



Revision of EU Ecolabel Criteria for Furniture

Technical report: EU Ecolabel criteria draft 3.0

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9th Oct. 2014

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1 EU ECOLABEL REVISION PROCESS FOR FURNITURE

The EU Ecolabel criteria for wooden furniture¹ are under revision. The revision process involves the writing and publication of a background 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 is 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 background report, a 1st technical report was published in which draft criteria areas for EU Ecolabel furniture were proposed and a 1st Ad-Hoc Working Group meeting took place in Sevilla on October 7th 2013 to discuss the proposals. Stakeholder feedback was gathered prior to the meeting via questionnaires, during the meeting via verbal dialogue 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 2nd technical report for EU Ecolabel furniture criteria, which was published approximately one month in advance of the 2nd Ad-Hoc Working Group meeting that took place in Brussels on May 15th 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.

The current version of the technical report (version 3.0) has been shaped by the feedback received from both the 1st and 2nd AHWG meetings and is presented to members of the EUEB for their consultation 4 weeks prior to the EUEB meeting of the 5th November 2014 to be held in Brussels.

¹ 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>

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 Ecolabel products, the overarching piece of legislation is the 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 Ecolabelled 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 their 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 Swan and the Blue Angel has an important influence over EU Ecolabel criteria. 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 1335 for office chairs. These standards are important from an environmental point of view when they refer to durability aspects of the furniture. For upholstered furniture, an important standard is EN 1021 for fire resistance of upholstered furniture, which can effectively require that flame retardants be used with certain materials.

2.2 Market analysis

According to the World Furniture Outlook by CSIL², the global furniture market is worth around US\$420 billion per year. The global market is dominated by China (37%) but the 3rd and 4th main producers were Germany and Italy (each with a 6% market share). In total, EU-27 countries account 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 Flower 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 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 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 FSC or PEFC certified wood or equivalent.
- 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 3rd 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.

² 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>)

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.

Ecolabelled 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 H- hazard statements according to CLP Regulation) has been made, based on the substances inherent properties.

3 SUMMARY OF MAIN CHANGES IN CRITERIA

Due to the inclusion of criteria for non-wood materials, the structure is more complex. After proposing a new criteria structure in TR 2.0 at the 2nd AHWG, it was requested that the hazardous substance criteria and coating/surface treatment criteria be integrated into specific sub-criteria for different materials. A summary of the structural rearrangement of the criteria between TR 2.0 and TR 3.0 are included below.

Table 1. Summary of the main changes between the previous criteria and new proposed criteria for furniture.

Criteria structure proposed at 2 nd AHWG (TR 2.0)		New proposed criteria for EUEB Nov. 2015 (TR 3.0)	
Criterion	Part	Criterion	Part
1 – Product Description		1 – Product description	
2 – Hazardous substances	<ul style="list-style-type: none"> a) Substances of Very High Concern b) Derogations c) Dyes and pigments d) Biocides e) Flame retardants f) Plasticisers g) Other restricted substances 	2 – General hazardous substance requirements	<ul style="list-style-type: none"> 2.1 Restricted hazard classifications and derogations 2.2 Substances of Very High Concern
3 – Wood and wood-based materials	<ul style="list-style-type: none"> a) Origin, traceability and sustainability b) Free formaldehyde in resin formulations c) Formaldehyde emissions from wood based panels d) Contaminants in recycled wood e) Genetically modified wood 	3 – Wood and wood-based materials	<ul style="list-style-type: none"> 3.1 Legality and origin of wood and wood-based materials 3.2 Sustainable wood 3.3 Restricted substances <ul style="list-style-type: none"> a) contaminants in recycled wood b) wood preservatives c) flame retardants d) vinyl chloride monomer e) heavy metals in paints and varnishes f) VOC content in paints and varnishes g) perfluorinated compounds in paints and varnishes 3.4 Formaldehyde emissions
4 – Surface treatments and adhesives	<ul style="list-style-type: none"> a) paints and varnishes b) Anti-corrosion coatings c) Adhesives 		
5 – Plastics	<ul style="list-style-type: none"> a) Marking of plastic parts b) Hazardous substances c) Recyclable plastics d) Recycled content 	4 – Plastics	<ul style="list-style-type: none"> 4.1 Marking of plastic components 4.2 Restricted substances <ul style="list-style-type: none"> a) Heavy metals in plastic additives b) Vinyl chloride monomer iii) Flame retardants iv) Plasticisers 4.3 Recycled plastic content
6 – Metals	<ul style="list-style-type: none"> a) Description of metal used 	5 – Metals	5.1 Restricted substances

	<ul style="list-style-type: none"> b) Hazardous substances c) Recyclable metals d) Recycled content 		<ul style="list-style-type: none"> a) Electroplating restrictions b) Heavy metals in paints and primers c) VOC content in paints and primers d) Perfluorinated compounds in paints and primers
7 - Leather	<ul style="list-style-type: none"> a) Animal origin b) Final effluent discharged from tannery site c) Final product leather requirements d) Hazardous substances 	6 - Upholstery covering materials	<ul style="list-style-type: none"> 6.1 Leather <ul style="list-style-type: none"> a) Physical requirements b) Restricted substances in furniture leather c) Restricted substances in leather production process 6.2 Textiles <ul style="list-style-type: none"> a) Physical requirements b) Restricted substances in textile coverings c) Restricted substances in textile production process 6.3 Coated fabrics <ul style="list-style-type: none"> a) Physical requirements b) Restricted substances
8 - Textiles (fabrics and fibres)	<ul style="list-style-type: none"> a) Cotton b) Elastane c) Polyamide (nylon) d) Polyester e) Hazardous substances f) Final product testing 		
9 - Padding materials (upholstery)	<ul style="list-style-type: none"> a) Latex foam b) Polyurethane (PUR) foam 	7 - Upholstery padding materials	<ul style="list-style-type: none"> 7.1. Latex foam <ul style="list-style-type: none"> a) Restricted substances b) 24h VOC emissions from latex foam 7.2. Polyurethane foam <ul style="list-style-type: none"> a) Restricted substances b) 72h VOC emissions 7.3. Other padding/filling materials
10 - Glass	<ul style="list-style-type: none"> a) Recyclability of glass b) Hazardous substances c) Recycled content 		
11 - Final product	<ul style="list-style-type: none"> a) Product performance (durability, safety, strength) b) Design for reparability/refurbishment/reuse c) End of life guidance d) VOC emissions e) Low energy light bulbs 	8 - Glass	<ul style="list-style-type: none"> 8.1 Heavy metals in glass 8.2 Information to the consumer
12 - Packaging	<ul style="list-style-type: none"> a) cardboard / paper b) Plastic and plastic bags c) Other materials 	9 - Final product requirements	<ul style="list-style-type: none"> 9.1 Fitness for use: a) Durability; b) Strength; c) Ergonomics 9.2 Warranty / Disassembly / Spare parts 9.3 VOC emissions
13 - Information for consumers	<ul style="list-style-type: none"> a) Documentation supplied with the product b) Information on the packaging c) Information appearing on the Eco-label 	Information appearing on the Eco-label	

In addition to changes with the criteria structure there are some changes in the ordering of the Appendices, which is summarised below.

Table 2. Comparison of appendices between TR 2.0 and TR 3.0

Technical Report 2.0	Technical Report 3.0
Annex I: List of derogated hazardous substances and conditions	Appendix I: Guidance for calculating VOC used in surface coatings
Annex II: Restricted substances list for dyes	Appendix II: Prohibited arylamine compounds in final leather and textile materials
Annex III: Restricted substance lists	Appendix III: EN 13336 requirements for furniture leather
Annex IV: Guidance for calculating VOC used in surface coatings	Appendix IV: Restricted substance lists for leather, textile and coated fabric production processes.
Annex V: European furniture standards	Appendix V: European furniture standards
	Appendix VI: FSC and PEFC criteria

Rationale for changes in criteria structure

Stakeholders at the 2nd AHWG meeting criticised the criteria structure and wanted hazardous substance derogations and further restrictions to be as material specific as possible. The same request was made for coating substances and adhesives. The aim of the restructuring has been to simplify the interpretation of the criteria in particular for those applicants whose furniture product(s) may only consist of one or two different materials.

The terminology has been changed from "Annex" to "Appendix" to avoid any possible confusion with the Annex of the final Decision that will be adopted for EU Ecolabel furniture criteria.

The order of the appendices has changed due to the restructuring of the criteria and in particular due to the fact that the old Annex I, which contained both derogations and further restrictions has now been split into a pure derogation table listed under criterion 2.1 and a production chain restricted substance list, which focuses on the processes used to make leather, textiles and coated fabrics (now the new Appendix IV).

The content for the VOC calculation guidance remains essentially unchanged as does the Annex/Appendix V on European furniture standards. **Although the furniture standards have now been referenced as whether they relate to strength, durability, ergonomic or safety considerations.**

It should be noted that Appendix III and Appendix V were requested to be removed from the criteria document because there is a possibility that these references may become obsolete during the next 5-6 years when the Decision of EU Ecolabel criteria for furniture is expected to remain valid if these standards change. They are still included in the Technical Report and will be referred to in the User Manual for the benefit of applicants and competent bodies.

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 EN standards exist for the furniture product in question.

For relevant standards, reference shall only be made to the specification standard and if tests in other standards are required, these will be mentioned where practical in the pass conditions, but not as a new row entry in the table. The revision of the standards is only partially complete but first it is desirable to know from stakeholders precisely what level of detail would be required here before going further.

In order to support the rationale behind the very concise but generalised text regarding sustainable wood, and the reasoning behind 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 (VI).

DRAFT

4 PRODUCT GROUP NAME, SCOPE AND DEFINITIONS

Table 3. 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
<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"> i. Mechanical fixtures and fittings, such as screws, nails, wheels and hinges are exempt from compliance with all criteria on materials. 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). 	<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/EU³.</p> <p>The product group shall not comprise the following products:</p> <p>(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.</p> <p>(b) Second-hand, refinished, refurbished or remanufactured furniture products.</p> <p>(c) Furniture fitted into vehicles used for public or private transit.</p>

³ JO L 184, 25.6.2014, p. 18

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 licensed 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 questionnaire⁴ 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 eligible for the EU Ecolabelling 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 2nd AHWG meeting. Due to the considerable amount of work this could entail, it was proposed to continue excluding these materials. A possible basis for future criteria on these materials could be taken from that of EU Ecolabel hard coverings⁵ 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?

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

⁵ 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 coverings⁶, wooden floor coverings⁷ and bed mattresses⁸.

⁶ 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,

⁷ 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.

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

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; hard plastic components; metals; leather, 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 sub-components and 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, hard plastics, metals, textile fibres/fabrics, leather, glass and padding 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 Ecolabelled furniture in the future and help shape later revisions of criteria.

Criterion 2: General hazardous substance requirements

2.1. Restricted hazard classifications and derogations

The EU Ecolabel may not be awarded if the product or any article of it, as defined in Article 3(3) of Regulation (EC) No 1907/2006 of the European Parliament and of the Council⁹, or any homogenous part of it contains a substance or mixture meeting the criteria for classification with the hazard statements or risk phrases specified in the table below, in accordance with Regulation (EC) No 1272/2008 or Council Directive 67/548/EEC¹⁰, or contains a substance or mixture referred to in Article 57 of Regulation (EC) No 1907/2006, unless specific derogation has been granted.

The most recent classification rules adopted by the Union shall take precedence over the listed hazard classifications and risk phrases. Applicants shall therefore ensure that any classifications are based on the most recent classification rules.

The hazard statements and the risk phrases in the table below generally refer to substances. However, if information on substances cannot be obtained, the classification rules for mixtures apply.

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 hazards no longer apply are exempted from the above requirements unless specifically restricted in relevant furniture material sub-criteria.

Table 4. Restricted hazard classifications and their categorisation

Acute toxicity	
Category 1 and 2	Category 3
H300 Fatal if swallowed (R28)	H301 Toxic if swallowed (R25)
H310 Fatal in contact with skin (R27)	H311 Toxic in contact with skin (R24)
H330 Fatal if inhaled (R23/26)	H331 Toxic if inhaled (R23)
H304 May be fatal if swallowed and enters airways (R65)	EUH070 Toxic by eye contact (R39/41)
Specific target organ toxicity	
Category 1	Category 2
H370 Causes damage to organs (R39/23, R39/24, R39/25, R39/26, R39/27, R39/28)	H371 May cause damage to organs (R68/20, R68/21, R68/22)
H372 Causes damage to organs (R48/25, R48/24, R48/23)	H373 May cause damage to organs (R48/20, R48/21, R48/22)
Respiratory and skin sensitisation	
Category 1A	Category 1B

⁹ 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, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (OJ L 396, 30.12.2006, p. 1).

¹⁰ Council Directive 67/548/EEC of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (OJ 196, 16.8.1967, p. 1).

H317: May cause allergic skin reaction (R43)	H317: May cause allergic skin reaction (R43)
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)
Carcinogenic, mutagenic or toxic for reproduction	
Category 1A and 1B	Category 2
H340 May cause genetic defects (R46)	H341 Suspected of causing genetic defects (R68)
H350 May cause cancer (R45)	H351 Suspected of causing cancer (R40)
H350i May cause cancer by inhalation (R49)	
H360F May damage fertility (R60)	H361f Suspected of damaging fertility (R62)
H360D May damage the unborn child (R61)	H361d Suspected of damaging the unborn child (R63)
H360FD May damage fertility. May damage the unborn child (R60, R60/61)	H361fd Suspected of damaging fertility. Suspected of damaging the unborn child (R62/63)
H360Fd May damage fertility. Suspected of damaging the unborn child (R60/63)	H362 May cause harm to breast fed children (R64)
H360Df May damage the unborn child. Suspected of damaging fertility (R61/62)	
Hazardous to the aquatic environment	
Category 1 and 2	Category 3 and 4
H400 Very toxic to aquatic life (R50)	H412 Harmful to aquatic life with long-lasting effects (R52/53)
H410 Very toxic to aquatic life with long-lasting effects (R50/53)	H413 May cause long-lasting effects to aquatic life (R53)
H411 Toxic to aquatic life with long-lasting effects (R51/53)	
Hazardous to the ozone layer	
EUH059 Hazardous to the ozone layer (R59)	

In accordance with Article 6(7) of Regulation (EC) No 66/2010 the following substances are specifically derogated from the requirements set out in criterion 2.1, subject to meeting the derogation conditions set out in Table 5.

Table 5. Derogations to the hazard restrictions in Table 4 and applicable conditions

Substances / Groups of substances	Applicability	Derogated classification(s)	Derogation conditions
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(a) Flame retardants ⁺⁺⁺		H317(1B), H373, H411, H412, H413	Only permitted when a flame retardancy function is required to comply with fire safety standards in the country of sale.
(b) Flame retardants / Antimony Trioxide (ATO) ⁺⁺⁺	Furniture upholstery materials*	H351	Only permitted when ATO is used as a synergist in the backcoating of textiles and only when a flame retardancy function is required to comply with fire safety standards. Emissions to air in the workplace where ATO is applied shall meet an eight hour occupational exposure limit value of 0,5mg/m ³ .
(c) Heavy metals / Nickel	Metal components	H317, H351, H372	Only permitted when i) used in stainless steel components and where the Nickel release rate is shown to be less than 0.5µg/cm ² /week according to EN 1811., ii) used in nickel-plated carbon steel components that are considered not to come into prolonged skin contact** during normal use of the furniture product.
(c) Heavy metals / Zinc		H412	Only permitted when used in the electroplating or other anti-corrosive coating of metal components either subject to heavy physical wear and/or not considered to come into prolonged skin contact
(d) Dyestuff for dyeing and non-pigment printing ⁺⁺⁺	Textiles, leather and coated fabrics in furniture upholstery covering materials.	H301, H311, H331, H317, H334	Only permitted when referring to 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	With solution dyeing and/or digital printing, no further requirements apply. Otherwise, reactive, direct, vat or sulphur dyes with these classifications meets at least one of the following conditions: —High affinity dyes are used; — Colour matching instrumentation is used; — Standard Operating Procedures for the dyeing process are used; — Colour removal is used in wastewater treatment ⁺⁺⁺ .
(e) 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: —In white coloured printing; —As additives during the production of acrylic, polyamide or polyester with a recycled content.
(f) Water, dirt and stain repellents ⁺⁺⁺	Use in any surface treatments of furniture components	H413	The repellent and its degradation products shall be readily biodegradable and non-bioaccumulative ⁺ in the aquatic environment, including aquatic sediment.
(g) Auxiliaries (comprising carriers, levelling agents,	Use in treatment of furniture upholstery	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.

dispersing agents, surfactants, thickeners and binders) ⁺⁺⁺	covering materials (textiles, leather or coated fabrics).	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.
(h) Isocyanates	Use in adhesives during assembly of different furniture components and sub-components	H315, H317, H319, H332, H334, H335, H351, H373	Only applies to high performance isocyanate adhesives / resins which have zero or negligible isocyanate emissions after curing.
(h) Isocyanates / Methylene diisocyanate	Use in resins for wood-based panel manufacture ⁺⁺		Workers must use appropriate personal protective equipment in a well ventilated environment where isocyanate concentration is maintained below 0,2 mg/m ³ at all times and 0,05 mg/m ³ as an 8-10 hour time weighted average (TWA) exposure.
(i) Metal complex dyes (based on Copper, Chromium and Nickel) ⁺⁺⁺	Dyeing of textiles		Only permitted in the dyeing of wool, polyamide or blends of these fibres with man-made cellulose fibres (e.g. viscose).
(j) Silicon resin emulsions [†]	Paints and varnishes	H412, H413	Only permitted if these substances amount to less than 2.0% w/w of the final paint product.
(k) Driers [†]	Paints and varnishes	H301, H317, H373, H412, H413	Only permitted if the total content of drier compounds amounts to less than 0,10% w/w in the final paint product.
		H400, H410	Only applies to Cobalt driers in alkyd paints and only if such compounds amount to less than 0,05% w/w in the final paint product.
(l) Anti-skimming agents [†]	Paints and varnishes	H317, H412, H413	Only permitted when it can be shown that anti-skimming agents with these classifications amount to less than 0,40% w/w in the final paint product.
(m) Mineral raw materials (including crystalline silica and leucophyllite minerals that contain crystalline silica) [†]	Paints and varnishes	H373	General derogation with no conditions.
(n) Neutralising agents [†]	Paints and varnishes	H311, H331, H400, H410, H411, H412, H413	Only permitted if quantities amount to less than: <ul style="list-style-type: none"> • 0,50% w/w in paint products • 1,0% w/w in varnish products
(o) Anti-corrosion pigments [†]	Coatings applied to the surfaces of metal components	H410, H411, H412, H413	Only permitted if the following limits are respected in the coating product: <ul style="list-style-type: none"> • ≤ 0,50% w/w in products used for "verdigris" protection • ≤ 2,0% w/w in all product subcategories defined in the Paints Directive (2004/42/EC) • ≤ 8,0% w/w in product subcategories d), i) or j) as defined in the Paints Directive (2004/42/EC)..
(p) Barium, antimony and cobalt in	Paints and varnishes		Shall only be permitted where laboratory testing (DIN 53770-1 or equivalent) of the pigment shows

pigments [†]			<p>that the metal chromophore is bonded within a crystal lattice and is insoluble. The following metal containing pigments are derogated for use without the need for testing:</p> <ul style="list-style-type: none"> •Barium sulfate •Antimony nickel within an insoluble TiO₂ lattice •Cobalt aluminate blue spinel •Cobalt chromite blue-green spinel
(q) General purpose surfactants [†]	Paints and varnishes	H411, H412, H413	<p>Only permitted if the concentration in the final paint or varnish product is less than:</p> <ul style="list-style-type: none"> •1,0% w/w in white and light coloured products •3,0% w/w in products of all other colours
(r) In-can preservatives [†]	Paints and varnishes		<p>Only permitted if:</p> <ul style="list-style-type: none"> •present in quantities less than 0,060% w/w in the final paint or varnish product •active substances are approved for use under the Bicial Products Regulation (EU) No. 528/2012 for the relevant product type. •Any H400 or H410 substances are classified as non-bioaccumulative[†].
(s) Dry film preservatives [†]	Paints and varnishes	H317, H331, H400, H410, H411, H412	<p>Only permitted when present in the final paint or varnish product at concentrations:</p> <ul style="list-style-type: none"> •≤ 0,10% w/w in paint or varnish products used in indoor furniture •≤ 0,65% w/w in paint or varnish products used in outdoor furniture •active substances are approved for use under the Bicial Products Regulation (No. 528/2012) for the relevant product type. •Any H400 or H410 substances are classified as non-bioaccumulative[†].
(t) Formaldehyde	When used as a resin or finishing agent in wood based panels ^{††}	H301, H311, H314, H317, H331, H341, H350;	<p>Only permitted when:</p> <ul style="list-style-type: none"> •Workplace air concentrations where panels are produced can be shown to not exceed 0.2 ppm TWA or 0,4ppm STEL, and •Formaldehyde emissions from the wood-based panel comply with the limits defined in criterion 3.4.
	When used as a finishing agent in leather or textiles		<p>Only permitted when the free formaldehyde limit values stated in Table 7 and Table 9 for leather and textiles respectively are respected.</p>
(v) Total Volatile Organic Compounds	Adhesives in assembly of any furniture		<p>Only permitted when one of the following conditions are met:</p> <ul style="list-style-type: none"> •The total VOC content of the adhesive is ≤

	components or sub-components		5,0% <ul style="list-style-type: none"> •The total quantity of VOC applied to the final product via adhesives is ≤ 4g •The final product complies with the requirements of criterion 8.3.
(w) N,N-Dimethylacetamide ^{†††}	Elastane and Acrylic textiles	H312, H319, H332, H360D	Only permitted as residue in textiles containing elastane and acrylic. In these cases a maximum residual content of 0.005% (w/w) in the final textile product is permitted and should be verified by testing by solvent extraction followed by GC-MS analysis.

*upholstery materials considered as textiles, leather, coated fabrics and padding materials

**prolonged skin contact is currently defined by CARACAL¹¹ 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⁻¹ at 436nm, 5m⁻¹ at 525nm and 3m⁻¹ at 620nm.

[†] Derogation conditions aligned with those set out in Decision 2014/312/EU on establishing the EU Ecolabel criteria for indoor and outdoor paints and varnishes

^{††} New derogation conditions that have been proposed for wood-based panels.

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

Assessment and verification:

The applicant shall screen the presence of substances and mixtures that may be classified with the hazard statements or risk phrases reported above in the criterion. The applicant shall provide a declaration of compliance with criterion 2.1 for the product, any article of it or any homogenous part of it.

Applicants shall select the appropriate forms of verification. The main forms of verification are foreseen as follows:

- For articles manufactured according to a specific chemical formulation (e.g. latex and PUR foams): Safety Data Sheets shall be provided for the final article or for the substances and mixtures composing the final article above a cut-off limit of 0,10 % w/w.
- For homogenous parts and any associated treatments or impurities (e.g. plastic and metal parts): Safety Data Sheets shall be provided for the materials composing that part of the product and for substances and mixtures used in the formulation and treatment of the materials remaining in the final part above a cut-off limit of 0,10 % w/w.
- For chemical recipes used to impart a specific function to the product or to components of the product (e.g. glues, adhesives, flame retardants, biocides, plasticizers, dyes): Safety Data Sheets shall be provided for substances and mixtures used in the assembly of the final product or substances and mixtures applied to components during production, dyeing, printing and finishing processes that remain in the treated components.

The declaration shall include related documentation, such as declarations of compliance signed by the suppliers, on the non-classification of the substances, mixtures or materials with any of the hazard classes associated to the hazard statements or risk phrases referred

¹¹ http://ec.europa.eu/enterprise/sectors/chemicals/reach/caracal/index_en.htm .

in the list above in accordance with Regulation (EC) No 1272/2008, as far as this can be determined, as a minimum, from the information meeting the requirements listed in Annex VII to Regulation (EC) No 1907/2006.

The information provided shall relate to the forms or physical states of the substances or mixtures as used in the final product.

The following technical information shall be provided to support the declaration of classification or non-classification for each substance and mixture:

(i) For substances that have not been registered under Regulation (EC) No 1907/2006 or which do not yet have a harmonised CLP classification: information meeting the requirements listed in Annex VII to that Regulation;

(ii) For substances that have been registered under Regulation (EC) No 1907/2006 and which do not meet the requirements for CLP classification: information based on the REACH registration dossier confirming the non-classified status of the substance;

(iii) For substances that have a harmonised classification or are self-classified: Safety Data Sheets where available. If these are not available or the substance is self-classified then information shall be provided relevant to the substances hazard classification according to Annex II to Regulation (EC) No 1907/2006;

(iv) In the case of mixtures: Safety Data Sheets where available. If these are not available then calculation of the mixture classification shall be provided according to the rules under Regulation (EC) No 1272/2008 together with information relevant to the mixtures hazard classification according to Annex II to Regulation (EC) No 1907/2006.

Safety Data Sheets (SDS) shall be completed in accordance with the guidance in Section 10, 11 and 12 of Annex II to Regulation (EC) 1907/2006 (Requirements for the Compilation of Safety Data Sheets). Incomplete SDS shall require supplementing with information from declarations by chemical suppliers.

Information on intrinsic 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 Regulation (EC) No 1907/2006. The sharing of relevant data across the supply chain is strongly encouraged.

Where substances used are derogated, then the declaration shall specifically identify those derogated substances and provide supporting evidence showing how the derogation conditions are met.

2.2. Restrictions that apply to Substances of Very High Concern

No derogation from the exclusion in Article 6(6) of Regulation (EC) No 66/2010 shall be given concerning substances identified as substances of very high concern and included in the list provided for in Article 59(1) of Regulation (EC) No 1907/2006, present in mixtures, in an article or in any homogeneous part of the product in concentrations > 0,10 % by weight.

Assessment and verification:

Reference to the latest list of substances of very high concern shall be made on the date of application. The applicant shall provide a declaration of compliance with this criterion, together with related documentation, including declarations of compliance signed by the material suppliers and copies of relevant Safety Data Sheets for substances or mixtures in accordance with Annex II to Regulation (EC) No 1907/2006. Concentration limits shall be

specified in the safety data sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

Rationale:

Significant changes have been made to the general hazardous substance criterion compared to the previous criteria for wooden furniture. This is mainly due to the fact that since the last Decision in 2009 for wooden furniture Ecolabel criteria, the EU Ecolabel Regulation (EU) No. 66/2010 has come into force.

The general text included in Criterion 2 reflects the requirements of Articles 6(6) and 6(7) as set out in the Ecolabel Regulation. To make the interpretation of these Articles more relevant to applicants, the excluded hazard statements (and associated risk phrases) have been included in Table 4. Applicants and Competent Bodies can check off substances and mixtures based on the H-statement(s)/risk phrase(s) identified in their safety data sheets.

The previous criteria referred only to risk phrases but now equivalent hazard classifications have been introduced as well as part of the global harmonized classification system that is gradually being implemented under the CLP Regulation (EU) No. 1272/2008. In fact risk phrases are gradually being phased out but are still included as they may still represent useful information for applicants.

The structure of the hazardous substance criteria closely follows that which was recently set out for Bed Mattresses in Decision 2014/391/EC. This comprises a general list of restricted hazard statements that are not permitted in the final product followed by a set of derogations from these hazard statements and under what particular conditions they may be applied.

The second part of the general hazardous substance criteria focusses on substances of very high concern (SVHC) and the process in place under the REACH Regulation (EU) No. 1907/2006, in particular with reference to Articles 57 and 59. This is a standard requirement for EU Ecolabel criteria and again reflects the text provided in Articles 6(6) and 6(7) of the Ecolabel Regulation. It is important to underline that no derogation to any Article 59 substance may be applied that results in a concentration of more than 0,1% in the final product or components thereof. Both the Blue Angel and Nordic Ecolabel criteria are generally aligned to prevent the use of SVHC in Ecolabelled products.

Any Article 59 SVHC shall be listed in either the Candidate List (prior to a decision being made) or Annex XIV (authorized substance list) or Annex XVII (restricted substance list) of REACH. All three lists are maintained by ECHA and publically available for consultation by applicants or Competent Bodies for cross-checking. To aid applicants and Competent Bodies alike, when referring to compounds such as biocides and flame retardants, lists of compound types that are already present on the Candidate list, Annex XIV or Annex XVII are proposed to be provided in the user manual. This is simply intended as an indicative guide to what substances cannot be used and applicants should be aware that these lists are updated at least twice per year by ECHA.

Rationale for derogations

The criteria and relevant derogations for hazardous substances have been considerably reworked between TR 2.0 and TR 3.0. This was in large part due to feedback at the 2nd AHWG meeting requesting that general requirements as per Articles 6(6) and 6(7) of the Ecolabel Regulation be laid out in a separate criterion.

Instead of having the derogated hazardous substances and applicable conditions listed in the Appendix, it was decided to place them in one single table immediately after the Article 6(6) banned hazardous classifications. This reflects the structure in place for Decision 2014/391/EC for Bed Mattresses, which was very recently voted and is of significant relevance to the furniture product group. It is possible that bed manufacturers may apply for the EU Ecolabel for bed mattresses as per Decision 2014/391/EU and the associated base, frame and legs as per the criteria set out for EU Ecolabel furniture. In such cases it would be very important that the applicant can see the common aspects of the criteria, of which hazardous substance requirements is an obvious example.

Stakeholders generally requested that EU Ecolabel criteria be material specific and that any relevant hazardous substance criteria, that does not involve derogation conditions, i.e. an outright ban or restricted to very low concentrations, be included as sub-criteria of the relevant material. This has led to some duplication of short sub-criteria but ensures that any applicant can quite quickly understand precisely what criteria is required for his or her particular product, especially if it only consists of one or two materials.

The derogation table has been amplified significantly due to a more thorough cross-check being carried out including the recently published criteria for textiles (Decision 2014/350/EU) and paints and varnishes (Decision 2014/312/EU). Care must be taken with criteria involving these materials to ensure that no derogation is missed, otherwise the possible scenario where an Ecolabel paint, varnish or textile may not be considered suitable for use in the manufacture of EU Ecolabel furniture – which would not make any sense. It may be simpler to simply refer to Decisions and equivalent derogations but this would be very inconvenient for potential applicants (and competent bodies).

The rationale for any new or different derogation conditions should also be explained here.

Nickel

With nickel, the derogation for its use in stainless steel has been justified in many previous 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/cm²/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 has 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 shall 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.

Isocyanates

Derogation for the use of isocyanate compounds has been provided for two possible uses: adhesives and as resins in wood-based panels. The derogation for isocyanate adhesives was requested by stakeholders, stating the most severe hazard classification (H351 – suspect carcinogen). However, a number of lesser hazard classifications can also be associated with a given isocyanate formulation and so these have also been included. The use of isocyanates in wood-based panel resins specifically refers to methylene diisocyanate (CAS 101-68-8), commonly referred to as MDI. The use of MDI is the main alternative to formaldehyde-based resins in wood-based panel manufacture and has the advantage of resulting in virtually zero formaldehyde emissions from the final product. Both isocyanate adhesives and resins are generally considered to cure completely and result in negligible residual emissions. However, due to potential health effects on workers exposed to uncured isocyanate compounds, a time weighted average workplace exposure limit of 0,05 mg/m³ and a short-term maximum exposure limit of 0,2 mg/m³ is required as part of the derogation. These limits are set by the American National Institute for Occupational Safety and Health.

Formaldehyde

A specific derogation for formaldehyde based substances and mixtures is included in the derogation table because these compounds are widely used in the finishing treatment of upholstery materials and are almost unavoidable in the manufacture of several types of wood based panel. The finishing treatments are essential to improve the durability of furniture materials and to extend product life. Limits for formaldehyde emissions are included for textiles, leather and wood based panels and so compliance with these limits is a key part of the derogation conditions. The criteria in TR 2.0 had been inserted relating to both the free-formaldehyde content of resin formulations (max 0,2%) and for emissions from the final product. Industry feedback related that the 0,2% limit was achievable but only if the entire resin formulation is considered, including not only the formaldehyde component of the formulation but also any hardeners and other additives. In TR 3.0, it is considered more relevant not to specify the free-formaldehyde content of the resin formulation but instead a workplace health and safety requirement. There are various limits proposed for workplace exposure to formaldehyde. OSHA recommends a time weighted average (TWA) of 0.75ppm with short term exposure limit (STEL) not exceeding 2,0ppm. Formacare have concluded that stricter limits of TWA = 0,4ppm and STEL = 0,8ppm are appropriate. Meanwhile the European Commission Scientific Committee on Occupational Exposure recommend that TWA = 0,2ppm and STEL = 0,4ppm. Although the latter limit has not yet been included in the published list of indicative OEL values, it is possible that these stricter limits will eventually be incorporated due to the fact that formaldehyde will be reclassified in 2015 when it shall no longer be considered as a Category 2 carcinogen (H351 – suspected of causing cancer) but instead as a Category 1B carcinogen (H350 – may cause cancer).

Biocides

It was considered that the criteria could be streamlined by included specific derogation conditions for biocides along with other derogation conditions, rather than as sub-criteria for different materials. Such an approach is justified in the sense that biocides are generally not permitted except under certain scenarios. Depending on the reaction at the EUEB, a similar approach could be adopted for flame retardants and plasticisers although biocides and plasticisers are missing specific H-statements that would be derogated.

Adhesives – Total VOC

In TR 2.0, specific criteria were dedicated to surface coatings and adhesives. However, as part of the restructuring of the criteria to be more material specific, this criterion was removed. It was foreseen that specific sub-criteria would be applied for coatings and adhesives for all materials but since the nature of adhesives used in leather may be very different to those used in wood, it was decided that a common criterion for VOCs in adhesives could be maintained and included in the general derogation table. Specific information on the most common hazard classifications of adhesives is still to be included however. The only specific derogation requirement received related to adhesives was for H351 isocyanates. It could also be argued that an adhesive is a clear example of a mixture or substance that undergoes chemical or physical changes that result in it no longer possessing its original hazardous properties. However, with VOCs, adhesives (and coatings) are locked into the criteria.

Other Ecolabel schemes take a different approach to VOCs form adhesives. For example, the Nordic ecolabel

Criterion 3: Wood and wood-based materials

3.1. Legality and origin of wood and wood-based materials

All wood and wood-based materials used in the furniture product must be compliant with the European Timber Trade Regulation (No. 995/2010).

For the purposes of the EU Ecolabel criteria, furniture products or components thereof that are classified under the following harmonized customs system codes:

- 9401 (Seats (excluding those of heading 9402), whether or not convertible into beds, and parts thereof),
- 9402 (Medical, surgical, dental or veterinary furniture; barbers' chairs & similar chairs, having rotating parts of the foregoing articles),
- 9403 10 (Metal furniture of a kind used in offices),
- 9403 80 00 (Furniture of other materials, including cane, osier, bamboo or similar materials) or
- 9403 90 (Furniture parts),

shall also meet the requirements of the Timber Regulation (EU) No 995/2010.

Assessment and Verification:

The applicants shall present the following means of proof:

- The demonstration of due diligence system(s) used by the company or companies responsible for the initial placement of wood, wood-based materials of products thereof on the EU market that meet the requirements of the EUTR, or
- A valid FLEGT license to accompany delivery invoices. or
- A valid CITES permit to accompany delivery invoices.

Rationale:

Despite the fact that illegal wood in Europe is banned according to the recent Timber Trade Regulation, it is known that illegal logging is still a common practice in some countries. Although no reliable statistics are available, a 2012 joint study by the United Nations Environment Programme and Interpol stated that illegal logging accounts for up to 30 % of the global logging trade and contributes to more than 50 % of tropical deforestation in Central Africa, the Amazon Basin and South East Asia¹². This wood can enter into Europe if furniture products or furniture components are imported from these countries.

Some stakeholders opposed the inclusion of legal requirements in Ecolabel criteria but an exceptional case was made here due to the number of exemptions for seating and bamboo furniture that currently exist in the EU Timber Regulation. It was generally accepted that a specific sub-criterion relating to the legal origin of wood and wood-based materials in furniture could be justified. It is likely that these exemptions will be removed when the Timber

¹² [Illegal Logging Trade Decimates Forests, Africa: AllAfrica.com](#), 2012, retrieved 18 October 2012

Regulation is revised in 2015/2016 but at least until then such a sub-criterion remains justifiable.

It was argued that surely the criterion for sustainable wood would effectively ensure that all wood in the EU Ecolabel product is of legal origin. However, despite FSC and PEFC altering their certification systems to align better with the requirements of the EUTR, the EUTR does not accept FSC or PEFC certified material as direct proof of legality. Although FSC or PEFC may provide a solid base for demonstrating EUTR compliance, it is still deemed necessary to have a separate sub-criterion directly related to the EUTR. This is the main reason why legal wood and sustainable wood are now proposed in separate sub-criteria rather than together as was the case in Technical Report (TR) 2.0 presented at the 2nd AHWG meeting.

Furthermore, the Timber Regulation obliges operators to comply but does not oblige final manufacturers to maintain chain of custody certificates if they only use wood or wood-based materials that are already on the EU market. Thus it is possible that although the wood was legally harvested, the end producer may not be aware of the origin of the wood. By obliging furniture manufacturers to ask operators, either directly or via traders, to show their due diligence, this will hopefully encourage operators to redouble their efforts while also facilitating furniture companies, and thus consumers, a better understanding of where their wood or wood-based material comes from.

3.2. Sustainable wood

All solid wood, wood chips and wood fibres shall be covered by valid chain of custody certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.

A minimum of 70 % of the virgin solid wood, wood chips and wood fibres shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.

The remaining proportion of virgin wood and wood fibres shall be 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.

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 virgin solid wood, wood chips or wood fibres have been sourced from forests managed according to Sustainable Forestry Management principles and/or are from legal and controlled sources. FSC, PEFC or equivalent schemes shall be accepted as independent third party certification.

For any recycled wood content, the applicant shall declare, and provide declarations from any relevant suppliers, that state the recycled wood fibre content and that any pre-consumer recycled wood material was not generated from logging or sawmill operations or from any processes within which it could have been reused. Recycled wood certified under FSC, PEFC or

equivalent schemes shall be considered as compliant with the requirements for origin of recycled wood, wood chips or wood fibres.

Rationale

This issue of % certified wood requirements has previously been discussed in other EU Ecolabel product groups and indicates that the originally proposed level of at least 70 % for solid wood and 40 % for wood-based materials at the 1st AHWG meeting may not be stringent enough and should be revised upwards. Although 100 % certified wood is desirable, and was requested by some stakeholders, it could be difficult to maintain due to possible fluctuations in market supplies. This is part of the reasoning behind not putting any upper or lower limit on recycled wood content in this criterion. In terms of virgin wood from sustainably managed sources, the criterion makes no distinction between minimum contents for furniture made with solid wood, wood chips or wood fibres. Consequently no arguments can be raised regarding less ambitious criteria for wood-based panels.

The proposed text for sustainable wood used in this TR generally aligns with sustainable wood text for other EU Ecolabel decisions that involve wood-based materials and which has been the product of a long ongoing discussion at the EUEB level. Some opposition to this proposal was expressed in the specific wording, saying that the criteria 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 attempt to list the sustainable forest management principles that are common to FSC and PEFC would be complicated due to the fact that each scheme has around 10 such principles and around 70 related sub-criteria (see Appendix VI). 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 rendering EU Ecolabel criteria obsolete.

The minimum requirement of 70% is not raised higher because this aligns with the two major sustainable forest management schemes (FSC and PEFC). A total of 5 labels exist between the schemes (see Figure 1).



Figure 1. Illustration of the 5 current sustainable forest management labels from FSC and PEFC.

Two labels require minimum recycled contents ("*FSC recycled*" → 100% and "*PEFC recycled*" → 70%), two more require a minimum sustainable certified wood content ("*FSC Mix*" → 70% and "*PEFC certified*" → 70%) and the last label ("*FSC 100%*") requires 100% certified wood. The four most important aspects that ensure any of the above labels can be accepted as compliance with this criterion are:

- Requiring that all wood material (including recycled) be covered by valid chain of custody certificates.
- Requiring that a minimum of 70% of virgin wood be sustainably certified according to FSC, PEFC or equivalent.
- Accepting that any remaining quantity simply has to meet the requirements of FSC, PEFC or equivalent schemes for controlled sources.
- Not distinguishing between pre-consumer and post-consumer recycled material.

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 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.

An indirect effect of the currently drafted criteria is that the requirement for non-GMO wood that was previously stated in TR 2.0 becomes obsolete. This is because both FSC and PEFC (and by extension any equivalent schemes) do not permit GMO wood to be used in controlled wood supplies and obviously such material is not permitted in sustainably managed forests in the current versions of their criteria.

3.3. 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 and comply with the limits for contaminants as listed in Table 6 below.

Table 6. 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 are 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 6.

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 Ecolabelled 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 background 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 3rd 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 Ecolabel criterion, it is worth specifying these limits again

for the benefit of any non-EU suppliers of recycled wood fibres or panels containing recycled wood. The same rationale applies to why limits for substances that are banned or restricted in the EU such as pentachlorophenol and benzo(a)pyrene are maintained.

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 limits would not exclude large quantities of available recycled wood. 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) Wood preservatives

Treatment of wooden components with preservatives shall only be permitted in outdoor wooden furniture if it can be shown that the wood does not meet durability class 1 or 2 requirements according to EN 350.

In such cases, only wood preservatives whose active substance(s) are approved under the Regulation (EU) No. 528/2012 of the European Parliament and of the Council¹³ (Biocidal Products Regulation) for the relevant product type shall be permitted.

Assessment and verification:

The applicant shall either:

- Provide a declaration of non-use of wood preservatives, or
- Provide a declaration stating that:
 - (i) the furniture product is intended for outdoor use,
 - (ii) the wood used in the furniture product does not meet the durability requirements of class 1 or 2 as per EN 350, and
 - (iii) what active substances are present in the wood preservative(s) used, supported by its respective SDS and that these are approved for such use under Regulation (EU) No. 528/2012.

Active substances approved under Regulation (EU) No.528/2012 can be cross-checked against the list of BPR approved substances published and updated by the European Commission¹⁴ and substances still approved under Annexes I and IA of Directive 98/8/EC of the European Parliament and of the Council.

Rationale:

The need for the preservation of outdoor wooden furniture to guarantee a minimum useful life is a key aspect of the life-cycle of such furniture. Preservation is needed in such situations where the solid wood itself is not inherently resistant. Solid wood with durability class 1 (Very Durable) or 2 (Durable) is generally considered as sufficiently resistant and stakeholders did not object to this proposal.

¹³ Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products (OJ L 167, 27.06.2012, p. 181-303).

¹⁴ A list of approved active substances under the BPR (No. 528/2012) can be found here: http://ec.europa.eu/environment/chemicals/biocides/active-substances/approved-substances_en.htm

Although very specific indoor environments may also be aggressive to wood, it is preferred that instead of permitting the use of preservation or impregnation treatments in EU Ecolabel furniture *per se*, that confidence is placed in the end user to take the appropriate action in individual cases. For example, not purchasing wood-based furniture in areas with known termite problems, or using household treatments should an infestation problem unexpectedly arise.

In the Blue Angel RAL UZ 38 (Ecolabel criteria for low emission wood and wood based furniture, Jan. 2013 edition) the use of any biocides is not permitted (except in-can preservatives of coating substances) but it should be noted that the scope of this ecolabel does not extend to outdoor furniture products.

In cases where preservation/impregnation treatment is permitted, rather than stating specific substances that are allowed, it is preferred to refer instead to those Biocidal products or formulations that have been approved under the BPR. This because such substances have been approved through an assessment system that has been established at the EU level for many years through the previous Biocidal Products Directive (No. 98/8/EC) and takes into account many Decisions published at the Commission level regarding the suitability or non-suitability of individual active biocidal substances in specific product types.

c) Flame retardants

Flame retardants shall not be permitted in wood and wood-based materials unless specifically required for the furniture product to meet fire safety requirements¹⁵ in the country or countries where it is to be sold. Flame retardant substances shall comply with the general hazardous substance requirements set out in Criterion 2.

Assessment and verification:

The applicant shall either:

- Provide a declaration of non-use of flame retardants or,
- Provide a declaration stating what flame retardant substance(s) or formulation(s) have been used with wood and wood-based materials, supported by SDS from the flame retardant suppliers. The flame retarding substances shall be cross checked and not appear in the latest versions of REACH Annexes XIV and XVII and the Candidate List or only possess any of the derogated hazard statements listed in Table 5 (entry a), and
- Provide evidence that the furniture product, when treated with flame retardant substance(s) or formulation(s), meets the fire safety requirements in the country or countries where it is to be sold

Rationale

The non-use of flame retardants is preferential purely from an environmental point of view but any criteria relating to these substances should not be worded so as to potentially conflict

¹⁵ Fire safety standards vary between Member States with the most stringent being in the UK. The most relevant EN standards are: EN ISO 12952, EN 597 and EN 1021.

with existing fire safety regulations in the EU. Unfortunately the fire safety regulations vary between Member States. Therefore no specific fire resistance is stipulated.

Flame retardants are not particularly important with solid wood but may be relevant to finishes of wood-based panels and coating papers and so it is necessary to have specific sub-criteria related to flame retardants to prevent the possible entrance of SVHC into the Ecolabelled furniture product.

d) Vinyl Chloride Monomer

Plastic foils used in the coating of wood-based panels shall not be based on polymers that have been manufactured using vinyl chloride monomer (VCM, CAS No. 75 01 4).

The final plastic foil materials shall also comply with the requirements of Criterion 2.

Assessment and verification:

The applicant shall provide a declaration stating that either:

- Plastic foils have not been used on wood-based panels in the product; or
- The type of the polymer used in plastic foils, supported by SDS and a declaration from the plastic foil supplier stating that the plastic foil was not manufactured using vinyl chloride monomer.

Rationale:

By far the most dominant use of VCM is in the manufacture of poly-vinyl chloride (PVC). A number of MSs explicitly requested a ban on PVC in EU Ecolabelled products, citing other such bans implemented in other Ecolabel initiatives. For example the Nordic Ecolabel criteria for furniture and fitments (Version 4.9 – Mar.2011-Dec. 2017) excludes the use of halogenated organics in general and specifically includes PVC in this group of substances. The Blue Angel RAL UZ 117 criteria for low-emission upholstered furniture ((2009 Edition) and RAL UZ 76 criteria for low emission composite wood panels (2011 edition) specifically exclude halogenated organics due to potential issues with recycling and disposal, but do not explicitly mention PVC.

Due to the fact that REACH effectively exempts PVC from registration, it is more relevant to focus on the monomer used to manufacture PVC (i.e. VCM and the potential negative environmental impacts that can arise during end-of-life incineration, since the incineration of coated wooden panels is the predominant disposal route due to its composite nature and reasonable calorific value.

Based on evidence of cases of angiosarcoma (a rare form of liver cancer) amongst workers exposed to VCM, the monomer has been classified as a known human carcinogen. Under normal conditions, VCM is a colourless and odourless gas and thus presents obvious health risks to workers every day and the wider public in the case of accidents. Although stringent

occupational health and safety standards have been implemented in many EU countries, only 18% of global PVC production in 2009 was based in Europe with 57% based in Asia¹⁶.

Alternative polymer foils that do not require the use of VCM in their manufacture are available and can be used in furniture, for example polypropylene (PP) and acrylonitrile butadiene styrene (ABS).

A major concern with PVC is if it is incinerated at the end of life, which is often the case for composite furniture materials containing wood or plastic. A report by Bertin Technologies¹⁷ concluded that chlorine is typically present in municipal solid waste (MSW) in quantities of 0.6-0.8% and that 38-66% of this chlorine content could be attributed to PVC. The report also concluded that increased chlorine content in waste increased the exhaust gas neutralization costs, due to in-situ formation of HCl vapour. This can also be assumed to increase corrosion risks to metal parts of the incinerator exhaust gas system and any heat exchangers in energy recovery facilities.

In addition to these concerns, the incineration of PVC has been associated with increased dioxin or furan formation in exhaust gases released to the atmosphere or in air pollution control residues. Although modern incinerators achieve combustion temperatures that are sufficient to destroy dioxins and furans, there is the risk that these compounds may reform in the cooled exhaust gas sections where temperatures remain in the 275-400°C¹⁸. Even in modern incinerators that are compliant with the Waste Incineration Directive (WID - 2000/76/EC), many experts have criticized that fact that the WID only requires that at least two measurements for dioxins and furans per year (6-8 hour averages) to be taken under normal steady state conditions. Thus dioxin emission monitoring only covers 0.1-0.2% of the estimated operation time. Grosso et al.¹⁹ showed how dioxin emissions could vary widely depending on plant set-up and operation and that significant dioxin outputs were associated with the MSWI fly ash and activated carbon used in flue gas treatment. Based on real data, some studies estimate that 41%²⁰ or 60%²¹ of total annual dioxin emissions may occur during incinerator start-up and shutdown alone.

Although continuous (cumulative) sampling of dioxins for longer times is a technical challenge and costly, considerable experience with continuous sampling systems that can run for over 1 month at a time is available in Europe²². Such systems take into account all the variations in dioxin emission during the sampling period and have allowed operators to better control operation conditions to minimise total dioxin emissions in exhaust gases although to date such systems in the EU remain the exception rather than the rule.

¹⁶ Report by Deloitte accessed online at: http://www.deloitte.com/assets/Dcom-Russia/Local%20Assets/Documents/Energy%20and%20Resources/dttl_PVC-markets-of-Europe-and-South-EastAsia_EN.pdf

¹⁷ Accessed online at: <http://www.pvc.dk/billeder/Lovstof/incineration.pdf>

¹⁸ Cunliffe and Williams, 2007, "Desorption of PCDD/PCDF from municipal solid waste incinerator flyash under post-combustion plant conditions", *Chemosphere*, Vol. 68, p.1723-1732.

¹⁹ Grosso et al., 2007. *Chemosphere*, Vol. 67, S118-S124.

²⁰ Tejima et al., 2007. *Chemosphere*, Vol. 66, p.1123-1130.

²¹ Wang et al., 2007. *Chemosphere*, Vol. 67, p.1346-1353.

²² Jurgen and Roland. Long-term monitoring of PCDD/PCDF – concepts and case studies from Europe: accessed online at http://www.environnement-sa.fr/wp-content/uploads/2012/09/101102174344_2009_dioxin.pdf

e) 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, barium, selenium, antimony or cobalt, at concentrations exceeding 0,010% w/w for each individual metal in the final paint or varnish product. Derogation conditions may apply for barium, antimony or cobalt.

Assessment and verification:

The applicant shall declare that the paint or varnish does 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. The only exceptions that may apply are for barium, antimony and cobalt and only if the derogation conditions in entries (k) (for cobalt driers only) and (p) of Table 5 can be demonstrated to be met.

Rationale

This criterion essentially reflects 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.

The derogation for cobalt used in cobalt driers only extends up to 0,050% w/w and is because the substance would impart a specific function to the paint product. The other derogations for barium, antimony and cobalt refer to additives that contain these metals that can be shown to possess an extremely low mobility or solubility. For example barium sulfate is one of the most water-insoluble chemical compounds known.

f) VOC content in paints and varnishes

Paints or varnishes used on wood or wood-based materials shall either:

- Have a total VOC content of less than 5% (in-can substance concentration) or
- Be greater than 5% VOC content but shown to be applied in quantities that amount to less than 35g/m² of the coated surface area, or
- Be greater than 5% VOC content but that the coated panel product complies with the VOC emission limits as specified in criterion 9.3.

Assessment and verification:

If the SDS states that the VOC content of the paint or varnish used is less than 5%, then no further verification shall be necessary. If the VOC content is higher, then the applicant will provide calculations that demonstrate the effective quantity of VOCs applied per m² of the outer surface area of the final assembled furniture product. Guidance on these calculations is provided in Appendix I.

If the VOC content of the coating substance(s) is greater than 5% and no appropriate calculation is provided, then a test report demonstrating compliance with criterion 9.3 shall be provided.

Rationale

VOC's 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".

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 is calculated.

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 after reading the final product criteria 9.3.

When setting optional limits for the total VOC content applied to the coated surface are applied, there are two main options available:

1. A single value of 35 g/m²
2. A three-tiered value that varies as a function of the furniture type:
 - 10 g/m² for "bedroom furniture, reception furniture, MDF panels and contoured surfaces"
 - 30 g/m² for "tables, chairs and other product groups"
 - 60 g/m² for "contract furniture and furniture of high quality".

Option number 1 is based on the previously voted EU Ecolabel criteria for furniture (Decision 2009/894/EC) and is supported by the FEMB (European Federation for Office Furniture Associations) in their draft sustainability criteria for office and non-domestic furniture.

Option number 2 is currently proposed in the Nordic Ecolabel criteria for furniture and fitments (Version 4.9). It is unclear exactly how the precise values of 10 and 60 g/m² were agreed upon for domestic and contract furniture respectively. If it can be demonstrated the 60 g/m² VOC is necessary to meet the most stringent scratch resistance and other surface quality requirements that effectively prolong the life of contract furniture then perhaps this limit could be justified in the Nordic Ecolabel.

However, in the absence of specific evidence it is proposed to remain with a uniform requirement of 35 g/m². The fact that this is supported by the FEMB implies that higher VOC content coatings are not necessary to produce good quality office furniture. It also implies that industry would be able to comply with this criteria and it would not represent an obstacle to potential applicants. In fact the proposed EU Ecolabel criteria, as it is currently worded, does not exclude the use of coatings at 60g VOC/m² levels, but would simply require that a final product VOC emission test be carried out (where other limits must be complied with).

Finally, the specific wording must be commented on since no furniture criteria currently published specifically states whether or not the m² applies only to the coated area or the entire outer surface area of the product. It is highly likely to be the former case but this must be clarified.

g) Perfluorinated compounds in paints and varnishes

Paints and varnishes with long chain perfluoroalkyl sulfonates ($\geq C6$) and/or perfluorocarboxylic acids ($\geq C8$) shall not be used on wood or wood-based materials.

Assessment and verification:

The applicant shall provide a declaration from the paint or varnish supplier, supported by SDS, of the non-use of these substances for each production stage.

Rationale

These substances were not directly mentioned in TR 2.0 but are specifically banned from use in the recently voted paints and varnishes EU Ecolabel criteria Decision (2014/312/EU). Although these substances are already registered in Annex B restricted substances under the Stockholm Convention on Persistent Organic Pollutants, it was not certain whether criterion 2 fully applies to paints and varnishes used in furniture since they undergo physical and chemical changes which may alter or remove their hazardous properties and so they may possibly be interpreted as exempt from the conditions of criterion 2. For this reason it was considered useful to enter specific sub-criteria to confirm that these substances are not permitted in paints or varnishes to be used on EU Ecolabel furniture products.

3.4. Formaldehyde emissions

All wood-based panels used in the final furniture product, that use formaldehyde-based resins or finishing agents shall have formaldehyde emissions that are lower than 50% of the threshold value allowing them to be classified as E1²³ or, in the case of MDF²⁴ panels, lower than 65% of the E1 threshold limit.

However, where unfaced panels are supplied to furniture manufacturers who subsequently coat, overlay or veneer the panels themselves, the original unfaced panels only need to

²³ 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.

²⁴ MDF – Medium Density Fibreboard

comply with being below the E1 threshold limit so long as proof is provided that the final coated, overlaid or veneered panel that will be used in the furniture product is compliant with the more stringent 50% of E1 threshold limit (or 65% of E1 threshold limit in the case of MDF).

Assessment and verification:

In cases where E1 panels are subsequently coated, overlaid or veneered by the furniture manufacturer, the applicant shall provide:

- A declaration from the wood-based panel supplier, stating that unfaced panels are E1 compliant, supported by test reports carried out according to either EN 717-1, EN 717-2 or EN 120, and
- Test results according to either EN 717-1, EN 717-2 or EN 120 demonstrating that formaldehyde emissions from panels that have been coated, overlaid or veneered by the furniture manufacturer comply with emissions limits of 50% of E1 or, in the case of MDF panels, 65% of E1.

In the case of coated, overlaid or veneered panels that are supplied to the furniture manufacturer and are already compliant with 50% of E1 or 65% of E1 for MDF panels, the applicant shall provide:

- A declaration from the coated, overlaid or veneered panel supplier, stating that the panel is compliant with 50% or 65% of E1 emission limits, supported by test reports carried out according to either EN 717-1, EN 717-2 or EN 120, and,
- A declaration from the applicant stating that no further formaldehyde-based surface treatment was applied to supplied panels and that the panels were not altered in any other way that would potentially increase formaldehyde emissions.

In the case of CARB compliant panels, the applicant shall provide a declaration from the panel manufacturer, supported by third party verified test results according to ASTM E1333 or ASTM D6007 that show panel compliance with the formaldehyde Phase II emission limits defined in the California Composite Wood Products Regulation 93120²⁵. Optionally, the panels may be labelled in accordance with Section 93120.3(e) and containing the following details:

- o manufacturer's name,
- o product lot number or batch produced, and
- o 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).

In the case of any panels certified as F 3-star or F 4-star rated as per JIS A 5905 (fibreboard) or JIS A 5908:2003 (particleboard and plywood), the applicant shall provide a declaration of compliance from the panel supplier, supported by third party verified test data according to the JIS A 1460 desicator method.

²⁵ Regulation 93120 "Airborne toxic control measure to reduce formaldehyde emissions from composite wood products" California Code of Regulations.

Rationale:

Wood-based panels represent more economical alternatives to solid wood and have become widely established in many furniture items. 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 often 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 type of resin to another. Given that the most important environmental impact associated with these resins are formaldehyde emissions from the final product, their use is permitted in EU Ecolabel furniture so long as the final emission criteria (3d and, where relevant, 8c) are complied with.

Formaldehyde is currently classified as a Category 2 carcinogen (suspected of causing cancer) and is due to be reclassified as a Category 1B carcinogen (may cause cancer) in 2015. However, the use of formaldehyde-based resin formulations remains the most common method of produced wood-based panels. Emissions from unfaced panels and panels that have not yet been machined present risks to factory workers during assembly and to the environment at the end of the product life. A limit on formaldehyde emissions from unfinished panels encourages producers to only use the minimum amount of resin and/or the optimum additives and curing process required to give the product the necessary technical properties and to favour optimally designed resin formulations that result in the lowest residual free-formaldehyde contents after curing.

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 Swan, 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. Rep.).

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 2.^{26,27}

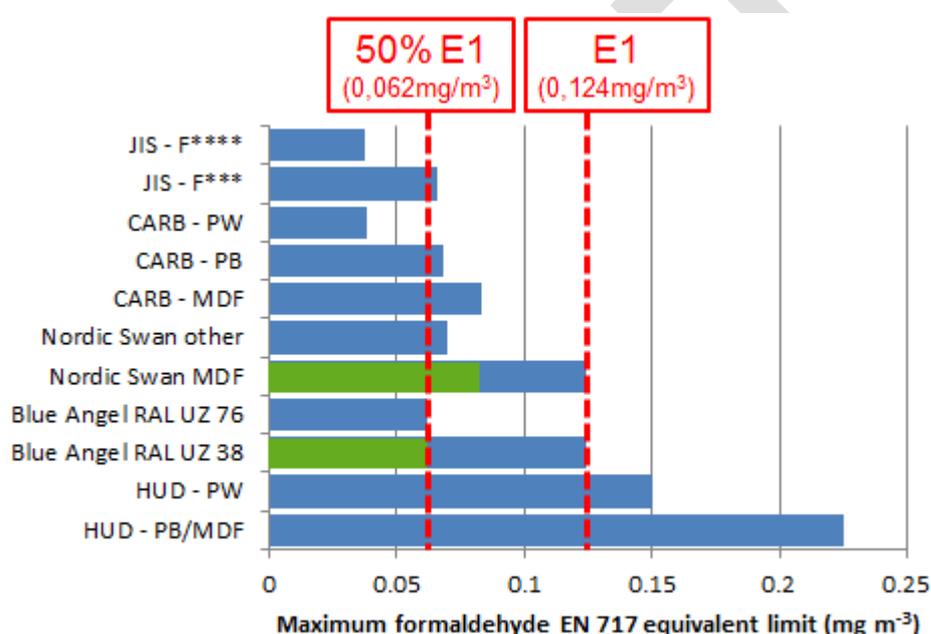


Figure 2. Comparison of different formaldehyde emission ambition levels in different schemes for wood-based panels

The HUD limits are the mandatory maximum formaldehyde emissions 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

²⁶ 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.

²⁷ Risholm-Sundman et al., 2007. Formaldehyde emission – Comparison of different standard methods. *Atmospheric Environment*, Vol. 41, p.3193-3202.

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 requirement is for 50% of E1 except with MDF panels where, if the EN 120 test method is used, the requirement is raised to around 62-63% of E1 but if the MDF is tested according to EN 717-1 the requirement 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 possible 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 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. The Japanese F-star standards do not specify different panel types.

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. Further flexibility is built into the process by mirroring the approach taken by RAL UZ 38, where unfaced E1 panels are permitted so long as the final panel product is 50% E1 (or 65% E1 for MDF) compliant. In these cases, the furniture manufacturer would have to decide if it is better to buy a 50%/65% E1 panel that is already coated or an E1 panel that they can later coat themselves and take responsibility for formaldehyde emission testing.

Criterion 4: Plastics

The requirements set out in the present criterion only apply to rigid plastic components that are made entirely of plastic and not to foils, thermosetting resins or materials used in upholstery, which are covered by criteria 3.3d), 3.4, 6.2, 6.3, 7.1, and 7.2.

4.1 Marking of plastic components

Plastic parts with a weight ≥ 50 g shall be visibly marked in accordance with the requirements of EN ISO 11469 or EN ISO 1043 so that polymeric materials can be identified to ensure they are able to be recycled, recovered or disposed of in the correct manner at end-of-life.

Assessment and verification:

The applicant shall demonstrate the markings on all rigid plastic components ≥ 50 g.

The ISO 11469 marking scheme may be used for single polymers based on polyethylene terephthalate (PET), high density polyethylene (HD-PE), low density polyethylene (LD-PE), Polypropylene (PP) or Polystyrene (PS), the ISO 11469 marking scheme may be used.

For any other single polymers or co-polymers, the marking scheme defined in EN ISO 1043 shall be used.

Rationale:

In the TR 2.0 and at the 2nd 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 weight less than 50 g if their total weight adds up to more than 100 g in the final product unit.

Some stakeholders wanted the threshold for marking raised to 100 g while others wanted it lowered to 25 g. The choice of 25, 50 or 100 g as a cut-off weight is rather arbitrary regardless and 50 g was considered as a reasonable compromise. It was argued by some stakeholders that marking has no direct environmental benefit, that recycling schemes often use automated systems to separate polymers and that if plastic is incinerated then the marking is meaningless.

However the marking of plastics can indeed facilitate potential recycling at end of product. Most automated plastic recycling systems are set up for post-consumer plastic bottles which are generally light coloured or transparent but do not work so well with dark coloured parts if the detection system relies on infra-red scanning. Where plastics are shredded and sorted by sedimentation/floatation, the marking of large plastic parts can reduce the quantity of plastic that has to be shredded then automatically separated.

Marking is also useful for informing customers and end-users of the actual polymer type used. This information may also be useful to people trying to gather information about the major polymers used in furniture items in general and facilitate more accurate life cycle studies or embodied energy calculations to be carried out by third parties.

In situations where recycling does not occur, marking may still be important if plastics end up being incinerated, the case in point being PVC which, unlike the majority of other plastics, might not be accepted in cement kilns or hazardous waste incinerators due to its chloride content.

One new change in TR 3.0 here is the proposal to also allow marking to be carried out according to ISO 1043. This standard is far more comprehensive and offers the potential to provide information that is valuable to recyclers, competent bodies and users alike regarding fillers, flame retardants and plasticisers (see Figure 3). By requiring ISO 11469 only in the criteria, it could perhaps be interpreted that labelling according to ISO 1043 is not allowed. ISO 11469 provides polymer specific labels for single polymer mixes of the 6 most commonly used polymers but any other polymer must simply be labelled as "other". In furniture the use of other polymers or co-polymers is much more common than with food, drink and toiletries containers. Important "other" polymers include acrylonitrile butadiene styrene (ABS) and polycarbonate (PC).

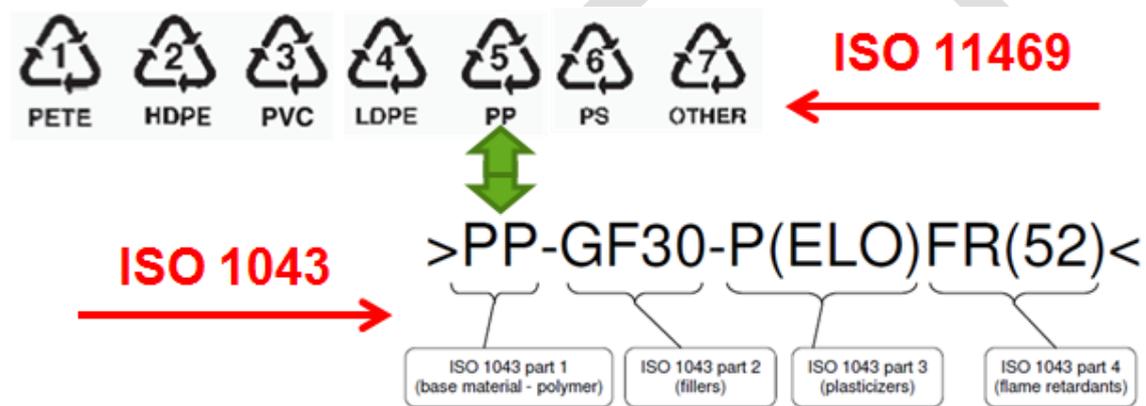


Figure 3. Hypothetical comparison of ISO 11469 and ISO 1043 level of information for polypropylene (PP)

The ISO 1043 code shown in Figure 3 essentially means that the polymer used is pure polypropylene and that the plastic contains 30% w/w glass fibre filler, that has been plasticised with epoxidised linseed oil and that red phosphorus has been intentionally added as a flame retardant. By contrast, the ISO 11469, which would be applied to the exact same plastic component, would only say that polypropylene is the only polymer used.

Feedback from plastic recyclers has revealed that information on the filler type and content is important because this can strongly affect the recyclability of the plastic, especially where plastic wastes are separated according to densities.

It is appreciated that the ISO 1043 code may not be practical in small plastic components but should be required, for the polymer type and filler type/quantity at least for those plastics that would otherwise be labelled as "other" by ISO 11469. That is to say basically any co-polymers or single polymers that are not PET, HD-PE, LD-PE, PVC, PP or PS.

4.2. Restricted substance

a) Heavy metals in plastic additives

No additives shall be used in plastics that specifically contain arsenic, cadmium, chromium VI, lead, mercury, tin or their compounds either in the bulk plastic material or any surface layer.

Assessment and verification:

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) as well as relevant SDS(s) that listed any potentially hazardous additives used.

Rationale:

In the TR 2.0, no criteria for heavy metal pigments in plastics were proposed and this has been included now 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.

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).

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.

For the other heavy metals, multiple entries exist in the REACH Candidate List and Annexes XIV and XVII of REACH for substances based on chromium VI, mercury and tin and their compounds. Consequently a declaration of non-use by the plastics supplier would be of value although potential standardized verification methods to measure residual heavy metal contents in plastics would be of potential interest in the case of not being able to obtain a declaration of sufficient confidence. In the case of what limits would be deemed as trace impurities a suggested arbitrary threshold of 0,01% would be initially suggested although further work, based on real test results of plastics used in furniture would be necessary before deciding an appropriate threshold.

b) Vinyl chloride monomers

Plastic components shall not have been manufactured using vinyl chloride monomer (CAS No. 75 01 4).

Assessment and verification:

The applicant shall provide a declaration from the plastic supplier stating what polymer type or types were used in the plastic component(s) and that they have not been manufactured from vinyl chloride monomer. Alternatively, proof of marking of plastic components may also be accepted as verification.

Rationale:

During the 1st AHWG meeting, further research into the development of possible criteria for the restriction of PVC and PC from Ecolabel furniture due to concerns about the hazardous monomers involved (vinyl chloride monomer and bisphenol-A respectively). It was found that residual vinyl chloride monomer in PVC was generally 5 mg/kg or less whereas the residues of bisphenol-A could vary largely and may exceed 100 mg/kg in PC plastic cups that go through a high-temperature dishwasher cycle. It was concluded that the exposure of either monomer was not of particular concern in plastic furniture components due to the unlikely exposure pathways but that food and beverage packaging was far more relevant.

However, with PVC another concern is not only with risks from the monomer during manufacture, but also with end-of-life if the plastic is incinerated. For the rationale explaining why PVC incineration is a potential concern please refer to the reasoning given in criterion 3.3d) for plastic foils. With solid plastic components the incineration is of even greater concern due to the higher polymer content in plastics (due to lower plasticiser additions).

To date no widespread recycling scheme exists for PVC so it is highly probable that these plastics would end up being incinerated. It is recognised that efforts are being made in this area and reference should be made specifically to the Vinyl Plus scheme which has reported the recycling of 360,000 tonnes of pre- and post-consumer PVC waste in 2012 and the Vinyl Loop scheme which offers a selective dissolution and re-precipitation process to recover PVC polymer resin from PVC waste, including plasticised PVC that is especially difficult to recycle. However, despite this progress, no widespread collection schemes yet exist where consumers could send their PVC products and components for recycling and so it remains highly probable that they will end up being incinerated.

In the TR 2.0 report and at the 2nd AHWG meeting, primarily based on concerns with chlorine content in plastics, it was proposed to target PVC by excluding any plastic components > 50 g in weight that consisted of more than 50% w/w chlorine. Pure PVC contains 57% w/w chlorine and this may be reduced by the inclusion of additives or increased by later chlorination treatment of the PVC. The proposal was criticised as unscientific by one industry stakeholder.

Considerable support exists for the exclusion of PVC amongst competent bodies and this would align with the Nordic Ecolabel criteria for furniture and fittings (Version 4.9). A number of Blue Angel Ecolabel criteria also state generic bans on halogenated organics, generally being linked to concerns with the end-of-life of the product, should it later be sent to an energy recovery facility or standard incinerator.

In TR 3.0, an approach that directly relates to the monomer compound has been proposed. Again, for the rationale as to why the monomer compound is restricted and not explicitly the polymer, please refer to the rationale for criterion 3.3d).

c) Flame retardants

Flame retardants shall not be permitted in plastic materials unless specifically required for the furniture product to meet fire safety requirements²⁸ in the country or countries where it is to be sold. Flame retardant substances shall comply with the general hazardous substance requirements of Criterion 2.

Assessment and verification:

The applicant shall either:

- provide a declaration of non-use of flame retardants or,
- provide a declaration stating what flame retardant substance(s) or formulation(s) have been used with plastic components, supported by SDS from the flame retardant suppliers. The flame retarding substances shall be cross checked with the latest versions of REACH Annexes XIV and XVII and the Candidate List.

Rationale:

In the text presented in TR 2.0, a horizontal text on flame retardants prohibited their use in any furniture component except for furniture upholstery and when their use was required in order to comply with fire safety regulations.

Due to the wide variety of furniture products that potentially lie within the product scope and definition, it is possible that some situations remain unforeseen where flame retardants may be required to be used on wooden or plastic components and that is the main rationale for no longer restricting flame retardants only to upholstery materials. This rationale also applies to criterion 3.3c) relating to flame retardants in wood and wood-based materials.

The general requirement that any flame retardant used be compliant with criterion 2 was accepted by industry although some stakeholders wanted to push for generic bans on halogenated organics, similar to the approach taken by Nordic Ecolabel and Blue Angel criteria for several different products. In this aspect no change from the criteria in TR 2.0 is proposed. Generic bans on entire groups of substances, although permitted in certain cases where toxicological data is not available and a "read across" method can be used, are generally considered as unscientific.

In the user manual it is proposed that a list of flame retardants that appear on the latest lists published by ECHA for Annexes XIV and XVII of REACH and the Candidate List be included as a guide to applicants and competent bodies, with the caveat that the list is indicative only since new substances may later be added as the REACH process progresses.

d) Plasticisers

Any plasticisers used in solid plastic components shall be declared and shall comply with the general hazardous substances requirements established in criterion 2

Assessment and verification:

²⁸ Fire safety standards vary between Member States with the most stringent being in the UK. The most relevant EN standards are: EN ISO 12952, EN 597 and EN 1021.

The applicant shall provide either:

- A declaration from the manufacturer of the plastic components stating that no plasticisers have been used or,
- A declaration from the plastic component manufacturer stating which plasticisers have been used, together with their chemical names and CAS numbers in relevant SDS or similar documentation. The CAS numbers shall be cross-checked with the latest versions of REACH Annexes XIV and XVII and the ECHA Candidate List.

Rationale:

The use of any plasticiser substances must be communicated to the Competent Body and shown not to be identified as a substance of very high concern.

Any plasticiser substances can simply be cross-checked against the latest lists published by ECHA for Annexes XIV and XVII of REACH and the Candidate List, which are generated by an extensive consultation supported by scientific and industry inputs at the EU level following the procedures outlined in the REACH Regulation (No. 1907/2006)

There is no difference compared to the proposal in TR 2.0 except that it now appears as a sub-criteria under plastic materials whereas in TR 2.0 it appear in a horizontal hazardous substances criterion.

In a situation analogous to flame retardants, one stakeholder cautioned against the banning of entire substance groups, (i.e. phthalates) as unscientific. It was added that their hazardous properties can vary considerably as a function of molecular weight in particular. Also analogous to flame retardants, it is proposed to publish a list in the user manual of plasticisers that appear in the latest lists published by ECHA for Annexes XIV and XVII of REACH and the Candidate List be included as a guide to applicants and competent bodies, with the caveat that the list is indicative only since new substances may later be added as the REACH process progresses.

4.3 Recycled plastic content

Where the final furniture product (not including packaging) consists of at least 20% w/w by weight plastic parts, the average recycled content of plastic parts in the final product (not including packaging) shall be at least 30% w/w.

Recycled plastic material may come from:

- post-consumer waste polyethylene (high or low density, HD-PE or LD-PE), polypropylene (PP), polyethylene terephthalate (PET) or polystyrene (PS) , and/or
- pre-consumer plastic wastes that could not be reused within the same process that generated them and that shall be declared as compliant with criterion 4.2.

Assessment and verification:

The applicant shall provide a declaration from the plastic manufacturer(s) stating the average recycled content. 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 product shall be calculated.

Deliveries of post-consumer plastic recyclates shall be accompanied by batch information according to the conditions set out in EN 15343.

Any deliveries of pre-consumer recycled plastic to manufacturers should be accompanied by a declaration stating compliance with the conditions set out in criterion 4.2.

In the absence of such a declaration, the Competent Body may consider relevant test results from analysis of representative batches of pre-consumer plastic recyclates that demonstrate compliance with criterion 4.2.

Where pre-consumer recycled material streams consist of only a small number of different types of plastic off-cuts, the SDS of those plastics may be accepted as suitable proof of compliance with criterion 4.2.

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 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.

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

Because plastic is not recycled at high rates, 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. 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 by taking an approach analogous to the Nordic ecolabel by limiting recycled plastic sources to defined pre-consumer sources, or to post-consumer PE, PP, PS and PET – which is mainly food and beverage grade material.

To date no industry wide standard exists for impurities for recycled plastics (analogous to the EPF standard for recycled wood fibres) but would be a welcome addition to improving

confidence in recycled plastic. The EN 15343 standard may form a useful basis for such a system.

In TR 2.0, an additional criterion was proposed for "recyclable plastics" which basically required that they could technically be recycled (i.e. that they are thermoplastic and not thermosetting plastics) and that details of facilities where these plastics could be recycled, at least at the time of the EU Ecolabel license application, would be provided both to the competent body and the consumer.

This criteria was widely criticised by both industry and non-industry stakeholders who seemed to find it an unreasonable burden to applicants and competent bodies and so it has been removed.

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Criterion 5: Metals

This criterion refers to any solid metallic materials used in the furniture product and includes small components such as nuts, bolts, nails, screws, hinges, brackets, runners and wheels.

5.1 Restricted substances

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.

a) Electroplating restrictions

Chromium VI or cadmium compounds shall not be used for electroplating operations of any metal components.

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

Assessment and verification:

The applicant will 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 applied additional surface treatments to the metal component(s) supplied, they shall make the same declaration.

Rationale:

In TR 2.0, this criterion was introduced under a horizontal criterion for surface treatments and adhesives and included a general exemption for any H412 coatings involving chromium, nickel or zinc stated. Electroplating was restricted only to components subject to heavy physical wear and the plating should not in any way impair the recyclability of the metal component(s). This approach very closely reflected that of the Nordic Ecolabel for furniture and fitments (Version 4.9).

Aluminium is inherently corrosion resistant while most electroplated metals will be carbon steels. Feedback from stakeholders revealed that electroplating is not a serious obstacle to metal 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. **This may be discussed further at the EUEB meeting.**

The criteria has been restructured by instead specifically banning chromium VI and cadmium electroplating in material specific sub-criteria while mentioning the derogated use of nickel and zinc in electroplating in Table 5, entry c).

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.

b) Heavy metals in paints and primers

Paints or primers used on wood or wood-based materials shall not contain additives based on cadmium, lead, chromium VI, mercury, arsenic, barium, selenium, antimony or cobalt, at concentrations exceeding 0,010% w/w for each individual metal in the final paint or primer product. Derogation conditions may apply for barium, antimony or cobalt.

Assessment and verification:

The applicant shall declare that the paint or primer does 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. The only exceptions that may apply are for barium, antimony and cobalt and only if the derogation conditions in entries (k) (for cobalt driers only) and (p) of Table 5 can be demonstrated to be met.

Rationale:

The exact same rationale stated for criterion 3.3e) applies here.

c) VOC content in paints and primers

Any paints or primers used on metal components shall either:

Any paints or primers used on metal components shall either:

- Have a total VOC content of less than 5% (in-can substance), or
- Have a total VOC content higher than 5%, but be shown by calculations that the total amount of VOC applied contributes to less than 35g/m² of coated surface area, or
- Have a total VOC content higher than 5%, only if the coated panel product complies with the VOC emission limits established in Criterion 9.3.

Assessment and verification:

The applicant shall provide the SDS or other relevant documentation from the paint and/or primer supplier that states the total VOC content of the in-can product.

If the total VOC content is less than 5%, no further verification shall be necessary.

If the VOC content is higher than 5%, then the applicant shall either:

- provide calculations according to the guidance provided in Appendix I, that demonstrate that the effective quantity of VOCs applied is less than 35g/m² of coated area, or
- provide a test report demonstrating compliance with criterion 9.3.

Rationale:

The rationale is the essentially same as stated previously in criterion 3.3 f).

Rationale for removed metal criteria

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

The "Description of metal used" sub-criteria was criticised for potentially requiring extra for applicants and competent bodies for what would be a very limited extra value in terms of information to the consumer and of 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 "recycle 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 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. **This will need to be discussed at the EUEB meeting further.**

Criterion 6. Upholstery Covering Materials

6.1 Leather

Requirements a) and b) shall apply regardless of the leather content in the final furniture product. Requirement c) shall only apply when leather in the final product accounts for more than 1,0 % w/w of the total furniture product (excluding packaging).

a) Physical requirements.

The physical requirements for furniture leather shall meet the characteristics specified in Tables 1 and 2 of EN 13336²⁹.

Assessment and verification:

The applicant shall provide a declaration from the leather supplier, supported by relevant test reports, that the leather meets the physical requirements for furniture leather specified in Tables 1 and 2 of EN 13336 (and Appendix III: EN 13336 requirements for furniture leather). The applicant shall declare that only EN 13336 compliant leather has been used in the furniture upholstery

Rationale:

The Nordic Ecolabel has detailed criteria for Ecolabel textiles, hides/skins and leather (Version 4.0 Dec. 2012) that go into a lot of detail about the leather production process whereas the Nordic Ecolabel for furniture and fitments (Version 4.9 Mar. 2011) has almost no requirements if the leather accounts for less than 1% w/w of the furniture product but then all the requirements in the first document become active if leather accounts for more than 1% w/w of the product.

The original text in TR 2.0 did not specify a cut-off threshold above which certain sub-criteria apply but simply went straight into detail about the leather supply chain included criteria about animal origin, final effluents discharged from the tannery site and the final leather properties. The approach was initially aligned with the leather criteria being developed for EU Ecolabel footwear but it was realised that furniture manufacturers may often know less about their leather supply chain than footwear manufacturers given the relative importance of leather in each product. In any case, at the 2nd AHWG meeting it was stated by an industry representative that the requirement for animal origin was unnecessary for furniture since the size of hides required means that the animal origin is almost exclusively bovine.

A more balanced and pragmatic approach is attempted here in TR 3.0 where some basic and fundamental requirements 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.

The physical properties of the leather are considered as fundamentally important regardless of total content in the product. Poor quality leather that fails early in the product life can lead

²⁹ EN 13336: Leather – Upholstery leather characteristics – Guide for selection of leather for furniture. A list of the physical characteristics and associated test methods and acceptable values is provided in Appendix III: EN 13336 requirements for furniture leather

to fluids, humidity, fungus or insects entering the padding and causing significant further damage to the entire product, resulting in it being disposed of prematurely. Consequently the physical durability of the leather is considered to be of paramount importance regardless of its overall content in the furniture product.

The testing standards and minimum requirements set out in EN 13336 (and reproduced in Appendix III: EN 13336 requirements for furniture leather) have been developed specifically for furniture leather and have been agreed upon between producers and retailers after considerable negotiation.

Consequently the requirements are both realistic and achievable but also represent good quality leather of adequate durability.

b) Restricted substances in furniture leather.

In addition to the general conditions on hazardous substances set out in criterion 2, the following conditions listed in Table 7 shall specifically apply to any furniture leather:

Table 7. Testing requirements for hazardous substances in final leather covering material.

Chemical	Test Method	Limits (mg/kg)
Restricted arylamines from cleavage of azodyes*	EN ISO 17234-1	≤ 30 for each amine*
Chromium VI	EN ISO 17075	< 3**
Free formaldehyde	EN ISO 17226-1	≤ 75
Extractable heavy metals	EN ISO 17072-1	Cr ≤200; Sb ≤30; As ≤1.0; Cd ≤0.1, Co ≤4.0, Cu ≤50 Pb ≤1.0, Ni ≤1.0 and Hg ≤0.02
Chlorophenols	EN ISO 17070	Pentachlorophenol ≤ 1 Tetrachlorophenol ≤ 1
Alkylphenols	EN ISO DIS 18218-1	Nonylphenol, mixed isomers (CAS 25154-52-3); 4-Nonylphenol; (CAS 104-40-5) 4-Nonylphenol, branched; (CAS 84852-15-3) Octylphenol; (CAS 27193-28-8) 4-Octylphenol; (CAS 1806-26-4) 4-tert-Octylphenol; (CAS 140-66-9) <u>Alkylphenoethoxylates & derivatives:</u> Polyoxyethylated octyl phenol; (CAS 9002-93-1) Polyoxyethylated nonyl phenol;(CAS 9002-93-1) Polyoxyethylated p-nonyl phenol; (CAS 9002-93-1) Sum Total limit = ≤ 25mg/kg
Chloralkanes	EN ISO DIS 18219	C10-C13 (SCCP) chloralkanes ≤not detectable C14-C17 (MCCP) chloralkanes ≤ 1000;

*A total of 22 arylamines listed in Entry 43 of Annex XVII of REACH plus two other compounds are listed also in Table 18. Carcinogenic arylamines to be tested for by EN 14362-1 and -3 (textiles) or EN 17234-1 (leather).of Appendix II. 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 furniture leather complies with the above limits, supported by results from the relevant referred test methods.

Rationale:

The levels of detectable hazardous substances are considered of fundamental importance since the users will come into direct skin contact with users.

Only tests for which standardised methods exist have been specified and for substances that can be expected to be potentially present in leather based on typical industry production and finishing processes.

The values align with those proposed for EU Ecolabel footwear and are similar to limits required in the Nordic Ecolabel criteria for textiles, hides/skins and leather and in Blue Angel RAL UZ 148 for low emission upholstery leathers and the Japan Eco Mark criteria for footwear.

c) Restricted substances in the leather production processes

If leather accounts for more than 1,0% w/w of the final furniture product, it shall be demonstrated that the leather production process meets the requirements on restricted substances as described in Appendix IV

Assessment and verification:

Compliance with the applicable assessment and verification conditions laid out in Appendix IV shall be demonstrated.

Rationale:

In TR 2.0, any hazardous substance criteria relevant to the leather production process was included in the horizontal text. Now the criteria is separated in an individual Appendix (IV) that focuses on leather, textiles and coated fabrics. These three materials are dealt with in a similar manner due to the fact that they perform the same function in the furniture product (upholstery covering materials) and share many common hazardous substances during their production and processing. With an estimated 14% of all leather production used in furniture upholstery, there is the potential for the furniture industry to demand leather that has been produced without certain restricted hazardous substances.

This sub-criterion may be too difficult to comply with where the leather supply chain is complex and so only applies to those furniture products which contain >1% w/w of leather in the final product.

A higher priority is given to the hazardous substances in criterion 6.1b) because these are measured in the final product whereas the hazardous substances mentioned here in criterion 6.1c), while of importance, could potentially be absent from the final product even if used.

It is worth discussing at the EUEB if any other criteria specific to the leather production process may be considered as worth adding when leather exceeds 1% w/w of the final furniture product.

6.2 Textile coverings

This requirement applies to textile fibres and woven fabrics used in furniture upholstery as covering materials only.

Requirements a) and b) must be complied, regardless the textile content in the final furniture product. Where textile content is higher than 1,0% w/w of the final product weight (excluding packaging), requirements a), b) and c) shall apply.

a) Physical requirements

The final textile covering materials used in the furniture product shall comply with the physical requirements set out in Table 8

Table 8. Physical requirements for final textile 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 105-C06 Commercial washing: ISO 15797 + ISO 105-C06	+/- 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	≥ 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.

Assessment and verification

The applicant shall provide test reports that demonstrate compliance with the minimum requirements specified in Table 8.

Rationale:

The rationale is the same as that stated for leather in criterion 6.1a). Which is basically that the physical properties of textile upholstery are not only key to the lifetime of the textile covering material but also the entire furniture product in many cases. Therefore minimum quality requirements for the physical durability of textiles are necessary, regardless of the total quantity of textile material present in the final product.

The requirements here align with the criteria set out in Decision 2014/350/EU for EU Ecolabel criteria for textiles and these considerations were considered to be the most relevant physical requirements in terms of customer complaints according to furniture industry representatives..

b) Restricted substances in textile coverings

In addition to the general conditions on hazardous substances set out in criterion 2, the following conditions shall specifically apply to any textile coverings used in the furniture product.

Table 9. Testing requirements for hazardous substances in final textile covering material.

Chemical	Test Method	Limits (mg/kg)
Restricted arylamines* from cleavage of azodyes	EN ISO 14362-1 and 14362-3	< 30 per arylamine
Free formaldehyde	EN ISO 14184-1	≤ 75**
Extractable heavy metals	EN ISO 105-E04	As ≤ 1.0; Sb ≤ 30.0; Cr ≤ 2.0; Ni ≤ 1.0; Cd ≤ 0.1; Co ≤ 4.0; Pb ≤ 1.0; Cu ≤ 50.0; Hg ≤ 0.02;
Alkylphenols	Solvent extraction followed by LC-MS	Nonylphenol, mixed isomers (CAS 25154-52-3); 4-Nonylphenol (CAS 104-40-5) 4-Nonylphenol, branched (CAS 84852-15-3) Octylphenol (CAS 27193-28-8) 4-Octylphenol (CAS 1806-26-4) 4-tert-Octylphenol (CAS 140-66-9) Alkylphenoethoxylates & derivatives: Polyoxyethylated octyl phenol (CAS 9002-93-1) Polyoxyethylated nonyl phenol(CAS 9002-93-1) Polyoxyethylated p-nonyl phenol (CAS 9002-93-1) Sum Total limit = ≤ 25mg/kg
Residual pesticides in cotton-based textile coverings	US EPA 8081B [†] US EPA 8151A US EPA 8141B US EPA 8270D	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-dematon, methylparathion, monocrotophos, neonicotinoids (clothianidine, imidacloprid, thiametoxam), parathion, phosphamidon, pentachlorophenol, thiofanex, triafanex, triazophos Combined total ≤ 0,5 mg/kg

**A total of 22 arylamines listed in Entry 43 of Annex XVII of REACH plus two other compounds are listed also in Table 18. Carcinogenic arylamines to be tested for by EN 14362-1 and -3 (textiles) or EN 17234-1 (leather).⁸ of Appendix II. Not detectable is considered as values lower than 30mg/kg according to the EN ISO 14362-1 method.

**Only applies to textile fabrics which have been treated with an "easy care" finish.

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

Assessment and verification:

The furniture manufacturer shall provide a declaration that the furniture textile complies with the above limits, supported by results from the relevant referred test methods.

In the case of cotton, material that is certified as organically produced in accordance with the requirements of Regulation (EC) No 834/2007³⁰, the US National Organic Programme (NOP)

³⁰ 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)

or equivalent legal obligations set by trade partners of the EU, may be exempted from testing.

Cotton that is certified as grown according to IPM (integrated pest management) principles that specifically exclude the above listed pesticides, or where declarations of non-use are obtained from farmers and/or farmer producer groups that are verified by site visits and tests carried out by control bodies accredited by either national governments or recognised organic or IPM certification schemes, may be exempted from pesticide testing.

Rationale:

The rationale is the same as that stated for leather in criterion 6.1b). Which is basically that the presence of hazardous substances in textile upholstery is very important since the material comes into direct skin contact with users during normal use.

These criteria are achievable because they are tests that can be carried out on the final material and, with the exception of alkylphenols, are covered by international standards. The values are set to align with those that will be introduced for EU Ecolabel footwear criteria and that pesticide residue levels and methods in cotton are taken from the EU Ecolabel textile criteria set out in Decision 2014/350/EU.

Formaldehyde is a chemical residue that is often left after finishing treatment textile fibres and/or fabrics. 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 direct concern in furniture textiles that come into direct 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 Ecolabel 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). The EU Ecolabel also have more stringent requirements (of 16ppm free formaldehyde) for products for babies and children < 3 years old but it is uncertain if this only refers to linen and clothing or also to furniture textiles for these users.

It is difficult to estimate the degree of skin contact between a piece of furniture textile and the skin of a user. This will vary as a function of the seating product and the behaviour of the user. For example almost zero skin contact could be estimated between the textile upholstery covering of an office chair and the skin of a user whereas a much higher degree of skin contact is estimated between a domestic sofa and a user. Therefore a uniform requirement of 75ppm is considered as a reasonable balance to avoid the possibility of furniture manufacturers having to source different textiles for different products simply as a function of the free formaldehyde content.

With specific regards to cotton, if alignment were to be directly with the EU Ecolabel criteria for textiles (Decision 2014/350/EU) then the use of a minimum of 10% organic cotton content or 20% IPM cotton content could be requested. Due to the fact that furniture suppliers are at least one step further down the supply chain that most clothing and textile producers, it was considered that such criteria could be more difficult to verify. Instead it was

preferred to take a simpler approach, which is also related to organic and IPM principles but that can be directly tested in the final product (i.e. residual pesticides). The limits for pesticides and methods specified fully align with those of EU Ecolabel textiles.

A similar approach to cotton was attempted for wool, specifying limits on ecoparasiticide concentrations instead of the pesticides specified for cotton. However, due to the complex nature of the criteria on wool, placing a simple limit on ecoparasiticide concentrations could 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.

c) Restricted substances in the textile covering production process

If the textile covering accounts for more than 1,0 % w/w of the final furniture product, it shall be demonstrated that the textile production process meets the requirements on restricted substances as described in Appendix IV.

Assessment and verification:

The applicable assessment and verification conditions laid out in Appendix IV shall be complied with.

Rationale:

The rationale are similar to those for leather in criterion 6.1c). It is important to liaise with suppliers to ensure that textiles are not produced using certain restricted hazardous substances but this criterion is only required in furniture products that contain more than 1% w/w of upholstery covering materials based on textiles due to the fact that supply chains may be very complex and information difficult to obtain.

In the original TR 2.0, full alignment with the criteria for individual textile materials was proposed although there were some inconsistencies in the wording which were pointed out at the 2nd AHWG meeting. As was stated with cotton in the rationale for criterion 6.2b), because furniture manufacturers are at least one step further down the supply chain than textile manufacturers, it may be difficult to obtain the verification information required in many of the EU Ecolabel textile criteria. Examples include the annual average air emissions of acrylonitrile from acrylic producers being less than 1,0 g/kg of fibre produced or that N₂O emissions from nylon producers shall not exceed 9,0g/kg caprolactam or adipic acid monomer production.

6.3 Coated fabrics

a) Physical requirements

The coated fabric material shall comply with the physical properties listed in Table 10.

Table 10. Physical requirements for coated fabric materials

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

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

Assessment and verification:

The applicant shall provide a declaration from the coated fabric manufacturer stating that the coated fabric material meets all the required physical properties, supported by tests carried out according to the methods referred to in Table 10.

Rationale:

The rationale is similar to that stated with criterion 6.1a) and 6.2a). As with leather and textile covering materials, the physical properties of any coated fabrics used are crucial to the lifetime of the product. The requirements set above have been recommended following consultation with industry representatives of coated fabric manufacturers.

No criteria were previously proposed for coated fabrics in TR 2.0. The interest in coated fabrics arose indirectly from leather criteria and specifically when mentioning faux leather, which is effectively defined as a "coated fabric". Following the 2nd AHWG a representative of coated fabric producers provided the physical requirements as defined above and stated that these were equivalent to high quality coated fabric materials.

This is a completely new material group to be included in the criteria document and will need to be discussed further at the EUEB meeting. For this reason an industry expert has been invited to attend.

b) Restricted substances

In addition to the general conditions on hazardous substances set out in criterion 2, the following conditions shall specifically apply to any coated fabrics used in the furniture product:

- Compliance with the hazardous substance requirements stated in Appendix IV shall be demonstrated.

-
- Coated fabrics shall not have been manufactured using vinyl chloride monomer (CAS No. 75 01 4).

Assessment and verification:

For compliance with the requirements of Appendix IV, the assessment and verification conditions stated there shall apply.

Regarding the vinyl chloride monomer criterion, the applicant shall provide a declaration from the coated fabric supplier stating what polymer type or types were used in the plastic component(s) and that they have not been manufactured from vinyl chloride monomer. Alternatively, proof of marking of plastic components may also be accepted.

Rationale

The exclusion of vinyl chloride monomer from use in coated fabric production mirrors the approach taken to plastic foils in wood based panels (criterion 3.3d) and in plastics (criterion 4.2b). The rationale for the exclusion of vinyl chloride monomer is no different to what applies here.

The use of plastics based on vinyl chloride monomer is widespread in coated fabrics. The recycling of PVC-based coated fabrics may be more difficult than that of more rigid PVC components due to the inclusion of potentially high amounts of plasticisers and other additives.

Of particular value would be a true life cycle assessment comparison between coated fabrics and leather based on the quantity of material required to upholster a defined product such as an armchair. However, such a study does not seem to be publically available at the present time.

Further discussion is needed with the industry to decide under what particular conditions these types of materials can be considered as being permitted into EU Ecolabel furniture. To date, other Ecolabel initiatives appear to have focussed only on textiles or leather, but not on coated fabrics in furniture. Would a small amount of PVC based material be accepted by the EUEB under certain conditions? Could the coated fabrics industry go further than plastics manufacturers in general seem to be willing, by offering a take-back scheme of coated fabrics to consumers for centralised repair / reprocessing / recycling? Are PVC based coated fabrics recyclable according to the Vinyloop process, is there any experience with this? Could coated fabrics with a minimum recycled content be offered?

Criterion 7. Upholstery padding materials

Criterion 7.1. Latex foam

Where latex foam accounts for at least 5,0% of total padding material (w/w) then sub criteria a) and b) shall apply.

a) Restricted substances

The concentrations in the latex foam of the substances listed below shall not exceed the values shown in Table 11.

Table 11. 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
Pesticides*	Sb (Antimony)	0.5	B
	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 2nd 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 Bed Mattress criteria were only recently published (June 2014) and it is possible that furniture criteria are during the first 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 12.

Table 12. VOC emission limits for latex foams

Substance	Limit value (mg/m ³)
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
Trichlorethylene	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 ± 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 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 13.

Table 13. 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)	-	-
	Diocetyl tin (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	

Assessment and verification:

For methods B, C, D and E where analysis is required, 6 composite samples shall be taken from up to a maximum depth of 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 13.

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. The sample shall be a composite of 6 pieces to be taken from beneath each samples face (to a maximum of 2 cm from the surface). Extraction shall be performed with dichloromethane using validated method and followed by analysis with gas chromatography–mass spectrometry (GC/MS) or high-performance liquid chromatography (HPLC/UV).

D. For TDA and MDA the applicant shall provide a report presenting the results of the following test procedure. The sample shall be a composite of 6 pieces to be taken from beneath each samples face (to a maximum of 2 cm from the surface). Extraction shall be performed with 1 % aqueous acetic acid solution. Four repeat extractions of the same foam sample shall be performed maintaining the sample weight to volume ratio of 1:5 in each case. The extracts shall be combined, made up to a known volume, filtered and 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. Extraction shall be performed for 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 sodium tetraethylborate solution in tetrahydrofuran (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.

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 particular criteria for polyurethane foam align with the requirements set out by the CERTIPUR scheme that is promoted by EuroPUR in the EU and 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.

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 14.

Table 14. 72-hour VOC emission limits for PUR foams.

Substance (CAS number)	Limit value (mg/m³)
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 from an accredited laboratory of VOC emissions from PUR foam samples that show compliance with the limits stated in Table 14. The test sample/chamber combination shall be either:

- 1 sample of 25x20x15 cm dimensions is placed in a 0.5m³ test chamber or
- 2 samples of 25x20x15 cm dimensions are placed in a 1.0m³ test chamber.

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 m²/m³ (= 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 ± 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 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:

- Criterion 2: General hazardous substance requirements for general requirements for hazardous substances and the restricted substances conditions set out in Appendices II and IV are respected.
- The padding/filling material shall not have been treated with biocides.
- Feathers or down shall not be used as padding/filling material either alone or in blends.
- If the padding/filling material uses coconut fibre that has been rubberised using latex then the criteria for latex foam shall apply.

Assessment and verification:

The applicant shall provide a declaration stating:

- the nature of the padding/filling material used and any other blended materials;
- the material has not been treated with any substances listed in Annex XIV or XVII of REACH or the ECHA Candidate list and that are not specifically restricted under the conditions set out in Appendices II and IV.
- that the material has not been treated with any biocidal substances,
- that down or animal feathers have not been used in the filling/padding material.

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 down or blends thereof can be used by producers as padding materials in furniture upholstery.

The original proposal was to generally align with the relevant 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 – and this due to criteria for a material that may only represent a small fraction of the total product weight and that does not come into direct skin contact with the user during normal use. The textile 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 criteria for cotton, due to requirements for certified organic cotton or IPM cotton requiring verification all the way back to farmers, it was decided that it would be more pragmatic to simply focus on residual pesticides, which are a potential indicator of non-IPM or non-organic cotton and can simply be tested in the final product.

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). However, since there is no practical method by which it can be guaranteed that down or feathers has not been plucked from a live bird that it is simplest to simply exclude them.

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

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 ≥ 100 mg/kg per metal.

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 the lead content in the glass by X-Ray Fluorescence according to the principles of the ASTM F2853-10 standard or equivalent.

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 for future 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 end up impairing the functionality of the mirror. However, lead-free alternatives do exist. Both the Nordic Ecolabel criteria for furniture and fittings (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). It is uncertain how this limit was arrived at and it was uncertain from the wording if the 0,2% limit referred to the in-can varnish product or the final coating layer. If it was the latter, the how are representative samples obtained? Considering the fact that stand alone and wall hung mirrors are already excluded from the EU

Ecolabel furniture product scope, no specific criteria for mirror glass is proposed here any longer.

A flexible approach to the criterion is provided in case the applicant cannot obtain a suitable declaration from a supplier in which final product testing of the backing may be carried out. Such testing with a portable XRF device may require the mirror component(s) to be removed from the product but is essentially non-destructive and is easily capable of detecting compliance with the 2000 mg/kg limit – which is also set by the French NF 217 and Nordic Ecolabel criteria for furniture.

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.

Criteria on the latter two points are included but criteria relating to good quality glass and its replacibility is covered in the final product criteria in general.

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. 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 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 3rd 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 material being used as a fine aggregate (downcycling). These three probable routes for furniture 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.

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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

a) Durability

Where a relevant and applicable EN standard exists for assessing the durability of any particular furniture product or component thereof, compliance with the minimum requirements set out in those standards shall be demonstrated.

Assessment and verification

The applicant shall provide a declaration stating compliance with relevant EN standards, supported by test reports.

b) Strength

Where a relevant and applicable EN standard exists for assessing the tensile strength, load-bearing capacity or any other strength related product of the final furniture product or components thereof, compliance with the minimum requirements set out in such standards shall be demonstrated.

Assessment and verification

The applicant shall provide a declaration stating compliance with relevant EN standards, supported by test reports.

c) Ergonomics

Any office chairs and office work tables or desks shall meet the minimum ergonomic requirements set out for Type A products as defined in EN 1335-1 and EN 527-1 respectively.

For any tables or chairs marketed for use in educational institutions, these shall comply with the minimum ergonomic requirements stated in EN 1729-1.

Assessment and verification

The applicant shall provide a declaration stating compliance with relevant EN standards, supported by test reports.

Rationale for criteria 9.1a), b) and c):

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 and CEN/TC 112 is provided in Appendix V: Furniture product durability, strength, ergonomic and safety standards. for reference, as was proposed during the meeting. Although it was pointed out that only EN standards that are ratified at the EU level, and not draft standards that are still marked as CEN/TS, should be used.

Furthermore it was requested that only the standards that specifically relate to tests be listed, some of the standards simply related to terminology and should be removed.

The list in Appendix V has been revised to remove the less relevant standards and to provide a checklist of which standards apply to which properties (i.e. durability, strength etc.).

Another request was that where a test goes beyond a simple pass/fail requirement and defines different levels of performance, this should also be defined in Appendix V if possible. This is a reasonable request although further investigation into each of the standards will be necessary before defining this more clearly.

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.

9.2. Warranty / Disassembly / Spare Parts

- i. A minimum 5-year warranty shall be provided with any EU Ecolabel furniture.
- ii. For furniture consisting of multiple components, the product shall be designed for simple disassembly and ease of replacement of damaged component parts.
- iii. The furniture manufacturer shall make available spare parts 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

- i. The applicant shall provide a guarantee (or warranty) for repair or replacement during a period of at least 5 years and provide the competent body with samples of the product information sheet and warranty terms that shall be made available to the customer.
- ii. The applicant shall provide technical drawings that illustrate how the furniture item is assembled and how it can be 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.
- iii. 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 this 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:

A standard piece of good quality furniture may have a lifespan of 30 years or more, which means that most often when furniture comes to the end of its life (average lifespan is 15 years) it still has residual life.³¹ This indicates that extending the life of furniture is the best choice to save impacts derived from the manufacturing of new furniture items.

The key factors to successful repair or extension of furniture life are that the product is designed to facilitate easy repair or refurbishment, that spare parts are actually available and that the consumer is aware of the potential for repair or refurbishment. If any one of these three factors are missing, the opportunity to repair or refurbish may be lost. This is why each of these three criteria are specifically mentioned.

9.3. VOC emissions

The testing of VOC emissions from the final furniture product shall be required when at least one of the following conditions apply:

- Coating substances have been used on wood-based or metal surfaces which have a total VOC content higher than 5% and whose application rate has not been satisfactorily calculated to be less than 35g/m² of the coated surface area, and the furniture product is intended for indoor use.
- Upholstery materials such as leather, coated fabrics or textiles are used, and the furniture product is intended for indoor use.

Sample packaging, handling and conditioning, test chamber conditions and gas analysis methods shall follow the procedures described in ISO 16000. The sample shall be conditioned in the chamber for a period of 3 days and then the chamber gas analysed and then again 25 days later (a total of 28 days after initial placement in the chamber). Note that if the VOC limits are already complied with after 3 days, no further 28 day testing shall be required.

Ideally, the entire furniture product in its assembled form should be tested, but testing may be limited only to certain furniture components that can reasonably be assumed to be the dominant source(s) of VOC emissions.

Where upholstery is determined to be the dominant source of VOC emissions, the upholstery shall be placed in the chamber with any relevant covering materials, as it would be used in the final product.

Where furniture contains more than one component to be tested, and these are assessed in separate tests, the emissions shall be added cumulatively when calculating the total emissions from the product.

³¹ Sahni, S. , Boustani, A., Gutowski, T., Graves, S. Furniture Remanufacturing and Energy Savings. 2010

The total volume of the test chamber shall be sufficient so that the furniture item or component does not obstruct the air inlet or outlet and allows a gap of at least 0.4 metres between the item/component and the side walls.

Where a complete furniture product is tested, it shall be placed in the chamber as it would sit normally. Where component(s) are tested, they shall be raised on metal feet or a metal rack to allow a gap of at least 2 cm between the floor and the bottom face of the item/component being tested and maximising the surface area in open contact with chamber air.

The test results, when applied to any single piece of furniture, whether this is the sum of separate component emission tests or the single result from testing of the entire assembled furniture item, shall not exceed the values set in Table 15.

Table 15. Maximum 28 days VOC emission limit values for individual furniture items

Substance	Coated wood, plastic or metal based furniture*		Upholstered furniture
	Chamber concentrations (ug/m ³)		
	3 days	28 days	28 days
TVOC**	3000	400	450
TSVOC [†]	-	100	80
R value ^{††}		≤ 1	≤ 1
Formaldehyde	-	62.5	62.5

*wood based furniture is considered as furniture where at least 50% of the total product weight (excluding packaging) is accounted for by solid wood or wood-based panels.

**TVOC – Total Volatile Organic Compounds, defined as those compounds within the retention range of C₆ to C₁₆ (inclusive).

†TSVOC – Total Semi-Volatile Organic Compounds, defined as those compounds within the retention range of C₁₇ to C₂₂ (inclusive)

†† R value = total of all quotients (C_i / LCI_i) < 1 (where C_i = substance concentration in the chamber air, LCI_i = LCI value of the substance as defined by the latest data defined under the European Collaborative Action "Urban air, indoor environment and human exposure").

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.

The total VOC emissions on a per product unit basis shall be calculated – either by a single result from testing the entire product or from the addition of emissions from separately tested individual furniture components.

Where furniture components are tested individually, only those components that are reasonably expected to contribute to VOC emissions need to be tested. Uncoated metal or uncoated solid wood components shall not require VOC emission testing.

Rationale:

Concerns are growing with modern buildings regarding the phenomenon of “sick building syndrome”. One of several factors linked to this phenomenon are VOC emissions from construction materials, furniture and certain cleaning products. Modern office building design, where doors and windows are much better draught-proofed and often where windows are not or cannot be opened may only exacerbate this problem. Under the Construction Products Regulation (No. 305/2011), and more specifically EC Mandate 366, a horizontal approach to indoor VOC emissions has been developed, resulting in the publication of CEN/TS 16516. This method attempts to improve the ISO 16000-base method by tightening the flexibility afforded by ISO 16000 in certain experimental variables. It should be noted that furniture does not lie within the scope of the construction products regulation and that any measures to control VOC emissions from final furniture products are purely voluntary via schemes such as the EU Ecolabel.

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 Exposure³². 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.

The limits for VOC emissions in Table 15, generally align with those set out in Blue Angel RAL-UZ 38 (for low-emission furniture and slatted frames made of wood and wood-based materials) and for RAL-UZ 117 (for low-emission upholstered furniture). Although the Blue Angel criteria also state limits for substances without an assigned LCI value³³, this criteria is not followed in the EU Ecolabel criteria for furniture because currently some 95 substances have still to be assigned LCI values at the EU level and even those with values are currently only assigned as "interim" values. Consequently, such an analysis could greatly increase testing costs to applicants with little proven scientific benefit.

It can be criticised that requiring limits for total VOCs is not directly linked to adverse health effects since some VOCs are relatively harmless while others can be highly toxic. However,

³² See: http://hcp.jrc.ec.europa.eu/our_activities/public-health/indoor_air_quality/eca/jrc-published-harmonisation-framework-health-based-evaluation-emissions

³³ 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”.

with the notable exception of formaldehyde, which has been extensively studied, the EU Ecolabel criteria does not set limits for individual VOCs, the reasoning being that specific limits for individual VOCs are still maturing and large differences exist between different schemes.

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 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 16. VOCs with emission limits defined under different systems

No.	Compound Name	CAS No.	CREL	EU-LCI	ANSES	AgBB
			(µg/m ³)			
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/

EU-LCI – European Union - 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".

ANSES – French Agency for Food, Environmental and Occupational Health & Safety. See: www.anses.fr

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

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. Therefore caution is urged when attempting to set limits for any individual VOC compounds.

The JRC are attempting to harmonise at the EU level the different values previously defined by ANSES and AgBB in France and Germany respectively. However, the process is still very much a work in progress, with 95 of the approximately 180 individual VOCs still to be ascribed an interim EU-LCI value.

Overall, significant further discussion is necessary in order to define clearly what are appropriate methods for chamber testing of the diverse different furniture products that are available on the market and what are appropriate values to set limits for different VOC parameters.

Criterion on. Packaging – proposal to remove

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 2nd AHWG meeting. The arguments for packaging criteria focus on the importance of packaging to the initial impressions on customers and the fact that if these criteria are achievable and bring environmental benefits then why should they be deleted.

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 or 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 background report, packaging is a small overall impact that may be negligible in terms of overall environmental impact although it is recognised that this can vary significantly between different furniture product types.

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

Appendix I: 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 = **1.5m²**.
- 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 x 1.5m² = **6m²**.

Total volume of coating compound used = 18.5 – 12.5 = **6L**.

Total VOC applied to surface = 3.9L x 120g/L = **468g**

Total VOC applied per m² = 468g/6m² = **78g/m²**.

*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 177. 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

*these factors are standard values but other degrees of effectiveness may be used if they can be proven.

Appendix II: 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 EN 17234 approach) or textiles (using EN 14362 approach).

Table 18. Carcinogenic arylamines to be tested for by EN 14362-1 and -3 (textiles) or EN 17234-1 (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-naphtylamine	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-diaminoanisol	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 18 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 19. 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
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

Appendix III: EN 13336 requirements for furniture leather

Table 20. Physical requirements of leather used in Ecolabel furniture (taken from Tables 1 and 2 in 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: Restricted substance lists for leather, textile and coated fabric production stages

Table 221. Restrictions for substances used in any one or more production stages

a) Surfactants, softeners and complexing agents	
<p>Applicability: Parts (i), (ii) and (iii) apply to all wet process stages in textile, leather or coated fabric production.</p>	<p>(i) At least 95% by weight of softeners, complexing agents and surfactants shall be:</p> <ul style="list-style-type: none"> • "readily biodegradable" under aerobic conditions, or • "inherently biodegradable", and/or • "eliminable" in wastewater treatment plants. <p>Assessment and verification: 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 appropriate OECD or ISO tests for:</p> <ul style="list-style-type: none"> • Readily biodegradability (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) • Inherently biodegradability (ISO 14593, OECD 302 A, ISO 9887, OECD 302B, ISO 9888, OECD 302 C) • Eliminability (OECD 303A/B, ISO 11733) <p>The latest revision of the Detergents Ingredients Database should be used as a reference point for biodegradability and, at the discretion of the Competent Body, accepted as an alternative to providing test reports.</p> <p>http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf</p>
	<p>(ii) All non-ionic and cationic surfactants must be readily biodegradable under anaerobic conditions.</p> <p>Assessment and verification: 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>http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf</p>
	<p>(iii) Long chain perfluoroalkyl sulfonates ($\geq C_6$) and perfluorocarboxylic acids ($\geq C_8$) shall not be used in the production processes for ecolabelled products.</p> <p>Assessment and verification: 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) Auxiliaries	
<p>Auxilliaries used in</p>	<p>The following substances shall not be used in any preparations or formulations within the supply chain:</p>

<p>preparations, formulations and adhesives.</p> <p><i>Applicability:</i></p> <p>Intermediate materials and final leather, textile or coated fabric product.</p>	<ul style="list-style-type: none"> •bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC) •distearyl dimethyl ammonium chloride (DSDMAC) •di(hardened tallow) dimethyl ammonium chloride (DHTDMAC) •ethylene diamine tetra acetate (EDTA), •diethylene triamine penta acetate (DTPA) •4-(1,1,3,3-tetramethylbutyl)phenol •1-Methyl-2-pyrrolidone •Nitrilotriacetic acid (NTA) <p>Assessment and verification: The applicant shall provide a declaration from the leather, textile or coated fabric supplier, supported by declarations from chemical supplier(s) and relevant SDSs, that these compounds have not been used in any of the production stages for leather, textiles or coated fabrics, ..</p>
c) Solvents	
	<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"> -2-Methoxyethanol -N,N-dimethylformamide -Bis(2-methoxyethyl) ether -4,4'- Diaminodiphenylmethane -1,2,3-trichloropropane -1,2-Dichloroethane; ethylene dichloride -2-Ethoxyethanol -Benzene-1,4-diamine dihydrochloride -Bis(2-methoxyethyl) ether -Formamide -N,N-dimethylacetamide (DMAC) -N-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone -Trichloroethylene <p>Assessment and verification: 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>

Table 22. Restricted substances in dyeing and printing processes

Chemical type	Restriction
i. Carriers used in dyeing process	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>Assessment and verification: 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>
ii. Chrome mordant dyes	<p>Chrome mordant dyes shall not be used.</p> <p>Assessment and verification: 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>
iii. Pigments	<p>Pigments based on cadmium, lead, chromium VI, mercury, arsenic and antimony shall not be used</p> <p>Assessment and verification: 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 pigments based on the mentioned heavy metals during dyeing or printing processes with any leather, textiles or coated fabrics used in the furniture product.</p>

Table 23. Restrictions for substances used in coating and finishing processes

a) Fluorinated Compounds	
<p>Applicability:</p> <p>Upholstery covering materials with integrated water or stain repellent function</p>	<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>Assessment and verification: 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 ≤ 3 or Bioconcentration Factors (BCF) ≤ 100 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>

	http://ec.europa.eu/environment/ecolabel/documents/did_list/didlist_part_a_en.pdf
f) Polycyclic Aromatic Hydrocarbons (PAHs)	
<p>Applicability: For finishes applied to coated fabrics, textiles and plastics.</p>	<p>The specified limits for polycyclic aromatic hydrocarbons (PAHs) shall not be exceeded in the plastic, coatings, natural and synthetic rubber:</p> <p>Naphthalene (CAS 91-20-3) Acenaphthylene (CAS 208-96-8) Acenaphthene (CAS 83-32-9) Fluorene (CAS 86-73-7) Phenanthrene (CAS 85-1-8) Anthracene (CAS 120-12-7) Fluoranthene (CAS 206-44-0) Pyrene (CAS 129-00-0) Chrysene (CAS 218-01-9) Benzo[a]anthracene (CAS 56-55-3) Benzo[b]fluoranthene (CAS 205-99-2) Benzo[k]fluoranthene (CAS 207-08-9) Benzo[a]pyrene (CAS 50-32-8) Dibenzo[a,h]anthracene (CAS 53-70-3) Indeno[1,2,3-c,d]pyrene (CAS 193-39-5) Benzo[g,h,i]perylene (CAS 191-24-2) Benzo[j]fluoranthene (CAS 205-82-3) Benzo[e]pyrene (CAS 192-97-2)</p> <p>Assessment and verification: The applicant shall provide a test report, using test method ZEK 01.2-08, that shows the sum concentrations of the chemicals listed above does not exceed 10 mg/kg and that the concentration of Benzo[a]pyrene does not exceed 1 mg/kg.</p>

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

Table 24. Indicative list of EN furniture standards produced by CEN TC 207 that are relevant to criterion 9.1

EN No.	Title	Type of testing required: (D)–durability, (St)–Strength, (E)–Ergonomics, (Sa)–Safety
Upholstered furniture		
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
Office furniture		
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 $\leq 8\text{mm}$ or $\geq 25\text{mm}$; 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 $\geq 12\text{ N}$ (according to test 7.4. of EN 1335-3).</p> <p>(St + D) Pass for strength & 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 $> 10\text{kg}$ and centre of gravity is higher than 650mm above the floor or when the potential energy is $> 65\text{Nm}$.</p>	<p>(St) – Pass for loads on storage parts = $\geq 1,5\text{kg/dm}^2$ for shelves, $\geq 5,0\text{kg/dm}$ for clothes rails, $\geq 0,5\text{kg/dm}^3$ for extension elements and $\geq 4,0\text{kg/dm}$ 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 $\leq 8\text{mm}$ or $\geq 25\text{mm}$; roll fronts shall not close by themselves from positions $> 200\text{mm}$ 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>Hardware for furniture</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 st slam, cycles, 2 nd 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 st vertical and 1 st 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 nd vertical and 2 nd 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.
Outdoor furniture		
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	
Seating furniture		
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)
Tables		
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)
Kitchen furniture		
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)
Beds		
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)
1129-1 1129-2	Furniture - Foldaway beds - Safety requirements and testing - Part 1: Safety requirements Furniture - Foldaway beds - Safety requirements and testing - Part 2: Test methods	(Sa)
1130-1 1130-2	Furniture - Cribs and cradles for domestic use - Part 1: Safety requirements Furniture - Cribs and cradles for domestic use - Part 2: Test methods	(Sa)
1334	Domestic furniture - Beds and mattresses - Methods of measurement and recommended tolerances	(St + D)
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)

Storage furniture		
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)
Glass in furniture		
14072	Glass in furniture - Test methods	(Sa + St + D)
Surface resistance and characteristics		
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)
Other types of furniture		
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)

14727	Laboratory furniture - Storage units for laboratories - Requirements and test methods	(St + E + D + Sa)
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Table 25. Indicative list of EN wood-based panel standards produced by CEN TC 112 that are relevant to criterion 9.1

EN No.	Title	Type of testing required: (D)–durability, (St)–Strength, (E)–Ergonomics, (Sa)–Safety
Upholstered furniture		
120	Wood based panels - Determination of formaldehyde content - Extraction method called the perforator method	
300	Oriented Strand Boards (OSB) - Definitions, classification and specifications	
309	Particleboards - Definition and classification	
310	Wood-based panels - Determination of modulus of elasticity in bending and of bending strength	(St)
311	Wood-based panels - Surface soundness - Test method	(D)
312	Particleboards - Specifications	
313-1	Plywood - Classification and terminology - Part 1: Classification	
314-1	Plywood - Bonding quality - Part 1: Test methods	(St + D)
314-2	Plywood - Bonding quality - Part 2: Requirements	
315	Plywood - Tolerances for dimensions	
316	Wood fibre boards - Definition, classification and symbols	
317	Particleboards and fibreboards - Determination of swelling in thickness after immersion in water	(D)
318	Wood based panels - Determination of dimensional changes associated with changes in relative humidity	(D)
319	Particleboards and fibreboards - Determination of tensile strength perpendicular to the plane of the board	(St)

320	Particleboards and fibreboards - Determination of resistance to axial withdrawal of screws	(Sa)
321	Wood-based panels - Determination of moisture resistance under cyclic test conditions	(D)
322	Wood-based panels - Determination of moisture content	
323	Wood-based panels - Determination of density	
324-1	Wood-based panels - Determination of dimensions of boards - Part 1: Determination of thickness, width and length	
324-2	Wood-based panels - Determination of dimensions of boards - Part 2: Determination of squareness and edge straightness	
325	Wood-based panels - Determination of dimensions of test pieces	
326-1	Wood-based panels - Sampling, cutting and inspection - Part 1: Sampling and cutting of test pieces and expression of test results	
326-2	Wood-based panels - Sampling, cutting and inspection - Part 2: Initial type testing and factory production control	
326-3	Wood-based panels - Sampling, cutting and inspection - Part 3: Inspection of an isolated lot of panels	
382-1	Fibreboards - Determination of surface absorption - Part 1: Test method for dry process fibreboards	(D)
382-2	Fibreboards - Determination of surface absorption - Part 2: Test method for hardboards	
622-1	Fibreboards - Specifications - Part 1: General requirements	
622-2	Fibreboards - Specifications - Part 2: Requirements for hardboards	
622-3	Fibreboards - Specifications - Part 3: Requirements for medium boards	
622-5	Fibreboards - Specifications - Part 5: Requirements for dry process boards (MDF)	

635-2	Plywood - Classification by surface appearance - Part 2: Hardwood	
635-3	Plywood - Classification by surface appearance - Part 3: Softwood	
635-5	Plywood - Classification by surface appearance - Part 5: Methods for measuring and expressing characteristics and defects	
636	Plywood - Specifications	
717-1	Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method	
717-2	Wood-based panels - Determination of formaldehyde release - Part 2: Formaldehyde release by the gas analysis method	
717-3	Wood-based panels - Determination of formaldehyde release - Part 3: Formaldehyde release by the flask method	
1087-1	Particleboards - Determination of moisture resistance - Part 1: Boil test	(D)
12369-1	Characteristic values for structural design - Part 1: OSB, particleboards and fibreboards	(St + Sa)
12369-2	Wood-based panels - Characteristic values for structural design - Part 2: Plywood	(St + Sa)
12775	Solid wood panels - Classification and terminology	
13017-1	Solid wood panels - Classification by surface appearance - Part 1: Softwood	
13017-2	Solid wood panels - Classification by surface appearance - Part 2: Hardwood	
13353	Solid wood panels (SWP) - Requirements	
13354	Solid wood panels (SWP) - Bonding quality - Test method	(St + D)
13446	Wood-based panels - Determination of withdrawal capacity of fasteners	(Sa)

13879	Wood-based panels - Determination of edgewise bending properties	(St)
14272	Plywood - Calculation method for some mechanical properties	
14279	Laminated Veneer Lumber (LVL) - Definitions, classification and specifications	
14322	Wood-based panels - Melamine faced boards for interior uses - Definition, requirements and classification	
14755	Extruded particleboards - Specifications	

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Appendix VI: List of FSC and FSC principles and 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 26. FSC Principles and criteria (FSC-STD-01-001 V5.0)

No.	PRINCIPLE / criteria
1 - COMPLIANCE WITH LAWS: <i>The Organization*</i> shall comply with all <i>applicable laws*</i> , regulations and <i>nationally-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.
PRINCIPLE 2 – WORKERS RIGHTS AND EMPLOYMENT CONDITIONS: <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.
PRINCIPLE 3 – INDIGENOUS PEOPLES' RIGHTS: <i>The Organization*</i> shall identify and uphold <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 uphold <i>the legal and 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 Free, <i>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 Free, <i>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 uphold <i>the rights, customs and culture of 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 uphold <i>the right of 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 Free, <i>Prior and Informed Consent*</i> before utilization takes place and shall be consistent with the protection of intellectual property rights.
PRINCIPLE 4 – COMMUNITY RELATIONS: <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.
PRINCIPLE 5 - BENEFITS FROM THE FOREST: <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> .
PRINCIPLE 6 – ENVIRONMENTAL VALUES AND IMPACTS: <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* and threatened species*</i> and their <i>habitats*</i> in the <i>Management Unit*</i> through <i>conservation zones*, protection areas*, 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.

PRINCIPLE 7 - MANAGEMENT PLANNING: *The Organization** shall have a *management plan** consistent with its policies and *objectives** and proportionate to *scale, intensity and risks** of its management activities. The management plan shall be implemented and kept up to date based on monitoring information in order to promote *adaptive management**. The associated planning and procedural documentation shall be sufficient to guide staff, inform *affected stakeholders** and *interested stakeholders** 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.
PRINCIPLE 8 – MONITORING AND ASSESSMENT: <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.
PRINCIPLE 9 – HIGH CONSERVATION VALUES: <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	<p><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:</p> <p>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.</p> <p>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.</p> <p>HCV 3 - Ecosystems and habitats. Rare, threatened, or endangered ecosystems, <i>habitats*</i> or <i>refugia*</i>.</p> <p>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.</p> <p>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.</p> <p>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.</p>
9.2	<p><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.</p>
9.3	<p><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.</p>
9.4	<p><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.</p>
<p>PRINCIPLE 10 – IMPLEMENTATION OF MANAGEMENT ACTIVITIES: 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.</p>	
10.1	<p>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.</p>
10.2	<p><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.</p>
10.3	<p><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.</p>
10.4	<p><i>The Organization*</i> shall not use <i>genetically modified organisms*</i> in the <i>Management Unit*</i>.</p>
10.5	<p><i>The Organization*</i> shall use <i>silvicultural*</i> practices that are ecologically appropriate for the vegetation, species, sites and management <i>objectives*</i>.</p>

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 27. List of the current International PEFC criteria and sub-criteria

No.	PRINCIPLE / criteria
1 - Maintenance and appropriate enhancement of forest resources and their contribution to the global carbon cycle.	
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	<p>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.</p> <p>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.</p>
1.6	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.
1.7	Monitoring of forest resources and evaluation of their management shall be periodically performed, and results fed back into the planning process.
1.8	Responsibilities for sustainable forest management shall be clearly defined and assigned.
1.9	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.
1.10	Appropriate silvicultural measures shall be taken to maintain or reach a level of the growing stock that is economically, ecologically and socially desirable.
1.11	<p>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:</p> <p>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</p> <p>b) entails a small proportion of forest type; and</p> <p>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</p> <p>d) makes a contribution to long-term conservation, economic, and social benefits.</p>
1.12	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.
CRITERION 2 – MAINTENANCE OF FOREST ECOSYSTEM HEALTH AND VITALITY	
2.1	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.
2.2	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.
2.3	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
2.4	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.
2.5	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.
2.6	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.

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>
CRITERION 3 – MAINTENANCE AND ENCOURAGEMENT OF PRODUCTIVE FUNCTIONS OF FORESTS (WOOD AND NON-WOOD).	
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>
CRITERION 4 – MAINTENANCE, CONSERVATION AND APPROPRIATE ENHANCEMENT OF BIOLOGICAL DIVERSITY IN FOREST ECOSYSTEMS	
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	<p>Forest management planning, inventory and mapping of forest resources shall identify, protect and/or conserve ecologically important forest areas containing significant concentrations of:</p> <p>a) protected, rare, sensitive or representative forest ecosystems such as riparian areas and wetland biotopes;</p> <p>b) areas containing endemic species and habitats of threatened species, as defined in recognised reference lists;</p> <p>c) endangered or protected genetic in situ resources; and taking into account</p> <p>d) globally, regionally and nationally significant large landscape areas with natural distribution and abundance of naturally occurring species.</p> <p>Note: This does not necessarily exclude forest management activities that do not damage biodiversity values of those biotopes.</p>
4.3	<p>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.</p>
4.4	<p>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.</p>
4.5	<p>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.</p> <p>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.</p>
4.6	<p>Afforestation and reforestation activities that contribute to the improvement and restoration of ecological connectivity shall be promoted.</p>
4.7	<p>Genetically-modified trees shall not be used.</p> <p>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.</p>
4.8	<p>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.</p>
4.9	<p>Traditional management systems that have created valuable ecosystems, such as coppice, on appropriate sites shall be supported, when economically feasible.</p>
4.10	<p>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.</p>
4.11	<p>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.</p>
4.12	<p>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.</p>
4.13	<p>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.</p>
<p>CRITERION 5: MAINTENANCE AND APPROPRIATE ENHANCEMENT OF PROTECTIVE FUNCTIONS IN FOREST MANAGEMENT (NOTABLY SOLI AND WATER).</p>	

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>
CRITERION 6: MAINTENANCE OF OTHER SOCIO-ECONOMIC FUNCTIONS AND CONDITIONS	
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> <small>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.</small>
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>
CRITERION 7 – COMPLIANCE WITH LEGAL REQUIREMENTS	
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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