities, a binding agreement between <i>The Organization*</i> and the <i>indigenous peoples*</i> shall be concluded through <i>Free, Prior and Informed Consent*</i> . The agreement shall define its duration, provisions for renegotiation, renewal, termination, economic conditions and other terms and conditions. The agreement shall make provision for monitoring by indigenous peoples of The Organization's compliance with its terms and conditions.
3.4	<i>The Organization*</i> shall recognize and <i>uphold*</i> the rights, customs and culture of <i>indigenous peoples*</i> as defined in the United Nations Declaration on the Rights of Indigenous Peoples (2007) and ILO Convention 169 (1989).
3.5	<i>The Organization*</i> , through <i>engagement*</i> with <i>indigenous peoples*</i> , shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance and for which these indigenous peoples hold legal or <i>customary rights*</i> . These sites shall be recognized by The Organization and their management, and/or protection shall be agreed through engagement with these indigenous peoples.
3.6	<i>The Organization*</i> shall <i>uphold*</i> the right of <i>indigenous peoples*</i> to protect and utilize their traditional knowledge and shall compensate indigenous peoples for the utilization of such knowledge and their <i>intellectual property*</i> . A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the indigenous peoples for such utilization through <i>Free, Prior and Informed Consent*</i> before utilization takes place and shall be consistent with the protection of intellectual property rights.
<b>PRINCIPLE 4 – COMMUNITY RELATIONS:</b> <i>The Organization*</i> shall contribute to maintaining or enhancing the social and economic wellbeing of <i>local communities*</i> .	
4.1	<i>The Organization*</i> shall identify the <i>local communities*</i> that exist within the <i>Management Unit*</i> and those that are affected by management activities. The Organization shall then, through <i>engagement*</i> with these <i>local communities*</i> , identify their rights of <i>tenure*</i> , their rights of access to and use of forest resources and <i>ecosystem services*</i> , their <i>customary rights*</i> and legal rights and obligations, that apply within the Management Unit.
4.2	<i>The Organization*</i> shall recognize and <i>uphold*</i> the legal and <i>customary rights*</i> of <i>local communities*</i> to maintain control over management activities within or related to the <i>Management Unit*</i> to the extent necessary to protect their rights, resources, lands and territories. Delegation by local communities of control over management activities to third parties requires <i>Free, Prior and Informed Consent*</i> .
4.3	<i>The Organization*</i> shall provide <i>reasonable*</i> opportunities for employment, training and other services to <i>local communities*</i> , contractors and suppliers proportionate to scale and intensity of its management activities.
4.4	<i>The Organization*</i> shall implement additional activities, through <i>engagement*</i> with <i>local communities*</i> , that contribute to their social and economic development, proportionate to the scale, intensity and socio-economic impact of its management activities.
4.5	<i>The Organization*</i> , through <i>engagement*</i> with <i>local communities*</i> , shall take action to identify, avoid and mitigate significant negative social, environmental and economic impacts of its management activities on affected communities. The action taken shall be proportionate to the <i>scale, intensity and risk*</i> of those activities and negative impacts.
4.6	<i>The Organization*</i> , through <i>engagement*</i> with <i>local communities*</i> , shall have mechanisms for resolving grievances and providing fair compensation to local communities and individuals with regard to the impacts of management activities of The Organization.
4.7	<i>The Organization*</i> , through <i>engagement*</i> with <i>local communities*</i> , shall identify sites which are of special cultural, ecological, economic, religious or spiritual significance, and for which these local communities hold legal or <i>customary rights*</i> . These sites shall be recognized by The Organization, and their management and/or protection shall be agreed through engagement with these local communities.
4.8	<i>The Organization*</i> shall <i>uphold*</i> the right of <i>local communities*</i> to protect and utilize their traditional knowledge and shall compensate local communities for the utilization of such knowledge and their <i>intellectual property*</i> . A binding agreement as per Criterion 3.3 shall be concluded between The Organization and the local communities for such utilization through <i>Free, Prior and Informed Consent*</i> before utilization takes place, and shall be consistent with the protection of intellectual property rights.
<b>PRINCIPLE 5 – BENEFITS FROM THE FOREST:</b> <i>The Organization*</i> shall efficiently manage the range of multiple products and services of the <i>Management Unit*</i> to maintain or enhance long term <i>economic viability*</i> and the range of environmental and social benefits.	
5.1	<i>The Organization*</i> shall identify, produce, or enable the production of, diversified benefits and/or products, based on the range of resources and <i>ecosystem services*</i> existing in the <i>Management Unit*</i> in order to strengthen and diversify the local economy proportionate to the <i>scale*</i> and <i>intensity*</i> of management activities.

5.2	<i>The Organization*</i> shall normally harvest products and services from the <i>Management Unit*</i> at or below a level which can be permanently sustained.
5.3	<i>The Organization*</i> shall demonstrate that the positive and negative <i>externalities*</i> of operation are included in the <i>management plan*</i> .
5.4	<i>The Organization*</i> shall use local processing, local services, and local value adding to meet the requirements of The Organization where these are available, proportionate to scale, <i>intensity and risk*</i> . If these are not locally available, The Organization shall make <i>reasonable*</i> attempts to help establish these services.
5.5	<i>The Organization*</i> shall demonstrate through its planning and expenditures proportionate to <i>scale, intensity and risk*</i> , its commitment to long-term <i>economic viability*</i> .
<b>PRINCIPLE 6 – ENVIRONMENTAL VALUES AND IMPACTS:</b> <i>The Organization*</i> shall maintain, conserve and/or restore <i>ecosystem services*</i> and <i>environmental values*</i> of the <i>Management Unit*</i> , and shall avoid, repair or mitigate negative environmental impacts.	
6.1	<i>The Organization*</i> shall assess <i>environmental values*</i> in the <i>Management Unit*</i> and those values outside the <i>Management Unit</i> potentially affected by management activities. This assessment shall be undertaken with a level of detail, scale and frequency that is proportionate to the <i>scale, intensity and risk*</i> of management activities, and is sufficient for the purpose of deciding the necessary conservation measures, and for detecting and monitoring possible negative impacts of those activities.
6.2	Prior to the start of site-disturbing activities, <i>The Organization*</i> shall identify and assess the <i>scale, intensity and risk*</i> of potential impacts of management activities on the identified <i>environmental values*</i> .
6.3	<i>The Organization*</i> shall identify and implement effective actions to prevent negative impacts of management activities on the <i>environmental values*</i> , and to mitigate and repair those that occur, proportionate to the <i>scale, intensity and risk*</i> of these impacts.
6.4	<i>The Organization*</i> shall protect <i>rare species*</i> and <i>threatened species*</i> and their <i>habitats*</i> in the <i>Management Unit*</i> through <i>conservation zones*</i> , <i>protection areas*</i> , <i>connectivity*</i> and/or (where necessary) other direct measures for their survival and viability. These measures shall be proportionate to the <i>scale, intensity and risk*</i> of management activities and to the conservation status and ecological requirements of the rare and threatened species. The Organization shall take into account the geographic range and ecological requirements of rare and threatened species beyond the boundary of the Management Unit, when determining the measures to be taken inside the Management Unit.
6.5	<i>The Organization*</i> shall identify and protect representative sample areas of native ecosystems and/or restore them to more natural conditions. Where representative sample areas do not exist, The Organization shall restore a proportion of the <i>Management Unit*</i> to more natural conditions. The size of the areas and the measures taken for their protection or restoration shall be proportionate to the conservation status and value of the ecosystems at the landscape level, and the <i>scale, intensity and risk*</i> of management activities.
6.6	<i>The Organization*</i> shall effectively maintain the continued existence of naturally occurring native species and genotypes, and prevent losses of <i>biological diversity*</i> , especially through habitat management in the <i>Management Unit*</i> . The Organization shall demonstrate that effective measures are in place to manage and control hunting, fishing, trapping and collecting.
6.7	<i>The Organization*</i> shall protect or restore natural water courses, water bodies, riparian zones and their connectivity. The Organization shall avoid negative impacts on water quality and quantity and mitigate and remedy those that occur.
6.8	<i>The Organization*</i> shall manage the <i>landscape*</i> in the <i>Management Unit*</i> to maintain and/or restore a varying mosaic of species, sizes, ages, spatial scales and regeneration cycles appropriate for the <i>landscape values*</i> in that region, and for enhancing environmental and economic <i>resilience*</i> .
6.9	<i>The Organization*</i> shall not convert <i>natural forest*</i> to <i>plantations*</i> , nor natural forests or plantations to any other land use, except when the conversion: a) affects a very limited portion of the area of the <i>Management Unit*</i> , and b) will produce clear, substantial, additional, secure long-term conservation benefits in the Management Unit, and c) does not damage or threaten <i>High Conservation Values*</i> , nor any sites or resources necessary to maintain or enhance those High Conservation Values.
6.10	<i>Management Units*</i> containing <i>plantations*</i> that were established on areas converted from <i>natural forest*</i> after November 1994 shall not qualify for certification, except where: a) clear and sufficient evidence is provided that <i>The Organization*</i> was not directly or indirectly responsible for the conversion, or b) the conversion affected a very limited portion of the area of the Management Unit and is producing clear, substantial, additional, secure long term conservation benefits in the Management Unit.

<b>PRINCIPLE 7 - MANAGEMENT PLANNING:</b> <i>The Organization*</i> shall have a <i>management plan*</i> consistent with its policies and <i>objectives*</i> and proportionate to <i>scale, intensity and risks*</i> of its management activities. The management plan shall be implemented and kept up to date based on monitoring information in order to promote <i>adaptive management*</i> . The associated planning and procedural documentation shall be sufficient to guide staff, inform <i>affected stakeholders*</i> and <i>interested stakeholders*</i> and to justify management decisions.	
7.1	<i>The Organization*</i> shall, proportionate to <i>scale, intensity and risk*</i> of its management activities, set policies (visions and values) and <i>objectives*</i> for management, which are environmentally sound, socially beneficial and economically viable. Summaries of these policies and objectives shall be incorporated into the <i>management plan*</i> , and publicized.
7.2	<i>The Organization*</i> shall have and implement a <i>management plan*</i> for the <i>Management Unit*</i> which is fully consistent with the policies and <i>objectives*</i> as established according to Criterion 7.1. The management plan shall describe the natural resources that exist in the Management Unit and explain how the plan will meet the FSC certification requirements. The management plan shall cover forest management planning and social management planning proportionate to <i>scale, intensity and risk*</i> of the planned activities.
7.3	<i>The management plan*</i> shall include verifiable targets by which progress towards each of the prescribed management <i>objectives*</i> can be assessed.
7.4	<i>The Organization*</i> shall update and revise periodically the management planning and procedural documentation to incorporate the results of monitoring and evaluation, stakeholder <i>engagement*</i> or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances.
7.5	<i>The Organization*</i> shall make <i>publicly available*</i> a summary of the management plan* free of charge. Excluding confidential information, other relevant components of the management plan shall be made available to <i>affected stakeholders*</i> on request, and at cost of reproduction and handling.
7.6	<i>The Organization*</i> shall, proportionate to <i>scale, intensity and risk*</i> of management activities, proactively and transparently engage <i>affected stakeholders*</i> in its management planning and monitoring processes, and shall engage <i>interested stakeholders*</i> on request.
<b>PRINCIPLE 8 – MONITORING AND ASSESSMENT:</b> <i>The Organization*</i> shall demonstrate that, progress towards achieving the management <i>objectives*</i> , the impacts of management activities and the condition of the <i>Management Unit*</i> , are monitored and evaluated proportionate to the <i>scale, intensity and risk*</i> of management activities, in order to implement <i>adaptive management*</i> .	
8.1	<i>The Organization*</i> shall monitor the implementation of its <i>management plan*</i> , including its <i>policies and objectives*</i> , its progress with the activities planned, and the achievement of its verifiable targets.
8.2	<i>The Organization*</i> shall monitor and evaluate the environmental and social impacts of the activities carried out in the <i>Management Unit*</i> , and changes in its environmental condition.
8.3	<i>The Organization*</i> shall analyze the results of monitoring and evaluation and feed the outcomes of this analysis back into the planning process.
8.4	<i>The Organization*</i> shall make <i>publicly available*</i> a summary of the results of monitoring free of charge, excluding confidential information.
8.5	<i>The Organization*</i> shall have and implement a tracking and tracing system proportionate to <i>scale, intensity and risk*</i> of its management activities, for demonstrating the source and volume in proportion to projected output for each year, of all products from the <i>Management Unit*</i> that are marketed as FSC certified.
<b>PRINCIPLE 9 – HIGH CONSERVATION VALUES:</b> <i>The Organization*</i> shall maintain and/or enhance the <i>High Conservation Values*</i> in the <i>Management Unit*</i> through applying the <i>precautionary approach*</i> .	
9.1	<i>The Organization*</i> , through <i>engagement*</i> with <i>affected stakeholders*</i> , <i>interested stakeholders*</i> and other means and sources, shall assess and record the presence and status of the following <i>High Conservation Values*</i> in the <i>Management Unit*</i> , proportionate to the <i>scale, intensity and risk*</i> of impacts of management activities, and likelihood of the occurrence of the High Conservation Values: HCV 1 - Species diversity. Concentrations of <i>biological diversity*</i> including endemic species, and <i>rare, threatened or endangered*</i> species, that are significant at global, regional or national levels. HCV 2 - Landscape-level ecosystems and mosaics. Large landscape-level <i>ecosystems*</i> and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance. HCV 3 - Ecosystems and habitats. Rare, threatened, or endangered ecosystems, <i>habitats*</i> or <i>refugia*</i> . HCV 4 - Critical ecosystem services. Basic <i>ecosystem services*</i> in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes. HCV 5 - Community needs. Sites and resources fundamental for satisfying the basic necessities of <i>local communities*</i> or <i>indigenous peoples*</i> (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples. HCV 6 - Cultural values. Sites, resources, habitats and <i>landscapes*</i> of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.



9.2	<i>The Organization*</i> shall develop effective strategies that maintain and/or enhance the identified <i>High Conservation Values*</i> , through <i>engagement*</i> with <i>affected stakeholders*</i> , <i>interested stakeholders*</i> and experts.
9.3	<i>The Organization*</i> shall implement strategies and actions that maintain and/or enhance the identified <i>High Conservation Values*</i> . These strategies and actions shall implement the <i>precautionary approach*</i> and be proportionate to the <i>scale, intensity and risk*</i> of management activities.
9.4	<i>The Organization*</i> shall demonstrate that periodic monitoring is carried out to assess changes in the status of <i>High Conservation Values*</i> , and shall adapt its management strategies to ensure their effective protection. The monitoring shall be proportionate to the <i>scale, intensity and risk*</i> of management activities, and shall include <i>engagement*</i> with <i>affected stakeholders*</i> , <i>interested stakeholders*</i> and experts.
<b>PRINCIPLE 10 – IMPLEMENTATION OF MANAGEMENT ACTIVITIES:</b> Management activities conducted by or for <i>The Organization*</i> for the <i>Management Unit*</i> shall be selected and implemented consistent with The Organization's economic, environmental and social policies and <i>objectives*</i> and in compliance with the <i>Principles*</i> and <i>Criteria*</i> collectively.	
10.1	After harvest or in accordance with the <i>management plan*</i> , <i>The Organization*</i> shall, by natural or artificial regeneration methods, regenerate vegetation cover in a timely fashion to pre-harvesting or more natural conditions.
10.2	<i>The Organization*</i> shall use species for regeneration that are ecologically well adapted to the site and to the management <i>objectives*</i> . The Organization shall use <i>native species*</i> and local <i>genotypes*</i> for regeneration, unless there is clear and convincing justification for using others.
10.3	<i>The Organization*</i> shall only use <i>alien species*</i> when knowledge and/or experience have shown that any invasive impacts can be controlled and effective mitigation measures are in place.
10.4	<i>The Organization*</i> shall not use <i>genetically modified organisms*</i> in the <i>Management Unit*</i> .
10.5	<i>The Organization*</i> shall use <i>silvicultural*</i> practices that are ecologically appropriate for the vegetation, species, sites and management <i>objectives*</i> .
10.6	<i>The Organization*</i> shall avoid, or aim at eliminating, the use of fertilizers. When fertilizers are used, The Organization shall prevent, mitigate, and/or repair damage to <i>environmental values*</i> .
10.7	<i>The Organization*</i> shall use integrated pest management and <i>silviculture*</i> systems which avoid, or aim at eliminating, the use of chemical <i>pesticides*</i> . The Organization shall not use any chemical pesticides prohibited by FSC policy. When pesticides are used, The Organization shall prevent, mitigate, and / or repair damage to <i>environmental values*</i> and human health.
10.8	<i>The Organization*</i> shall minimize, monitor and strictly control the use of <i>biological control agents*</i> in accordance with <i>internationally accepted scientific protocols*</i> . When <i>biological control agents*</i> are used, The Organization shall prevent, mitigate, and/or repair damage to <i>environmental values*</i> .
10.9	<i>The Organization*</i> shall assess risks and implement activities that reduce potential negative impacts from natural hazards proportionate to <i>scale, intensity, and risk*</i> .
10.10	<i>The Organization*</i> shall manage infrastructural development, transport activities and <i>silviculture*</i> so that water resources and soils are protected, and disturbance of and damage to <i>rare* and threatened species*, habitats*, ecosystems* and landscape values*</i> are prevented, mitigated and/or repaired.
10.11	<i>The Organization*</i> shall manage activities associated with harvesting and extraction of timber and <i>non-timber forest products*</i> so that <i>environmental values*</i> are conserved, merchantable waste is reduced, and damage to other products and services is avoided.
10.12	<i>The Organization*</i> shall dispose of waste materials in an environmentally appropriate manner

*\*The Organization: The person or entity holding or applying for certification and therefore responsible for demonstrating compliance with the requirements upon which FSC certification is based.*

*\*Other terms denoted \* are included in glossary of FSC INTERNATIONAL STANDARD "FSC-STD-01-001 (V5-0)*

The current criteria developed by PEFC are outlined in their document titled "PEFC INTERNATIONAL STANDARD" (PEFC ST 1003:2010). The criteria are summarized in the table below.

Table 23. List of the current International PEFC criteria and sub-criteria

No.	PRINCIPLE / criteria
<b>1 - Maintenance and appropriate enhancement of forest resources and their contribution to the global carbon cycle.</b>	
1.1	<i>Forest management planning shall aim to maintain or increase forests and other wooded areas and enhance the quality of the economic, ecological, cultural and social values of forest resources, including soil and water. This shall be done by making full use of related services and tools that support land-use planning and nature conservation.</i>
1.2	<i>Forest management shall comprise the cycle of inventory and planning, implementation, monitoring and evaluation, and shall include an appropriate assessment of the social, environmental and economic impacts of forest management operations. This shall form a basis for a cycle of continuous improvement to minimise or avoid negative impacts.</i>

1.3	<i>Inventory and mapping of forest resources shall be established and maintained, adequate to local and national conditions and in correspondence with the topics described in this document.</i>
1.4	<i>Management plans or their equivalents, appropriate to the size and use of the forest area, shall be elaborated and periodically updated. They shall be based on legislation as well as existing land-use plans, and adequately cover the forest resources.</i>
1.5	<i>Management plans or their equivalents shall include at least a description of the current condition of the forest management unit, long-term objectives; and the average annual allowable cut, including its justification and, where relevant, the annually allowable exploitation of non-timber forest products. Note: The identification of annually allowable exploitation of non-timber forest products is required where forest management covers commercial exploitation of non-timber forest products at a level which can have an impact on the long-term sustainability of non-timber forest products.</i>
1.6	<i>A summary of the forest management plan or its equivalent appropriate to the scope and scale of forest management, which contains information about the forest management measures to be applied, is publicly available. The summary may exclude confidential business and personal information and other information made confidential by national legislation or for the protection of cultural sites or sensitive natural resource features.</i>
1.7	<i>Monitoring of forest resources and evaluation of their management shall be periodically performed, and results fed back into the planning process.</i>
1.8	<i>Responsibilities for sustainable forest management shall be clearly defined and assigned.</i>
1.9	<i>Forest management practices shall safeguard the quantity and quality of the forest resources in the medium and long term by balancing harvesting and growth rates, and by preferring techniques that minimise direct or indirect damage to forest, soil or water resources.</i>
1.10	<i>Appropriate silvicultural measures shall be taken to maintain or reach a level of the growing stock that is economically, ecologically and socially desirable.</i>
1.11	<i>Conversion of forests to other types of land use, including conversion of primary forests to forest plantations, shall not occur unless in justified circumstances where the conversion: a) is in compliance with national and regional policy and legislation relevant for land use and forest management and is a result of national or regional land-use planning governed by a governmental or other official authority including consultation with materially and directly interested persons and organisations; and b) entails a small proportion of forest type; and c) does not have negative impacts on threatened (including vulnerable, rare or endangered) forest ecosystems, culturally and socially significant areas, important habitats of threatened species or other protected areas; and d) makes a contribution to long-term conservation, economic, and social benefits.</i>
1.12	<i>Conversion of abandoned agricultural and treeless land into forest land shall be taken into consideration, whenever it can add economic, ecological, social and/or cultural value.</i>
<b>CRITERION 2 – MAINTENANCE OF FOREST ECOSYSTEM HEALTH AND VITALITY</b>	
2.1	<i>Forest management planning shall aim to maintain and increase the health and vitality of forest ecosystems and to rehabilitate degraded forest ecosystems, whenever this is possible by silvicultural means.</i>
2.2	<i>Health and vitality of forests shall be periodically monitored, especially key biotic and abiotic factors that potentially affect health and vitality of forest ecosystems, such as pests, diseases, overgrazing and overstocking, fire, and damage caused by climatic factors, air pollutants or by forest management operations.</i>
2.3	<i>The monitoring and maintaining of health and vitality of forest ecosystems shall take into consideration the effects of naturally occurring fire, pests and other disturbances</i>
2.4	<i>Forest management plans or their equivalents shall specify ways and means to minimise the risk of degradation of and damages to forest ecosystems. Forest management planning shall make use of those policy instruments set up to support these activities.</i>
2.5	<i>Forest management practices shall make best use of natural structures and processes and use preventive biological measures wherever and as far as economically feasible to maintain and enhance the health and vitality of forests. Adequate genetic, species and structural diversity shall be encouraged and/or maintained to enhance the stability, vitality and resistance capacity of the forests to adverse environmental factors and strengthen natural regulation mechanisms.</i>
2.6	<i>Lighting of fires shall be avoided and is only permitted if it is necessary for the achievement of the management goals of the forest management unit.</i>
2.7	<i>Appropriate forest management practices such as reforestation and afforestation with tree species and provenances that are suited to the site conditions or the use of tending, harvesting and transport techniques that minimise tree and/or soil damages shall be applied. The spillage of oil during forest management operations or the indiscriminate disposal of waste on forest land shall be strictly avoided. Non-organic waste and litter shall be avoided, collected, stored in designated areas and removed in an environmentally-responsible manner.</i>
2.8	<i>The use of pesticides shall be minimised and appropriate silvicultural alternatives and other biological measures preferred.</i>
2.9	<i>The WHO Type 1A and 1B pesticides and other highly toxic pesticides shall be prohibited, except where no other viable alternative is available. Note: Any exception to the usage of WHO Type 1A and 1B pesticides shall be defined by a specific forest management standard.</i>

2.10	<i>Pesticides, such as chlorinated hydrocarbons whose derivatives remain biologically active and accumulate in the food chain beyond their intended use, and any pesticides banned by international agreement, shall be prohibited. Note: "pesticides banned by international agreements" are defined in the Stockholm Convention on Persistent Organic Pollutants 2001, as amended.</i>
2.11	<i>The use of pesticides shall follow the instructions given by the pesticide producer and be implemented with proper equipment and training.</i>
2.12	<i>Where fertilisers are used, they shall be applied in a controlled manner and with due consideration for the environment.</i>
<b>CRITERION 3 – MAINTENANCE AND ENCOURAGEMENT OF PRODUCTIVE FUNCTIONS OF FORESTS (WOOD AND NON-WOOD).</b>	
3.1	<i>Forest management planning shall aim to maintain the capability of forests to produce a range of wood and non-wood forest products and services on a sustainable basis.</i>
3.2	<i>Forest management planning shall aim to achieve sound economic performance taking into account any available market studies and possibilities for new markets and economic activities in connection with all relevant goods and services of forests.</i>
3.3	<i>Forest management plans or their equivalents shall take into account the different uses or functions of the managed forest area. Forest management planning shall make use of those policy instruments set up to support the production of commercial and non-commercial forest goods and services.</i>
3.4	<i>Forest management practices shall maintain and improve the forest resources and encourage a diversified output of goods and services over the long term.</i>
3.5	<i>Regeneration, tending and harvesting operations shall be carried out in time, and in a way that does not reduce the productive capacity of the site, for example by avoiding damage to retained stands and trees as well as to the forest soil, and by using appropriate systems.</i>
3.6	<i>Harvesting levels of both wood and non-wood forest products shall not exceed a rate that can be sustained in the long term, and optimum use shall be made of the harvested forest products, with due regard to nutrient off-take.</i>
3.7	<i>Where it is the responsibility of the forest owner/manager and included in forest management, the exploitation of non-timber forest products, including hunting and fishing, shall be regulated, monitored and controlled.</i>
3.6	<i>Adequate infrastructure such as roads, skid tracks or bridges shall be planned, established and maintained to ensure efficient delivery of goods and services while minimising negative impacts on the environment.</i>
<b>CRITERION 4 – MAINTENANCE, CONSERVATION AND APPROPRIATE ENHANCEMENT OF BIOLOGICAL DIVERSITY IN FOREST ECOSYSTEMS</b>	
4.1	<i>Forest management planning shall aim to maintain, conserve and enhance biodiversity on ecosystem, species and genetic levels and, where appropriate, diversity at landscape level.</i>
4.2	<i>Forest management planning, inventory and mapping of forest resources shall identify, protect and/or conserve ecologically important forest areas containing significant concentrations of:</i> <i>a) protected, rare, sensitive or representative forest ecosystems such as riparian areas and wetland biotopes;</i> <i>b) areas containing endemic species and habitats of threatened species, as defined in recognised reference lists;</i> <i>c) endangered or protected genetic in situ resources; and taking into account</i> <i>d) globally, regionally and nationally significant large landscape areas with natural distribution and abundance of naturally occurring species.</i> <i>Note: This does not necessarily exclude forest management activities that do not damage biodiversity values of those biotopes.</i>
4.3	<i>Protected and endangered plant and animal species shall not be exploited for commercial purposes. Where necessary, measures shall be taken for their protection and, where relevant, to increase their population.</i>
4.4	<i>Forest management shall ensure successful regeneration through natural regeneration or, where not appropriate, planting that is adequate to ensure the quantity and quality of the forest resources.</i>
4.5	<i>For reforestation and afforestation, origins of native species and local provenances that are well-adapted to site conditions shall be preferred, where appropriate. Only those introduced species, provenances or varieties shall be used whose impacts on the ecosystem and on the genetic integrity of native species and local provenances have been evaluated, and if negative impacts can be avoided or minimised.</i> <i>Note: CBD (Convention on Biological Diversity) Guiding Principles for the Prevention, Introduction, and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species are recognised as guidance for avoidance of invasive species.</i>
4.6	<i>Afforestation and reforestation activities that contribute to the improvement and restoration of ecological connectivity shall be promoted.</i>
4.7	<i>Genetically-modified trees shall not be used.</i> <i>Note: The restriction on the usage of genetically-modified trees has been adopted based on the Precautionary Principle. Until enough scientific data on genetically-modified trees indicates that impacts on human and animal health and the environment are equivalent to, or more positive than, those presented by trees genetically improved by traditional methods, no genetically-modified trees will be used.</i>
4.8	<i>Forest management practices shall, where appropriate, promote a diversity of both horizontal and vertical structures such as uneven-aged stands and the diversity of species such as mixed stands. Where appropriate, the practices shall also aim to maintain and restore landscape diversity.</i>

4.9	<i>Traditional management systems that have created valuable ecosystems, such as coppice, on appropriate sites shall be supported, when economically feasible.</i>
4.10	<i>Tending and harvesting operations shall be conducted in a way that does not cause lasting damage to ecosystems. Wherever possible, practical measures shall be taken to improve or maintain biological diversity.</i>
4.11	<i>Infrastructure shall be planned and constructed in a way that minimises damage to ecosystems, especially to rare, sensitive or representative ecosystems and genetic reserves, and that takes threatened or other key species – in particular their migration patterns – into consideration.</i>
4.12	<i>With due regard to management objectives, measures shall be taken to balance the pressure of animal populations and grazing on forest regeneration and growth as well as on biodiversity.</i>
4.13	<i>Standing and fallen dead wood, hollow trees, old groves and special rare tree species shall be left in quantities and distribution necessary to safeguard biological diversity, taking into account the potential effect on the health and stability of forests and on surrounding ecosystems.</i>
<b>CRITERION 5: MAINTENANCE AND APPROPRIATE ENHANCEMENT OF PROTECTIVE FUNCTIONS IN FOREST MANAGEMENT (NOTABLY SOLI AND WATER).</b>	
5.1	<i>Forest management planning shall aim to maintain and enhance protective functions of forests for society, such as protection of infrastructure, protection from soil erosion, protection of water resources and from adverse impacts of water such as floods or avalanches.</i>
5.2	<i>Areas that fulfil specific and recognised protective functions for society shall be registered and mapped, and forest management plans or their equivalents shall take full account of these areas.</i>
5.3	<i>Special care shall be given to silvicultural operations on sensitive soils and erosion-prone areas as well as in areas where operations might lead to excessive erosion of soil into watercourses. Inappropriate techniques such as deep soil tillage and use of unsuitable machinery shall be avoided in such areas. Special measures shall be taken to minimise the pressure of animal populations.</i>
5.4	<i>Special care shall be given to forest management practices in forest areas with water protection functions to avoid adverse effects on the quality and quantity of water resources. Inappropriate use of chemicals or other harmful substances or inappropriate silvicultural practices influencing water quality in a harmful way shall be avoided.</i>
5.5	<i>Construction of roads, bridges and other infrastructure shall be carried out in a manner that minimises bare soil exposure, avoids the introduction of soil into watercourses and preserves the natural level and function of water courses and river beds. Proper road drainage facilities shall be installed and maintained.</i>
<b>CRITERION 6: MAINTENANCE OF OTHER SOCIO-ECONOMIC FUNCTIONS AND CONDITIONS</b>	
6.1	<i>Forest management planning shall aim to respect the multiple functions of forests to society, give due regard to the role of forestry in rural development, and especially consider new opportunities for employment in connection with the socio-economic functions of forests.</i> Note: The stimulation of rural development could be achieved by training and employment of local people, including indigenous people, a preference for the local processing of timber and non-wood forest products, etc.
6.2	<i>Forest management shall promote the long-term health and well-being of communities within or adjacent to the forest management area.</i>
6.3	<i>Property rights and land tenure arrangements shall be clearly defined, documented and established for the relevant forest area. Likewise, legal, customary and traditional rights related to the forest land shall be clarified, recognised and respected.</i>
6.4	<i>Forest management activities shall be conducted in recognition of the established framework of legal, customary and traditional rights such as outlined in ILO 169 and the UN Declaration on the Rights of Indigenous Peoples, which shall not be infringed upon without the free, prior and informed consent of the holders of the rights, including the provision of compensation where applicable. Where the extent of rights is not yet resolved or is in dispute there are processes for just and fair resolution. In such cases forest managers shall, in the interim, provide meaningful opportunities for parties to be engaged in forest management decisions whilst respecting the processes and roles and responsibilities laid out in the policies and laws where the certification takes place.</i>
6.5	<i>Adequate public access to forests for the purpose of recreation shall be provided taking into account respect for ownership rights and the rights of others, the effects on forest resources and ecosystems, as well as compatibility with other functions of the forest.</i>
6.6	<i>Sites with recognised specific historical, cultural or spiritual significance and areas fundamental to meeting the basic needs of local communities (e.g. health, subsistence) shall be protected or managed in a way that takes due regard of the significance of the site.</i>
6.7	<i>Forest management operations shall take into account all socio-economic functions, especially the recreational function and aesthetic values of forests by maintaining for example varied forest structures, and by encouraging attractive trees, groves and other features such as colours, flowers and fruits. This shall be done, however, in a way and to an extent that does not lead to serious negative effects on forest resources, and forest land.</i>
6.8	<i>Forest managers, contractors, employees and forest owners shall be provided with sufficient information and encouraged to keep up-to-date through continuous training in relation to sustainable forest management as a precondition for all management planning and practices described in this standard.</i>
6.9	<i>Forest management practices shall make the best use of local forest-related experience and knowledge, such as those of local communities, forest owners, NGOs and local people.</i>

6.10	<i>Forest management shall provide for effective communication and consultation with local people and other stakeholders relating to sustainable forest management and shall provide appropriate mechanisms for resolving complaints and disputes relating to forest management between forest operators and local people.</i>
6.11	<i>Forestry work shall be planned, organised and performed in a manner that enables health and accident risks to be identified and all reasonable measures to be applied to protect workers from work-related risks. Workers shall be informed about the risks involved with their work and about preventive measures.</i>
6.12	<i>Working conditions shall be safe, and guidance and training in safe working practices shall be provided to all those assigned to a task in forest operations.</i> <i>Note: Guidance for specifying national standards can be obtained from the ILO Code of Good Practice: Safety and Health in Forestry Work.</i>
6.13	<i>Forest management shall comply with fundamental ILO conventions</i> <i>Note: In countries where the fundamental ILO conventions have been ratified, the requirements of 5.7.1 apply. In countries where a fundamental convention has not been ratified and its content is not covered by applicable legislation, specific requirements shall be included in the forest management standard.</i>
6.14	<i>Forest management shall be based inter-alia on the results of scientific research. Forest management shall contribute to research activities and data collection needed for sustainable forest management or support relevant research activities carried out by other organisations, as appropriate.</i>
<b>CRITERION 7 – COMPLIANCE WITH LEGAL REQUIREMENTS</b>	
7.1	<i>Forest management shall comply with legislation applicable to forest management issues including forest management practices; nature and environmental protection; protected and endangered species; property, tenure and land-use rights for indigenous people; health, labour and safety issues; and the payment of royalties and taxes.</i> <i>Note: For a country which has signed a FLEGT Voluntary Partnership Agreement (VPA) between the European Union and the producing country, the “legislation applicable to forest management” is defined by the VPA agreement.</i>
7.2	<i>Forest management shall provide for adequate protection of the forest from unauthorised activities such as illegal logging, illegal land use, illegally initiated fires, and other illegal activities.</i>

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## Appendix II: Guidance for calculating VOC used in surface coatings

The calculation method requires the following information:

- Total coated surface area of final assembled product
- The VOC content of the coating compound (in g/L).
- The volume of coating compound present before the coating operation.
- The number of identical units processed during the coating operation.
- The volume of coating compound remaining after the coating operation.

An example calculation is as follows:

- Total coated surface area of final assembled product = **1.5m<sup>2</sup>**.
- The VOC content of the coating compound (in g/L) = **120g/L**.
- The volume\* of coating compound present before coating operation = **18.5L**.
- The number of identical units processed during the coating operation = **4**.
- The volume\* of coating compound remaining after coating operation = **12.5L**.

Total area coated =  $4 \times 1.5\text{m}^2 = \mathbf{6\text{m}^2}$ .

Total volume of coating compound used =  $18.5 - 12.5 = \mathbf{6L}$ .

Total VOC applied to surface =  $3.9L \times 120\text{g/L} = \mathbf{468g}$

Total VOC applied per m<sup>2</sup> =  $468\text{g}/6\text{m}^2 = \mathbf{78\text{g/m}^2}$ .

\*note that weight measurements can be used instead of volume so long as the density of the coating compound is known and accounted for in the calculation.

Where more than one coating compound is applied, such as primers or finishing coats, the volumetric consumption and VOC contents should also be calculated and added together.

Options to lower the VOC content used in coatings can be improved by using more efficient techniques. Indicative efficiencies of different coating techniques are shown below.

Table 24. Indicative efficiency factors for coating techniques:

Coating technique	Effectiveness	Efficiency factor
Spraying device without recycling	50%	0.5
Electrostatic spraying	65%	0.65
Spraying device with recycling	70%	0.7
Spraying bell/disk	80%	0.8
Roller varnishing	95%	0.95
Blanket varnishing	95%	0.95
Vacuum varnishing	95%	0.95
Dipping	95%	0.95
Rinsing	95%	0.95

## Appendix III: EN 13336 requirements for furniture leather

Table 25. Physical requirements of leather used in Ecolabel furniture (as per EN 13336)

Fundamental characteristics	Test method		Recommended values		
			Nubuck, Suede and Aniline*	Semi-aniline*	Coated, pigmented and other*
pH and ΔpH	EN ISO 4045		≥ 3.5 (if the pH is <4.0, ΔpH shall be ≤ 0.7)		
Tear load, average value	EN ISO 3377-1		> 20 N		
Colour fastness to to-and-fro rubbing	EN ISO 11640. Total mass of finger 1000g.	Aspects to be evaluated	Change of leather colour and felt staining	Change of leather colour and felt staining No destruction of finish	
		using dry felt	50 cycles, ≥ 3 grey scale	500 cycles, ≥ 4 grey scale	
	Perspiration alkaline solution as defined in EN ISO 11641.	using wet felt	20 cycles, ≥ 3 grey scale	80 cycles, ≥ 3/4 grey scale	250 cycles, ≥ 3/4 grey scale
		using felt wetted with artificial perspiration	20 cycles, ≥ 3 grey scale	50 cycles, ≥ 3/4 grey scale	80 cycles, ≥ 3/4 grey scale
Colour fastness to artificial light	EN ISO 105-B02 (method 3)		≥ 3 blue scale	≥ 4 blue scale	≥ 5 blue scale
Dry finish adhesion	EN ISO 11644		--	≥ 2N / 10mm	
Dry flex resistance	EN ISO 5402-1		For aniline leather with non-pigmented finish only, 20 000 cycles (no finish damage cracks)	50 000 cycles (no finish damage cracks)	50 000 cycles (no finish damage cracks)
Colour fastness to water spotting	EN ISO 15700		≥ 3 grey scale (no permanent swelling)		
Cold crack resistance of finish	EN ISO 17233		--	-15°C (no finish crack)	
Fire resistance	EN 1021 or relevant national standards		Pass		

\*Definitions of these leather types are according to EN 15987.

## Appendix IV: Prohibited arylamine compounds in final leather, textile and coated fabric materials

Included here are the substances listed in Entry 43 that should be tested for in any dyed leather (using the EN 17234 standard) or textiles (using the EN 14362-1 and -3 standards).

Table 26. Carcinogenic arylamines to be tested in textiles or leather.

Aryl amine	CAS Number	Aryl amine	CAS Number
4-aminodiphenyl	92-67-1	4,4'-oxydianiline	101-80-4
Benzidine	92-87-5	4,4'-thiodianiline	139-65-1
4-chloro-o-toluidine	95-69-2	o-toluidine	95-53-4
2-naphthylamine	91-59-8	2,4-diaminotoluene	95-80-7
o-amino-azotoluene	97-56-3	2,4,5-trimethylaniline	137-17-7
2-amino-4-nitrotoluene	99-55-8	4-aminoazobenzene	60-09-3
4-chloroaniline	106-47-8	o-anisidine	90-04-0
2,4-diaminoanisole	615-05-4	2,4-Xylidine	95-68-1
4,4'-diaminodiphenylmethane	101-77-9	2,6-Xylidine	87-62-7
3,3'-dichlorobenzidine	91-94-1	p-cresidine	120-71-8
3,3'-dimethoxybenzidine	119-90-4	3,3'-dimethylbenzidine	119-93-7
3,3'-dimethyl-4,4'-diaminodiphenylmethane	838-88-0	4,4'-methylene-bis-(2-chloro-aniline)	101-14-4

A number of dye compounds, although not directly restricted themselves, are known to cleave to form some of the prohibited substances listed in Table 26 above. Thus it is strongly recommended that their use be avoided in leather and textile dyeing processes in order to comply with the requirements for carcinogenic arylamines.

As a guide to applicants, the following dyes should not be used:

Table 27. Indicative list of dyes that may cleave to form carcinogenic arylamines

Disperse dyes		Basic dyes	
Disperse Orange 60	Disperse Yellow 7	Basic Brown 4	Basic Red 114
Disperse Orange 149	Disperse Yellow 23	Basic Red 42	Basic Yellow 82
Disperse Red 151	Disperse Yellow 56	Basic Red 76	Basic Yellow 103
Disperse Red 221	Disperse Yellow 218	Basic Red 111	
Acid dyes			
CI Acid Black 29	CI Acid Red 4	CI Acid Red 85	CI Acid Red 148
CI Acid Black 94	CI Acid Red 5	CI Acid Red 104	CI Acid Red 150
CI Acid Black 131	CI Acid Red 8	CI Acid Red 114	CI Acid Red 158
CI Acid Black 132	CI Acid Red 24	CI Acid Red 115	CI Acid Red 167
CI Acid Black 209	CI Acid Red 26	CI Acid Red 116	CI Acid Red 170
CI Acid Black 232	CI Acid Red 26:1	CI Acid Red 119:1	CI Acid Red 264
CI Acid Brown 415	CI Acid Red 26:2	CI Acid Red 128	CI Acid Red 265
CI Acid Orange 17	CI Acid Red 35	CI Acid Red 115	CI Acid Red 420
CI Acid Orange 24	CI Acid Red 48	CI Acid Red 128	CI Acid Violet 12
CI Acid Orange 45	CI Acid Red 73	CI Acid Red 135	
Direct dyes			
Direct Black 4	Direct Blue 192	Direct Brown 223	Direct Red 28
Direct Black 29	Direct Blue 201	Direct Green 1	Direct Red 37
Direct Black 38	Direct Blue 215	Direct Green 6	Direct Red 39
Direct Black 154	Direct Blue 295	Direct Green 8	Direct Red 44
Direct Blue 1	Direct Blue 306	Direct Green 8.1	Direct Red 46
Direct Blue 2	Direct Brown 1	Direct Green 85	Direct Red 62
Direct Blue 3	Direct Brown 1:2	Direct Orange 1	Direct Red 67
Direct Blue 6	Direct Brown 2	Direct Orange 6	Direct Red 72
Direct Blue 8	Basic Brown 4	Direct Orange 7	Direct Red 126
Direct Blue 9	Direct Brown 6	Direct Orange 8	Direct Red 168



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Direct Blue 10	Direct Brown 25	Direct Orange 10	Direct Red 216
Direct Blue 14	Direct Brown 27	Direct Orange 108	Direct Red 264
Direct Blue 15	Direct Brown 31	Direct Red 1	Direct Violet 1
Direct Blue 21	Direct Brown 33	Direct Red 2	Direct Violet 4
Direct Blue 22	Direct Brown 51	Direct Red 7	Direct Violet 12
Direct Blue 25	Direct Brown 59	Direct Red 10	Direct Violet 13
Direct Blue 35	Direct Brown 74	Direct Red 13	Direct Violet 14
Direct Blue 76	Direct Brown 79	Direct Red 17	Direct Violet 21
Direct Blue 116	Direct Brown 95	Direct Red 21	Direct Violet 22
Direct Blue 151	Direct Brown 101	Direct Red 24	Direct Yellow 1
Direct Blue 160	Direct Brown 154	Direct Red 26	Direct Yellow 24
Direct Blue 173	Direct Brown 222	Direct Red 22	Direct Yellow 48

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## Appendix V: Furniture product durability, strength and ergonomic standards.

Table 28. Indicative list of EN furniture standards under CEN TC 207 relevant to criterion 9.1

EN No.	Title	Type of testing required: (D)–durability, (St)–Strength, (E)–Ergonomics, (Sa)–Safety
<b>Upholstered furniture</b>		
1021-1	Furniture - Assessment of the ignitability of upholstered furniture - Part 1: Ignition source smouldering cigarette	(Sa) – non-ignition required in all replicate tests
1021-2	Furniture - Assessment of the ignitability of upholstered furniture - Part 2: Ignition source match flame equivalent	(Sa) – non-ignition required in all replicate tests
<b>Office furniture</b>		
527-1	Office furniture - Work tables and desks - Part 1: Dimensions	(E). - Type A dimensions and adjustability required. For EU Ecolabel
527-2 527-3	Office furniture - Work tables and desks - Part 2: Mechanical safety requirements Tests - Strength under vertical force; Strength under horizontal force; Fatigue under horizontal force; Fatigue under vertical force; Drop test	(St) + (Sa) – Pass is considered as: no fracture of any member, joint or component; no loosening of joints intended to be rigid; no major structural element is significantly deformed; the table fulfils its functions after removal of test loads; any adjusting screws fulfil their functions.
1023-2 1023-3	Office furniture - Screens - Part 2: Mechanical safety requirements Office furniture - Screens - Part 3: Test methods Tests: Stability test; dislodgement test; strength test	(Sa) – Pass for non-load bearing screens = not overturning (test 6.1. in EN 1023-3) (Sa) – Pass for load bearing screens = not overturning (test 6.2 in EN 1023-3) (Sa + St) – Pass for screen mounted components = no dislodgement of any component and no structural failure. (test 6.3 in EN 1023-3) (St) – Pass for load bearing screens = no adverse effect on screen stability, with or without add-on elements; no fracture of any member, joint or component; no deformation or loosening that would affect safety of function (test 6.4 in EN 1023-3)
1335-1	Office furniture - Office work chair - Part 1: Dimensions - Determination of dimensions	(E) – Type A dimensions and adjustability required for EU Ecolabel

<p>1335-2 1335-3</p>	<p>Office furniture - Office work chair - Part 2: Safety requirements Office furniture - Office work chair - Part 3: Test methods Tests: General design requirements; Stability; Rolling Resistance;; Strength and Durability</p>	<p>(Sa) Pass for safe design = accessible corners, seat edges, back rest, arm rest and handle edges are rounded with a minimum 2mm radius; safety distance of accessible movable parts is <math>\leq 8\text{mm}</math> or <math>\geq 25\text{mm}</math>; all other edges are free from burrs and rounded or chamfered; the ends of accessible hollow components are closed or capped; adjusting devices can be operated from seating position; load bearing parts of the chair cannot unintentionally come loose; users are protected from soiling from lubricated parts</p> <p>(Sa) Pass for stability = Chair does not overbalance using tests 7.1.1-7.1.7 of EN 1335-3 using forces and number of cycles defined in Table A.1 of EN 1335-2.</p> <p>(Sa) Pass for rolling resistance = castors are of identical construction; the rolling resistance is <math>\geq 12\text{ N}</math> (according to test 7.4. of EN 1335-3).</p> <p>(St + D) Pass for strength &amp; durability = no fractures of any member, joint or component; no loosening of joints intended to be rigid; no major structural element deformation or loss of functionality after tests 7.2.1, 7.2.2, 7.2.6, 7.3.1 and 7.3.2 of EN 1335-3 using forces and number of cycles defined in Table A.2 of EN 1335-2 and when there is no fracture of arm rests after test 7.2.3 in EN 1335-3 using forces and cycles defined in table A.2 of EN 1335-2.</p>
<p>14073-2 14073-3 14074</p>	<p>Office furniture - Storage furniture - Part 2: Safety requirements Office furniture - Storage furniture - Part 3: Test methods for the determination of stability and strength of the structure Office furniture - Tables and desks and storage furniture - Test methods for the determination of strength and durability of moving parts Tests: maximum content loads; general safety; extra safety concerns if mass of unit is <math>&gt; 10\text{kg}</math> and centre of gravity is higher than 650mm above the floor or when the potential energy is <math>&gt; 65\text{Nm}</math>.</p>	<p>(St) – Pass for loads on storage parts = <math>\geq 1,5\text{kg/dm}^2</math> for shelves, <math>\geq 5,0\text{kg/dm}</math> for clothes rails, <math>\geq 0,5\text{kg/dm}^3</math> for extension elements and <math>\geq 4,0\text{kg/dm}</math> for suspended pocket files.</p> <p>(Sa) – Pass for general safety requirements = accessible edges and corners are rounded or chamfered; no open ended tubes; all moveable parts with safety distances of <math>\leq 8\text{mm}</math> or <math>\geq 25\text{mm}</math>; roll fronts shall not close by themselves from positions <math>&gt; 200\text{mm}</math> from closed position; extension elements shall have effective open stops;</p> <p>(Sa) – Pass for extra safety tests for floor standing units = no fracture, other damage or change of function that affects safety and: the shelf shall remain in the unit (test 5.3.1 of EN 14073-3); no slide under applied force (test 5.2 of EN 14073-3); door remains attached to unit (test 6.3.1 of EN 14074); the extension element does not fall out of unit (test 6.2.3 of EN 14074); the extension element remains closed (test 6.2.4 of EN 14074); the unit remains attached to the building (test 5.7 of EN 14073-3) and the unit does not overturn (tests 5.5.1 and 5.5.2 of EN 14073-3).</p> <p>(Sa) – Pass for extra safety tests for screen and wall hanging units = no fracture, other damage or change of function that affects safety and: the shelf shall remain in the unit (test 5.3.1 of EN 14073-3); the door remains attached to the unit (test 6.3.1 of EN 14074); the extension element does not fall out of the unit (test 6.2.3 of EN 14074) and the extension element shall remain closed (test 6.2.4 of EN 14074).</p>
<p><b>Hardware for furniture</b></p>		

EN 15570	Hardware for furniture - Strength and durability of hinges and their components - Hinges pivoting on a vertical axis Tests: Overload tests; ;Functional tests; Corrosion resistance	(St + D) Pass Overload test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after vertical tests where doors open within 3-5secs and close within 3-5secs and (where relevant) after horizontal overload tests. (D) – Pass of the functional test = the closing force of hinges with self-closing spring mechanisms shall not be less than 0,5N before and after durability tests; deflection sagging shall not be more than 0,5% of the width of the door after durability tests (D) – Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
EN 15706	Hardware for furniture - Strength and durability of slide fittings for sliding doors and roll fronts Tests: Overload tests; Functional tests; Corrosion resistance	(St + D) Pass Overload test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after slam test, pull out test or horizontal static load test. (D) – Pass of the functional test = doors weighing <40kg shall not sag more than 2mm and doors weighting >40kg shall not exceed 0,05mm per (extra?) 1kg mass up to a maximum of 5mm after durability tests (1 <sup>st</sup> slam, cycles, 2 <sup>nd</sup> slam). (D) – Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
EN 15828	Hardware for furniture - Strength and durability of hinges and their components - Stays and hinges pivoting on a horizontal axis Tests: Overload tests; Functional tests; Corrosion resistance	(St + D) Pass Overload test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after horizontal overload test or slam test (as relevant). (D) Pass Functional test = opening force <50N if flap <10kg or force <70N if flap >10kg.. Sagging shall be less than 0,5% of the width of the flap after durability tests (D) – Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
EN 15939	Hardware for furniture - Strength and loading capacity of wall attachment devices Tests: loading capacity (various); Corrosion Resistance	(St) Pass loading capacity = frame remains attached to mountings, supports test load and top panel does not touch test frame after: static load test, door swing test and overload test. (D) – Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.

EN 16014	Hardware for furniture - Strength and durability of locking mechanisms Tests: Overload tests; functional tests; durability tests	(St + D) Pass Overload test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after Lock; Bolt; Shooting Bar and Locking Hook tests using forces and cycles specified in Table B.1. (D) Pass Functional test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after Lock; Bolt; Shooting Bar, Locking Hook and Torque tests using forces and cycles specified in Table B.2. (D) Pass Durability test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after: Locks test according to forces and cycles specified in Table B.3; Cylinder and key test after 20000 cycles at 5 cycles/min. (D) - Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
EN 16337	Hardware for furniture – Strength and loading capacity of shelf supports Tests: Loading Capacity (Impact and sustained load tests); Corrosion Resistance	(St) Pass Loading capacity = No damage shown or impaired functionality after or have inclined downwards by more than 2° after the test. (D) - Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
EN 15338	Hardware for furniture - Strength and durability of extension elements and their components Tests: Overload, Functional (various); Corrosion Resistance	(St + D) Pass Overload test = no fracture of any component of joint, no loosening of any joint or fixing component, no impairment of function of any component or part after: vertical downwards or horizontal sideways static overloads; Outwards static overload; slam-shut/open tests. (D) Pass functional test = Deflection of element bottom by less than 1/75 of shortest inner dimension in the deflection test; that the bottom does not fall out or lose function after deformation test. Opening and closing forces <50N if loading capacity is <40kg or <12.5% of loading capacity if loading capacity >40kg; element still fulfills function after 1 <sup>st</sup> vertical and 1 <sup>st</sup> horizontal static load tests; (D) Pass durability function test = deflection of less than 4% of extension length after front deflection test; still functions correctly after 2 <sup>nd</sup> vertical and 2 <sup>nd</sup> horizontal static load tests and after slam-shut/open test. (D) - Pass of the corrosion resistance test = 3 cycles AHT when measured according to EN ISO 6270-2.
<b>Outdoor furniture</b>		
581-1	Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 1: General safety requirements	(Sa)

581-2	Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 2: Mechanical safety requirements and test methods for seating	(Sa + St)
581-3	Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 3: Mechanical safety requirements and test methods for tables	
<b>Seating furniture</b>		
1022	Domestic furniture - Seating - Determination of stability	(Sa)
1728	Furniture - Seating - Test methods for the determination of strength and durability	(St + D)
12520	Furniture - Strength, durability and safety - Requirements for domestic seating	(St + D)
12727	Furniture - Ranked seating - Test methods and requirements for strength and durability	(St + D)
13759	Furniture - Operating mechanisms for seating and sofa-beds - Test methods	
14703	Furniture - Links for non-domestic seating linked together in a row - Strength requirements and test methods	(St)
16139	Furniture - Strength, durability and safety - Requirements for non-domestic seating	(St + D + Sa)
<b>Tables</b>		
1730	Furniture - Tables - Test methods for the determination of stability, strength and durability	(Sa + D + St)
12521	Furniture - Strength, durability and safety - Requirements for domestic tables	(St + D + Sa)
15372	Furniture - Strength, durability and safety - Requirements for non-domestic tables	(St + D + Sa)
<b>Kitchen furniture</b>		
1116	Kitchen furniture - Co-ordinating sizes for kitchen furniture and kitchen appliances	

14749	Domestic and kitchen storage units and worktops - Safety requirements and test methods	(Sa)
<b>Beds</b>		
597-1	Furniture - Assessment of the ignitability of mattresses and upholstered bed bases - Part 1: Ignition source: Smouldering cigarette	(Sa) – non-ignition required in all replicate tests
597-2	Furniture - Assessment of the ignitability of mattresses and upholstered bed bases - Part 2: Ignition source: Match flame equivalent	(Sa) – non-ignition required in all replicate tests
716-1 716-2	Furniture - Children's cots and folding cots for domestic use - Part 1: Safety requirements Furniture - Children's cots and folding cots for domestic use - Part 2: Test methods	(Sa)
747-1 747-2	Furniture - Bunk beds and high beds - Part 1: Safety, strength and durability requirements Furniture - Bunk beds and high beds - Part 2: Test methods	(Sa)
1725	Domestic furniture - Beds and mattresses - Safety requirements and test methods	(Sa)
1957	Furniture - Beds and mattresses - Test methods for the determination of functional characteristics and assessment criteria	(St + D)
12227	Playpens for domestic use - Safety requirements and test methods	(Sa)
<b>Storage furniture</b>		
16121	Non-domestic storage furniture - Requirements for safety, strength, durability and stability	(St + D + Sa)
16122	Domestic and non-domestic storage furniture - Test methods for the determination of strength, durability and stability	(St + D + Sa)
<b>Glass in furniture</b>		
14072	Glass in furniture - Test methods	(Sa + St + D)

<b>Surface resistance and characteristics</b>		
12720	Furniture - Assessment of surface resistance to cold liquids	(D)
12721	Furniture - Assessment of surface resistance to wet heat	(D)
12722	Furniture - Assessment of surface resistance to dry heat	(D)
13721	Furniture - Assessment of the surface reflectance	
13722	Furniture - Assessment of the surface gloss	
15185	Furniture - Assessment of the surface resistance to abrasion	(D)
15186	Furniture - Assessment of the surface resistance to scratching	(D)
15187	Furniture - Assessment of the effect of light exposure	(D)
<b>Other types of furniture</b>		
1729-1	Furniture - Chairs and tables for educational institutions - Part 1: Functional dimensions	(E)
1729-2	Furniture - Chairs and tables for educational institutions - Part 2: Safety requirements and test methods	(Sa)
13150	Workbenches for laboratories - Dimensions, safety requirements and test methods	(Sa)
14434	Writing boards for educational institutions - Ergonomic, technical and safety requirements and their test methods	(E + D + St + Sa)



## Appendix VI: Lists of VOCs of concern

### VOCs with ascribed EU-LCI values

These substances should be measured when determining the "R value" of VOC emissions from a particular furniture product or component that is being tested in a chamber.

When calculating the R-value, for each substance that is identified, the concentration should be compared to its EU-LCI value and a quotient calculated. For example, if 50ug/m<sup>3</sup> of toluene were detected, which has an EU-LCI value of 2900ug/m<sup>3</sup>, this would equate to a quotient of (50 / 2900) = **0.017**. If another VOC with an EU-LCI value was also detected, for example ethylbenzene at say, 100ug/m<sup>3</sup>, then this quotient would also be calculated (100 / 850) = **0.117**. If these were the only VOCs with EU-LCI values detected, the R-Value would be **0.134**.

Table 29. List of VOCs that have been assigned EU-LCI values

EU-LCI no.	CAS No.	Compound name	EU-LCI limit (ug/m3)
<b>1-AROMATIC HYDROCARBONS</b>			
1-1	108-88-3	Toluene	2900
1-2	100-41-4	Ethylbenzene	850
1-3	1330-20-7, 106-42-3, 108-38-3, 95-47-6	Xylene (o-, m-, p-) and mixes of these isomers	500
1-5	103-65-1	n-Propylbenzene	950
1-6	108-67-8, 95-63-6, 526-73-8	Trimethylbenzene (1,2,3-; 1,2,4-; 1,3,5-)	450
1-8	527-84-4, 535-77-3, 99-87-6, 25155-15-1	Cymene (o-,m-,p-) (1-Isopropyl-2(3,4)-methylbenzene) and mix of o-, m- and p-cymene	1000
1-11	99-62-7, 100-18-5	Diisopropylbenzene (1,3-;1,4-)	750
1-12	2189-60-8	Phenyl octane and isomers	1100
1-16	100-42-5	Styrene	250
1-25	95-13-6	Indene	450
<b>2-SATURATED ALIPHATIC HYDROCARBONS</b>			
2-2	110-82-7	Cyclohexane	6000
2-3	108-87-2	Methyl cyclohexane	8100
2-6		Other saturated aliphatic hydrocarbons higher than C9	6000
<b>3-TERPENES</b>			
3-1	498-15-7	3-Carene	1500
3-3	127-91-3	B-Pinene	1400
3-5		Other terpene hydrocarbons	1400
<b>4-ALIPHATIC ALCOHOLS</b>			
4-1	75-65-0	2-Methyl-2-propanol (tert-butanol)	620
4-3	71-36-3	1-Butanol	3000
4-4	71-41-0, 30899-19-5, 94624-12-1, 6032-29-7, 584-02-1, 137-32-6, 123-51-3, 598-75-4, 75-85-4, 75-84-3	1-Pentanol (all isomers)	730

4-5	111-27-3	1-Hexanol	2100
4-6	108-93-0	Cyclohexanol	2000
4-8	111-87-5	1-Octanol	1100
4-9	123-42-2	4-Hydroxy-4-methyl-pentane-2-on (diacetone alcohol)	960
<b>5-AROMATIC ALCOHOLS</b>			
5-2	128-37-0	BHT (2,6-di-tert-butyl-4-methylphenol)	100
5-3	100-51-6	Benzyl alcohol	440
<b>6-GLYCOLS, GLYCOETHERS</b>			
6-4	111-46-6	Diethylene glycol	440
6-8	110-98-5, 25265-71-8	Dipropylene glycol	670
6-9	110-63-4	1,4-Butanediol	2000
6-11	6846-50-0	2,2,4-Trimethylpentanediol diisobutyrate (TXIB)	450
6-15	111-96-6	Diethylene glycol dimethyl ether (1-Methoxy-2-(2-methoxy-ethoxy)-ethane)	28
6-16	25265-77-4	2,2,4-Trimethyl-1,3-pentanediol monoisobutyrate (Texanol)	600
6-17	109-59-1	Ethylene glycol isopropylether (2-Methylethoxyethanol)	220
6-22	111-90-0	Diethylene glycol monoethyl ether (2-(2-ethoxyethoxy) ethanol)	350
6-23	2807-30-9	Ethylene glycol monoisopropyl ether (2-Propoxyethanol)	860
6-24	111-76-2	Ethylene glycol monobutylether (2-butoxyethanol)	1100
6-26	112-34-5	Diethylene glycol monobutylether	670
6-27	124-17-4	Diethylene glycol monomethyl ether acetate (Butyldiglykolacetate, 2-(2-butoxyethoxy) ethyl acetate)	850
6-28	122-99-6	2-Phenoxyethanol	1100
6-32	1589-47-5	1-Propylene glycol 2-methyl ether (2-methoxy-1-propanol)	19
6-33	70657-70-4	1-Propylene glycol 2-methyl ether acetate (2-methoxy-1-propyl acetate)	28
6-35	34590-94-8	Dipropylene glycol monomethyl ether	3100
6-40	63019-84-1, 89399-28-0, 111109-77-4	Dipropylene glycol dimethyl ether	1300
<b>7-ALDEHYDES</b>			
7-2	75-07-0	Acetaldehyde	1200
7-4	123-72-8	Butanal	650
7-5	110-62-3	Pentanal	800
7-6	66-25-1	Hexanal	900
7-7	111-71-7	Heptanal	900
7-8	123-05-7	2-Ethyl-hexanal	900
7-9	124-13-0	Octanal	900
7-10	124-19-6	Nonanal	900
7-11	112-31-2	Decanal	900

8-KETONES			
8-1	78-93-3	2-Butanone (ethylmethylketone)	5000
8-2	563-80-4	3-Methyl-2-butanone	7000
8-4	120-92-3	Cyclopentanone	900
8-5	108-94-1	Cyclohexanone	410
8-7	583-60-8	2-Methylcyclohexanone	2300
8-8	98-86-2	Acetophenone	490
9-ACIDS			
9-2	79-09-4	Propionic acid	310
10-ESTERS			
10-1	108-21-4	Propyl acetate (n-, iso-)	4200
10-2	108-65-6	2-Methoxy-1-methylethyl acetate	2700
10-3	107-31-3	Methylformiate	1200
10-7	110-19-0	Isobutyl acetate	4800
10-8	123-86-4	n-butyl acetate	4800
10-10	96-33-3	Methyl acrylate	180
10-11	140-88-5	Ethyl acrylate	200
10-12	141-32-2	n-Butyl acrylate	110
10-13	103-11-7	2-Ethylhexyl acrylate	380
10-14		Other acrylates (acrylic acid esters)	110
10-15	627-93-0	Dimethyl adipate	50
10-16	106-65-0	Dimethyl succinate	50
10-17	1119-40-0	Dimethyl glutarate	50
10-20	105-75-9	Dibutyl fumarate	50
10-21	105-76-0	Maleic acid dibutylester	50
10-22	13048-33-4	Hexamethylene diacrylate	10
11-CHLORINATED HYDROCARBONS			
11-3	106-46-7	1,4-Dichlorobenzene	150
12-OTHERS			
12-2	105-60-2	γ-caprolactan	300
12-3	872-50-4	N-methyl-2-pyrrolidon	400
12-4	556-67-2	Octamethylcyclotetrasiloxane (D4)	1200
12-7	100-97-0	Hexamethylenetetramine	30
12-11	26172-55-4	5-chloro-2-methyl-2H-isothiazol-3-one (CIT)	1
12-12	2682-20-4	2-Methyl-4-isothiazolin-3-one (MIT)	100
7-ALDEHYDES			
7-2	75-07-0	Acetaldehyde	1200
7-4	123-72-8	Butanal	650
7-5	110-62-3	Pentanal	800
7-6	66-25-1	Hexanal	900
7-7	111-71-7	Heptanal	900

7-8	123-05-7	2-Ethyl-hexanal	900
7-9	124-13-0	Octanal	900
7-10	124-19-6	Nonanal	900
7-11	112-31-2	Decanal	900
<b>8-KETONES</b>			
8-1	78-93-3	2-Butanone (ethylmethylketone)	5000
8-2	563-80-4	3-Methyl-2-butanone	7000
8-4	120-92-3	Cyclopentanone	900
8-5	108-94-1	Cyclohexanone	410
8-7	583-60-8	2-Methylcyclohexanone	2300
8-8	98-86-2	Acetophenone	490
<b>9-ACIDS</b>			
9-2	79-09-4	Propionic acid	310
<b>10-ESTERS</b>			
10-1	108-21-4	Propyl acetate (n-, iso-)	4200
10-2	108-65-6	2-Methoxy-1-methylethyl acetate	2700
10-3	107-31-3	Methylformiate	1200
10-7	110-19-0	Isobutyl acetate	4800
10-8	123-86-4	n-butyl acetate	4800
10-10	96-33-3	Methyl acrylate	180
10-11	140-88-5	Ethyl acrylate	200
10-12	141-32-2	n-Butyl acrylate	110
10-13	103-11-7	2-Ethylhexyl acrylate	380
10-14		Other acrylates (acrylic acid esters)	110
10-15	627-93-0	Dimethyl adipate	50
10-16	106-65-0	Dimethyl succinate	50
10-17	1119-40-0	Dimethyl glutarate	50
10-20	105-75-9	Dibutyl fumarate	50
10-21	105-76-0	Maleic acid dibutylester	50
10-22	13048-33-4	Hexamethylene diacrylate	10
<b>11-CHLORINATED HYDROCARBONS</b>			
11-3	106-46-7	1,4-Dichlorobenzene	150
<b>12-OTHERS</b>			
12-2	105-60-2	?-caprolactan	300
12-3	872-50-4	N-methyl-2-pyrrolidon	400
12-4	556-67-2	Octamethylcyclotetrasiloxane (D4)	1200
12-7	100-97-0	Hexamethylenetetramine	30
12-11	26172-55-4	5-chloro-2-methyl-2H-isothiazol-3-one (CIT)	1
12-12	2682-20-4	2-Methyl-4-isothiazolin-3-one (MIT)	100

## Carcinogenic VOCs

An indicative list of carcinogenic VOCs that are expected to be of relevance to construction products are included in in table below. Although not all VOCs may be of direct relevance it should serve as a useful guide as to what VOCs to look for in test results.

The limits for these substances are in general much stricter than those of VOCs with assigned EU-LCI values.

**Table 30. List of carcinogenic VOCs.**

No.	CAS	Name	No.	CAS	Name
1.	79-06-1	Acrylamide	31.	79-46-9	2-Nitropropane
2.	107-13-1	Acrylonitrile	32.	924-16-3	N-Nitrosodibutylamine
3.	106-92-3	Allyl glycidyl ether	33.	55-18-5	N-Nitrosodiethylamine
4.	71-43-2	Benzene	34.	621-64-7	Nitrosodipropylamine
5.	1464-53-5	2,2'-Bioxirane	35.	601-77-4	N-Nitrosodiisopropylamine
6.	542-88-1	Bis (chloromethyl) ether	36.	612-64-6	N-Ethyl-N-nitrosoaniline
7.	101-90-6	Resorcinol diglycidyl ether	37.	1116-54-7	2,2'-(Nitrosoimino)bisethanol
8.	106-47-8	4-Chloroaniline	38.	10595-95-6	N-Methyl-N-nitrosoethylamine
9.	106-89-8	Epichlorohydrine	39.	59-89-2	N-Nitrosomorpholine
10.	51594-55-9	(R)-(-)-Epichlorohydrine	40.	100-75-4	N-Nitrosopiperidine
11.	95-69-2	4-Chloro-2-methylaniline	41.	930-55-2	N-Nitrosopyrrolidine
12.	100-44-7	Benzyl chloride	42.	88-72-2	2-Nitrotoluene
13.	14977-61-8	Chromyl chloride	43.	122-60-1	Phenyl glycidyl ether
14.	96-12-8	1,2-Dibromo-3-chloropropane	44.	1120-71-4	1,3-Propansulton
15.	106-93-4	1,2-Dibromoethane	45.	91-22-5	Quinoline
16.	764-41-0	1,4-Dichlorobut-2-ene	46.	94-59-7	5-Allyl-1,3-benzodioxole
17.	505-60-2	Bis(2-chloroethyl) sulfide	47.	96-09-3	Styrene oxide
18.	107-06-2	Ethylene dichloride	48.	95-06-7	Sulfallate
19.	96-23-1	1,3-Dichloro-2-propanol	49.	5216-25-1	4-Chlorobenzotrichloride
20.	542-75-6	1,3-Dichloropropene, isomers	50.	509-14-8	Tetranitromethane
21.	79-44-7	Dimethylcarbamoyl chloride	51.	95-53-4	o-Toluidine
22.	540-73-8	N,N'-Dimethylhydrazine; 1,2-Dimethylhydrazine	52.	2431-50-7	2,3,4-Trichlorobut-1-ene
23.	106-87-6	Vinylcyclohexane diepoxide	53.	79-01-6	Trichloroethylene
24.	680-31-9	Hexamethylphosphoric triamide	54.	96-18-4	1,2,3-Trichloropropane
25.	90-04-0	2-Methoxyaniline	55.	98-07-7	Benzotrichloride
26.	120-71-8	6-Methoxy-m-toluidine	56.	137-17-7	2,4,5-Trimethylanilin
27.	592-62-1	Methyl azoxy methyl acetate	57.	51-79-6	Urethane
28.	51-75-2	N-Methylbis(2-chloroethyl)amine			
29.	838-88-0	4,4-Methylenedi-o-toluidine			
30.	15159-40-7	Morpholine-4-carbonyl chloride			

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