Revision of EU Ecolabel Criteria for Furniture

2nd Ad-Hoc Working Group meeting
Technical report:
EU Ecolabel criteria draft 2.0

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1 EU ECOLABEL REVISION PROCESS FOR FURNITURE

The EU Ecolabel criteria for wooden furniture[1] are under revision. The revision process involves the writing and publication of a background report that aims to examine keep up to date the situation with the furniture industry and any relevant innovation that is related to environmental performance of furniture products. One major issue was the remit to expand the scope for this product group. This leads to the need for additional criteria for furniture materials other than wood. The criteria aim to focus on the most important environmental impacts of furniture materials from a life cycle perspective.

During the development of the EU Ecolabel criteria, a continuous and broad consultation is enagged with experts and stakeholders representing manufacturers, intermediaries, consumer organizations, NGO's and Member States. The evidence base uses 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, an 1st technical report was published in which possible new criteria for ecolabel furniture were proposed and a 1st Ad-Hoc Working Group meeting took place in Sevilla on the 7th October 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 have been proposed for ecolabel furniture and a set out in this 2nd technical report, which will be published approximately one month in advance of the 2nd Ad-Hoc Working Group meeting in Brussels on May 15th 2014.

[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

Furthermore, in the background report the following issues are covered:

- Legislation,
- European Standards,
- Other environmental labelling schemes,
- Market analysis,
- Analysis of Life Cycle Assessment studies
- Analysis of hazardous substances used in furniture industry according to REACH Regulation (EC) No. 1907/2006.

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 one is the Ecolabel Regulation (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 (No. 1907/2006) and the CLP Regulation (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 lists authorised active ingredients in biocidal products as a function of the group application (two product groups apply directly to wooden materials).

For wood and wood based materials, the EU Timber Regulation (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. Going beyond legal requirements, the most relevant programmes for demonstrating that wood and wood based materials are sustainably sourced 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, EN 747 for bunk beds 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.

To add to an already complex situation, some Member States choose to apply more stringent fire standards than those required by EN specifications.

2.2 Market analysis

According to the World Furniture Outlook by CSIL[2], 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, cannier, 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.
- Incentivise of the use of recycled wood by considering it as sustainable wood.
- Sending a market signal to small and medium enterprises for recycled plastic.
- Greatly 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 from the LCA review and the analysis of ecodesign measures 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. The consideration of more stringent requirements (in comparison with the currently existing criteria) is proposed for some criteria in order to ensure better environmental performance of this product group.

3 PRODUCT GROUP NAME, SCOPE AND DEFINITIONS

Previous product group name: Wooden furniture.

Previous product definition: "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.

The following conditions shall be fulfilled:

(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.

(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."

Exemptions:

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”.
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.

New product group name: Furniture

New product definition: "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.

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.

Exemptions from the criteria shall apply to:

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).

3.1 Rationale for product scope

Stakeholders generally agreed on the extension of the scope to all materials and in general the proposal to set a cut-off limit for materials other than wood was not supported. Some stakeholders stated that wood should be the principal material in pieces of ecolabelled furniture, since wood has a better environmental profile than plastic and metals, provided it originates from certified sustainable sources. In this respect, the extension of the criteria to cover other materials than wood, should also ensure that meaningful criteria are set for them. Maximum % limits for materials other than wood was not supported by most stakeholders. It was generally accepted that also leather should be included in the scope.

It is important that the scope is unambiguous as well as representative for the whole market. Furniture often consists of different materials. Wood and wood-based materials are the most common, followed by metals and plastics. Therefore, it is reasonable to extend the product group scope and definition in order to allow the inclusion of furniture made of commonly used materials, together with padding materials (upholstery furniture) and textiles.

For the scope definition, it is important to take into account types of furniture with greater market shares. Specific types of products whose primary function is not to be used as a piece of furniture should be excluded from the scope (e.g. streetlights, bike-parks, playground equipments, building products - steps, walls, panels -, carpets). Separate criteria have been drafted for carpets under the EU Ecolabel for textile floor coverings[3] and consequently it should be out of the scope of the product group under revision.

Based on the outcome of the questionnaire[4], the possible scope extension was in general welcomed by stakeholders.

Initially it was proposed to reduce the current threshold (90 % w/w) for wood content to 50 % w/w, as in the Blue Angel. Finally, it was concluded to eliminate this threshold since stakeholders stated that since the 90 % w/w minimum threshold for wood was a major reason why industry did not apply more for the EU Ecolabel (only two companies hold licenses). The market analysis shows that 56% of the production volume is classified as wooden furniture. However, according to the results of a market questionnaire[5] answered by two European furniture associations representing over 2900 furniture manufacturers and seven other manufactures, only a few products are composed of at least 90 % by weight of wood. Consequently, the current scope does not cover a significant share of the (wooden) furniture in the market. The extension of the scope (from wooden furniture with a minimum content of 90 % w/w of wood to furniture made of several materials) substantially increases the potential market share of Ecolabel furniture. This will encourage the environmental improvement of a broader share of the furniture sector.

[3] 2009/967/EC: Commission decision of 30 November 2009 on establishing the ecological criteria for the award of the textile floor coverings, more information available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:332:0001:0016:EN:PDF

[4] See appendix I: Results of questionnaires to analyze the existing scope and criteria for furniture

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

A harmonized approach for the definition and scope for the EU Ecolabel and GPP is proposed.

Regarding the exemptions proposed, all materials used in the product should be reported, including replaceable parts such as glass elements. Glass can be an important component in some furniture and can have relevant contribution to environmental impacts according to LCA results. Most stakeholders agreed with this inclusion.

4 EU ECOLABEL CRITERIA FOR FURNITURE

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

Table 1: Structure of criteria for EU Ecolabel furniture

Criterion	Part
1 – Product description	
2 – Hazardous substances	a) Substances of Very High Concern – general b) Derogations c) Dyes and pigments d) Biocides e) Flame retardants f) Plasticisers g) Other excluded or restricted substances
3 – Wood and wood-based materials	a) Origin, traceability and sustainability of wood and wood-based materials b) Free formaldehyde in resin formulations c) Formaldehyde emission from untreated wood-based panels d) Contaminants in recycled post-consumer wood fibres e) Genetically modified wood
4 – Surface treatments and adhesives	a) Paints and varnishes - general b) Anti-corrosion coatings c) Adhesives
5 – Plastics	a) Marking of plastic parts b) Hazardous substances c) Recyclable plastics d) Recycled content
6 – Metals	a) Description of metal used b) Hazardous substances c) Recyclable metals d) Recycled content
7 – Leather	a) Animal origin b) Final effluent quality from tannery site c) Final product requirements
8 – Textiles	a) Cotton b) Elastane c) Polyamide (Nylon) d) Polyester e) Hazardous substances f) Final product testing
9 – Padding materials	a) Latex foam b) Polyurethane foam
10 – Glass	a) Recyclability b) Hazardous substances c) Recycled content
11 – Final product	a) Product performance b) design for disassembly (reparability/refurbishment/reuse) c) End-of-Life guidance d) VOC emissions e) Low energy lighting
12 – Packaging	a) Cardboard / paper b) Plastic bags / plastics b) Other materials
13 – Consumer information	a) Documentation supplied with product b) Information on packaging c) Information on Ecolabel

Each criterion is defined, methods to assess and verify the criterion described and a brief rationale explaining why the criterion is relevant to the EU Ecolabel for furniture products. Any derogation from the requirements is explicitly mentioned.

4.1 Criterion 1: Product description

A description of the product shall be provided (functional description, for indoor or outdoor use, product name and/or reference code). If various types of the same product are available a description of the subtypes to which the application applies should be given. Information shall be provided on the total weight of the product, the materials used in the product, including fixtures and fittings, and their respective weights.

Assessment and verification: The applicant shall provide a product description, including any relevant technical drawings, to the Competent Body in which the above-described information is included.

4.1.1 Rationale

The product description proposed was generally accepted by the stakeholders. As stated above, taken into account the possible scope extension, it will be important to describe which materials are used, together with their respective weights, also for glass materials. All materials used in the product should be reported, including replaceable parts, e.g. glass elements or textile parts.

4.2 Criterion 2: Hazardous substances

4.2.1 Substances of Very High Concern (SVHC)

According to the Article 6(6) of Regulation (EC) No. 66/2010, the EU Ecolabel may not be awarded if the product if it, or any homogenous part of it contains substances meeting the criteria for classification with the hazard statements or risk phrases specified in the table below (as per Regulation (EC) No. 1272/2008[6] or Directive 67/548/EC[7]). The product or homogenous product parts shall not contain substances referred to in Article 57 of Regulation (EC) No. 1907/2006, which establishes the candidate list for SVHC. The risk phrases generally refer to substances however, if information on substances cannot be obtained, the classification rules for mixtures apply.

Table 2: List of hazard statements and risk phrases.

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 an enters airways (R65)	EUH070 Toxic by eye contact (R39/41)
H370 Causes damage to organs (R39/23/24/25/26/27/28)	H371 May cause damage to organs (R68/20/21/22)
Specific target organ toxicity	
Category 1	**Category 2**
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 (R49)
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 (R60/61/60-61)	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)	

[6] *Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006*

[7] *Directive 67/548/EEC with adjustment to REACH according to Directive 2006/121/EC and Directive 1999/45/EC as amended*

Concentration limits for substances or mixtures which may be or have been assigned the hazard statements or risk phrases listed above, meeting the criteria for classification in the respective hazard classes, and for substances meeting the criteria set out in points (a)[8], (b)[9] or (c)[10] of Article 57 of Regulation (EC) No. 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with Article 10 of Regulation (EC) No. 1272/2008. Where specific concentration limits are determined they shall prevail over the generic ones.

Concentration limits for substances meeting the criteria set out in points (d)[11], (e)[12] or (f)[13] of Article 57 of Regulation (EC) No. 1907/2006 shall not exceed 0.1 % by weight in the final product or any homogenous part of it. The same restrictions apply to substances and mixtures used unless specifically derogated.

More stringent limits than 0.1 % may apply to certain Article 57d), e) or f) substances that appear on Restricted Substances Lists (RSL's) for specific materials and/or industrial processes. Where these more stringent limits exist in RSL's, they shall take precedence over the general 0.1 % limit specified here.

4.2.2 Derogations applying to substance groups

Substances or mixtures which change their properties through processing and thus become no longer bioavailable, or undergo chemical modification in a way that removes the previously identified hazard may be exempted from criterion 2(a).

Following the text of Article 6(7) of the Ecolabel Regulation (No. 66/2010), derogations have been granted for defined groups of substances under certain conditions. These derogations are set out in Table 12 (see Annex I) and stipulate the hazard classification that are derogated and the conditions that apply.

However, **no derogation** for excluded substances shall be granted to substances identified as substances of very high concern and included in the candidate list provided for in Article 59(1) of Regulation (EC) No. 1907/2006[14]. This applies to their presence in the furniture product or in any homogeneous part of the furniture product in concentrations higher than 0.1 % w/w. Specific concentrations limits determined in accordance with Article 10 of Regulation (EC) No. 1272/2008 shall apply in cases where the concentration is lower than 0.1 %.

[8] Substances meeting the criteria for classification in the hazard class carcinogenicity category 1A or 1B

[9] Substances meeting the criteria for classification in the hazard class germ cell mutagenicity category 1A or 1B

[10] Substances meeting the criteria for classification in the hazard class reproductive toxicity category 1A or 1B, adverse effects on sexual function and fertility or on development

[11] Substances which are persistent, bioaccumulative and toxic

[12] Substances which are very persistent and very bioaccumulative

[13] Substances — such as those having endocrine disrupting properties or those having persistent, bioaccumulative and toxic properties or very persistent and very bioaccumulative properties, which do not fulfil the criteria of points (d) or (e) — for which there is scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern to those of other substances listed in points (a) to (e) and which are identified on a case-by-case basis

[14] http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

4.2.3 Dyes and pigments

Dyes and/or pigments can be used in paints, plastics, textiles, leather and in some cases foam upholstery in furniture. Criteria 2a) shall be respected. The following specific restrictions that apply to dyes and pigments are mentioned below:

i. Pigments based on Lead, Mercury, Cadmium, Chromium and Antimony shall not be used.
ii. Chrome mordant dyes shall not be used.
iii. Dyes that are carcinogenic aromatic amines (see Table 13 in Annex II for a list of compounds) shall not exceed 30mg/kg in final textile and leather materials in tests conducted according to EN 14362-1 and -3. The limit applies to individual compounds listed in Annex II. As a guide to complying with the above limit, an indicative list of dyes that can potentially cleave to form the aforementioned carcinogenic aromatic amines, and whose use is recommended to be avoided altogether, are listed in Table 14 in Annex II.
iv. Dyes that are carcinogenic, mutagenic or toxic to reproduction (CMR) or potentially sensitising shall not be used in any furniture materials (see Table 15 in Annex II for a list of specific dye formulations).
v. Halogenated dyeing accelerants (carriers) shall not be used to dye synthetic fibres and fabrics or polyester-wool blends.

Assessment and verification: The applicant shall provide a list of any dyes, pigments or carriers used in the furniture product, including their hazard classification, concentration and specifying in what material they were used (e.g. textiles, leather, plastics etc.) with any relevant supporting documentation from material suppliers. The dyes and pigments shall correspond with the text above in points i) to v). Where a derogation is requested, the conditions must be described and correspond with those mentioned in Table 12 (see Annex I). Where dyes are used in textiles or leather, a test report with results of textile or leather analysis according to EN 14362 or EN ISO 17234 for the carcinogenic aromatic amines listed in Table 13 in Annex II shall be provided.

4.2.4 Biocides

Biocides shall not be permitted in indoor wooden furniture or applied to the surface of any finished material for the purposes of adding a final disinfective effect. Specifically excluded substances for biocidal purposes include; chlorophenols (their salts and esters), polychlorinated biphenyls (PCB's), compounds including Arsenic, Boron or Copper, organotin compounds (including TBT, TPhT, DBT and DOT), dimethylfumarate (DMFu) and nanosilver. Other biocides shall only be permitted in the following furniture materials and only under the conditions described below:

i. With impregnation of outdoor wooden furniture, they shall fulfil the requirements on hazardous substances in accordance with general criterion 2(a) and contain only active substances included in Annex IA of the Directive 98/8/EC of the European Parliament and of the Council, and approved under the Biocidal Products Regulation (EC) No. 528/2012 (for product group 8 or 18). Applicants

should consult the listing of authorized biocides approved by the European Commission by product type:

http://ec.europa.eu/environment/chemicals/biocides/active-substances/approved-substances_en.htm.

Preservatives for which a dossier has been submitted for evaluation pending a decision on authorization or non-inclusion may be used in the interim period up until the adoption of the Decision.

ii. With wood from logging activities that is stored prior to and after the saw mill stage. The active substance(s) used must comply with the same requirements as described in part i).

iii. With raw hides or semi-finished leather products for preservation during transportation or storage, only biocidal active substances shall be permitted that are approved for use under Regulation No. 528/2012 for use in leather preservation (Product group 9).

iv. With water-borne coating materials, the use of in-can preservatives in shall be permitted so long as the derogation conditions described in Table 12 in Annex I are complied with.

v. With wool or other animal-based textile coving fabrics, the use of pyrethroids (Permethrin) only at final concentrations of 35-100 mg/kg shall be permitted.

Assessment and verification: The applicant shall provide a dossier supported by declarations from materials suppliers, confirming that biocides have not been used or, in the situations described in i) to v) above, stating which biocidal products have been added, what active substance(s) are involved and the relevant concentrations and H classifications / R phrases.

4.2.5 Flame retardants

Flame retardants shall not be permitted in EU Ecolabel furniture materials except for in textiles and upholstery/padding materials. Any flame retardants used shall comply with criteria 2(a) and 2(b).

Only when fire safety regulations would otherwise prevent the placing on the market of a piece of EU Ecolabel furniture, may flame retardants that possess certain hazard statements be used (see Table 12 in Annex I). A non-exhaustive list of flame retardants that shall not be used is provided in Table 3.

Table 3. Non-exhaustive list of flame retardants that shall not be added intentionally to the product

Name of substance	CAS number	Acronym
Hexabromocyclododecane and all major diastereoisomers	25637-99-4	(HBCDD)
Tris(2-chloroethyl)phosphate	115-96-8	(TCEP)
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	85535-84-8	(SCCP)
Bis(pentabromophenyl) ether (decabromodiphenyl ether)	1163-19-5	(decaBDE)
Octabromodiphenylether	32536-52-0	octaBDE
Pentabromodiphenylether	32534-81-9	pentaBDE
Polybrominated biphenyls	59536-65-1	PBB
Tri-(2,3-dibromopropyl)-phosphate	126-72-7	TRIS
Tris-(aziridinyl)-phosphinoxide	545-55-1	TEPA

Assessment and verification*:* The applicant shall provide a dossier to the Competent Body, supported by declarations from suppliers that no flame retardants have been used in the individual furniture materials. Alternatively, in cases where flame retardants have been added, the chemicals used shall be provided along with concentrations and related H statements / R phrases and comply with the derogation conditions set in Appendix I. A statement saying that the material in question complies with the relevant fire safety standards in the country where the furniture product is to be sold shall also be provided, including results according to the standards accepted in that country.

4.2.6 Plasticisers

In addition to criterion 2(a) on hazardous substances, the following plasticizers shall not be intentionally added to any of the furniture materials:

Table 4. Non-exclusive list of some plasticizers that shall not be added intentionally to the product

Name of substance	EC number	CAS number
Benzyl butyl phthalate (BBP)	201-622-7	85-68-7
Bis (2-ethylhexyl)phthalate (DEHP)	204-211-0	117-81-7
Dibutyl phthalate (DBP)	201-557-4	84-74-2
Diisobutyl phthalate (DIBP)	201-553-2	84-69-5
Dipentyl phthalate (DPP)	205-017-9	131-18-0
N-pentyl-isopentylphthalate	-	776297-69-9
Bis(2-methoxyethyl) phthalate (DMEP)	204-212-6	117-82-8
Diisopentylphthalate (DIPP)	210-088-4	605-50-5
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich[15] (DIHP)	276-158-1	71888-89-6
Dihexyl phthalate (DHP)	201-559-5	84-75-3
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	271-084-6	68515-42-4
1–2 -Benzenedicarboxylic acid, dipentylester, branched and linear		84777-06-0
Diisononyl phthalate (DINP)*	249-079-5 & 271-090-9	28553-12-0 & 68515-48-0
Diisodecyl phthalate (DIDP)*	247-977-1 & 271-091-4	26761-40-0 & 68515-49-1
Di-n-octyl phthalate (DOP or DnOP)*	204-214-7	117-84-0

* only to be counted in furniture products children/babies <36 months of age.

[15] Synonyms: C6-8-(branched)-Alkyl phthalate, Diisoheptyl phthalate (DIHP)

The sum of the prohibited plasticizers listed above shall be lower than 0.1 % by weight. For furniture intended for babies and small children, the DINP, DIDP and DnOP shall also be included in the analysis and calculation.

Assessment and verification: The applicant shall provide to the Competent Body a declaration from the material supplier of non-use of the above compounds, supported by Safety Data Sheets (SDS) of any other plasticisers that have been used in the product formulation. In the absence of such a declaration, testing may be requested according to EN ISO 14389 for textile materials….

4.2.7 Other restricted hazardous substances

A number of other hazardous substances are restricted whose functions and purposes can vary widely. More specific information regarding their restriction can be found in Annex III, but a general list of the substance groups is as follows:

- Alkylphenols and their ethoxylate derivatives (APEO's) shall not be used in textile and leather processing (see Table 16 in Annex III).
- Certain organic solvents are banned from use in adhesives, coating chemicals and other substances used in any processes related to furniture manufacture (see Table 17 in Annex III).
- Polyfluorinated or perfluorinated treatments (PFC's) shall not be used to impart water, stain or oil repellent properties to any furniture material (see Table 12 in Annex I).
- The use of short-chain chlorinated paraffins (SCCP C10-13) are banned and medium chain chlorinated paraffins (MCCP C14-17) is restricted (see Table 19 in Annex III).
- Polycyclic Aromatic Hydrocarbons (PAH's) in plastics and plastic coatings (see Table 18 in Annex III).

Assessment and verification: The applicant shall provide a dossier, supported by declarations of non-use from suppliers and/or the furniture manufacturer. In the absence of a declaration, testing may be requested by the Competent Body according the methods described underneath the relevant Table for each group of restricted substances in Annex III.

4.2.8 Rationale for hazardous substances criteria

4.2.8.1 General exclusions

Limitations on hazardous substances and mixtures need to be included in the criteria set according to all new EU Ecolabel criteria decisions developed or revised after the implementation of the new EU Ecolabel Regulation[16].

Certain types of substances are not allowed in ecolabelled products, Article 6(6) of EU Ecolabel Regulation states:

"*The EU Ecolabel may not be awarded to goods containing substances or preparations/mixtures meeting the criteria for classification as toxic, hazardous to the*

[16] Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel, available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:027:0001:0019:EN:PDF

environment, carcinogenic, mutagenic or toxic for reproduction (CMR), in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures nor to goods containing substances referred to in Article 57 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)".

Nevertheless, the EU Ecolabel Regulation recognizes also that in certain circumstances restriction of some substances may not be technically or economically viable. Therefore, Article 6(7) of the Regulation states that:

"*For specific categories of goods containing substances referred to in paragraph 6, and only in the event that it is not technically feasible to substitute them as such, or via the use of alternative materials or designs, or in the case of products which have a significantly higher overall environment performance compared with other goods of the same category, the Commission may adopt measures to grant derogations from paragraph 6*".

However, and according to Article 6(7) of Regulation (EC) No. 66/2010, no derogations shall be given concerning substances that meet the criteria of Article 57 of Regulation (EC) No. 1907/2006 and that are identified according to the procedure described in Article 59(1) of that Regulation, present in mixtures, in an article or in any homogeneous part of a complex article in concentrations higher than 0.1 % w/w. As such, some specific substances are strictly and without exception excluded from the ecolabelled products and there is no room to derogate them.

4.2.8.2 Rationale for criteria for dyes and pigments

Pigments are fundamental ingredients for imparting colour to paints and plastics. There are many examples of pigments based on heavy metal compounds or complexes that are either hazardous in themselves or could potentially transform into hazardous species during or after the life of the paint coating or plastic. Thus the criteria focuses on excluding pigments based on particular elements of concern (Lead, Mercury etc.) rather than simply the actual hazard classification of the pigment itself.

Dyes are widely used in textile fibres, leather and also plastics. Azo dyes are the name of the most important group of synthetic dyes and pigments based on nitrogen representing 60-80 % of all organic colorants. The direct use of carcinogenic aromatic amine dyes listed in Annex II is prohibited but it is well known that some azo dyes may cleave under certain conditions to produce in-situ these banned carcinogenic and allergenic aromatic amines. Consequently, even though these substances are banned, it is still necessary to test for their presence as they may be indirectly formed from other permitted dye compounds (30 ppm is decided since the method is prone to smaller results of "false positives"). As an aid to manufacturers a non-exhaustive list of such dyes that are susceptible to cleaving to indirectly form carcinogenic aromatic amines, following the EU Azo colorants Directive 2002/61/EC[17], is

[17] Directive 2002/61/EC of the European Parliament and of the council of 19 July 2002 amending for the nineteenth time Council Directive 76/769/EEC relating to restrictions on the marketing and use of certain

included in Annex II. Although not directly banned, their avoidance should help ensure compliance with the limits for carcinogenic aromatic amines. Another list of specific dye formulations that are banned due to being sensitizing or CMR is also provided in Annex II. It should be highlighted that the Azo Directive came into force in 2003. Since Annex XVII of REACH came into force in 2009, the AZO Directive 2002/61/EC has been replaced by the REACH Regulation. Azo dyes are included in the REACH Restriction List[18].

4.2.8.3 Rationale for biocides

The following specific substances are proposed to be excluded to be used at any stage of the manufacturing process of EU Ecolabel furniture for biocidal purposes:

Exclusion of Chlorophenols (their salts and esters)

Pentachlorophenol (EC 201-778-6, CAS 87-86-5) and its salts and esters are included in the Annex XVII of REACH Regulation[19] according to restricted substances. It was banned in the EU 1987 for this use. However, it is explicitly mentioned as a banned substance for the purpose of informing non-EU wood suppliers.

Exclusion of Dimethyl fumarate (DMFu)

Dimethylfumarate (DMFu) is a mould inhibitor which is used to protect items in transit from attack by micro-organisms. DMFu as a biocide is not allowed in the EU according to decision 2009/251/EC. The decision has been incorporated into REACH (Annex XVII) under entry 61.

DMFu being present either in the articles themselves or in sachets added to the articles seem to have caused many of the observed cases of DMFu-sensitisation. A number of cases of DMFu in articles have been reported via the EU rapid alert system for dangerous consumer products, the RAPEX system. Some of the identified health effects from the use of DMFu in sofas are serious burns, eye problems and breathing difficulties.

Exclusion of Organic tin compounds, including TBT, TPhT, DBT and DOT;

Stakeholders agreed to exclude “organic tin compounds” but to be more specific in excluding substances based on the hazard classification according to CLP Regulation.

Tributyltin compounds are included in the Rotterdam Convention and are considered toxic chemicals which have negative effects on human and environment. In addition, TBT compounds elicit effects in the endocrine systems of aquatic organisms and are moderately to highly persistent organic pollutants causing irreversible damage to the aquatic life.

Bis(tributyltin) oxide (TBTO) was identified as a Substance of Very High Concern (SVHC) meeting the criteria of a PBT substance pursuant to Article 57(d) and was therefore included

dangerous substances and preparations (azocolourants), more information available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:243:0015:0018:EN:PDF

[18] List of restrictions according to REACH regulation: http://www.echa.europa.eu/web/guest/addressing-chemicals-of-concern/restrictions/list-of-restrictions/list-of-restrictions-table

[19] List of restricted substances according Annex XVII of REACH regulation, more information available online at: http://www.echa.europa.eu/web/guest/addressing-chemicals-of-concern/restrictions/list-of-restrictions/list-of-restrictions-table

in the candidate list for authorization. TBTO is currently only used in the EU as an intermediate for manufacture of other chemicals. The declining use of TBT has been reflected in reduced levels of TBT found in sediments (Norwegian Competent Authority, 2008).

Tributyltin compounds were the main active ingredients in certain biocides to control a broad spectrum of organisms. Uses include wood preservation, antifouling pesticide in marine paints and antifungal action in textiles. They are also used as impurities in stabilizers for plastics (PVC), catalyst in production of polyurethane foams, fibrefill polymers used in products such as flooring, carpeting, back-coating of textiles used in upholstery and fabrics treated with a coating (e.g PVC).

The use as biocide is prohibited in the EU as it was not notified under the Biocidal Products Regulation (BPR, Regulation (EU) 528/2012) and the consumption is decreasing. However, many of these uses have a relative long service life and still are in use in society.

TRI-SUBSTITUTED ORGANOSTANNIC COMPOUNDS such as tributyltin (TBT) compounds and triphenyltin (TPhT) compounds shall not be used after 01 July 2010 (except for articles that are already in use before that date) in articles in concentrations higher than 0.1 % by weight of tin.

DIBUTYLTIN (DBT) compounds: shall not be used after 01 January 2012 (except for articles that are already in use before that date) in articles in concentrations higher than 0.1 % by weight of tin. Some of these bans are delayed until the 1st January 2015 for certain applications including soft PVC, Tin-stablised PVC coated fabrics, outdoor rainwater pipes and fittings as well as certain adhesives (RTV-1 and RTV-2 sealants).

DIOCTYLTIN (DOT) compounds: shall not be used after 01 January 2012 (except for articles that are already in use before that date). The only exceptions are in textiles, gloves, footwear, wall and floor coverings. Childcare articles, female hygiene products, nappies and two-component room temperature vulcanization moulding kits. Even still, the concentration in these articles must not exceed 0.1 % by weight of Tin.

It should be noted that restrictions on organic tin compounds have already been introduced at the EU level by means of amendments to the Marketing and Use Directive (76/769/EEC) and Directive 2009/48/EC related to toy safety.

According to ECHA, organotin compounds covered by entry 20 of Annex XVII of REACH consist in organostannic compounds that must contain a carbon-tin bond. Substances like tin salts or organotin compounds for which tin is bound to an atom other than carbon are not covered by this entry. In conclusion, it is a legal requirement that organostannic compounds are not used as biocides in free association paint and this exclusion shall be extended to biocides used in any materials involved with EU Ecolabel furniture. A derogation for Organotin under certain conditions when not used as a biocide in PU foam manufacture is described in Annex I.

Exclusion of biocides for use with indoor wood

According to the draft criteria proposal, indoor furniture shall not be impregnated. However, during the 1st AHWG, it was mentioned by stakeholders that impregnation of indoor furniture is sometimes needed, especially in Mediterranean countries such as Spain. The European

standard EN 335:2013 -*Durability of wood and wood-based products – Use classes: definitions, application to solid wood and wood-based products*- gives general definitions of Use Classes for different service situations relevant to solid timber and wood-based products.

The differences between the use classes are based on differences in environment exposures that can make the wood or wood-based products susceptible to biological deterioration and consequently require protective measures. It should be noted that these measures were developed considering structural wooden elements, where failure due to disfiguring or wood-destroying fungi is potentially far more serious than in typical furniture products. Indoor wooden furniture corresponds with use class 1, where no exposure to the weather and wetting occurs. Attack by disfiguring or wood-destroying fungi is considered insignificant and always accidental and attack by wood-boring insects, including termites, is possible although the frequency and importance of the insect occurrence depends on the geographical region. For geographical areas at high risk of attack by wood boring insects, it is preferred that the end user should decide whether or not if additional biocidal products are to be used on indoor wooden furniture materials post-purchase rather than all consumers potentially being deprived of the opportunity to have biocide-free indoor wooden furniture. Overall, indoor furniture shall not be impregnated due to fact that the adverse environmental impact caused by chemical treatment outweighs by far the positive effect of inherent resistance to attacks by fungi or insects on indoor wooden furniture that perhaps may never occur during the use phase.

Allowance for certain biocides in raw hides and semi-finished leather products

Traditionally the leather industry was intimately associated with abattoirs and the transport of hides was not so widespread. Preservation for several days can easily be achieved without any negative effects on the final product by storage in sufficiently cool conditions. However, the global nature of the meat and leather industry today means that often hides and semi-finished leather products are shipped to the EU from other continents and need to be preserved for several weeks during transport. To prevent biological degradation, the use of chemical preservatives is required.

Allowance for certain in-can preservatives for paints and varnishes

Some stakeholders specifically stated that a derogation for R43 preservatives (biocides) would be required if water-borne coatings were to be used in EU Ecolabel furniture. The use of water-borne coatings is desirable due to the substantially lower VOC contents of such products compared to organic-solvent based equivalents. Although specific EU Ecolabel criteria have been developed for paints and varnishes[20], it should be highlighted that the scope for those criteria do not extend to coating compounds used in factory processes involving furniture or wood-based panel manufacture. Regardless, a specific derogation for biocides in water-borne paints is included in criterion 2(d) that generally aligns with those for in-can preservatives for Ecolabel paints and varnishes and is listed in more detail in Annex I.

[20] 2009/544/EC: Commission Decision of 13 August 2008 establishing the ecological criteria for the award of the Community eco-label to indoor paints and varnishes, more information available online at: http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html

Allowance for Permethrin in textiles based on animal fibres

A specific concentration range of 35-100 mg/kg is set for this repellent in alignment with Blue Angel criteria (RAL UZ 117) in textiles based on animal fibres because it is precisely within this range that the chemical has been shown to be effective as a moth-repellent. Too high, or too low a concentration would both represent wasteful use of this chemical.

4.2.8.4 Rationale for flame retardants (FR's)

Flame retardants are widely used in PUR foams and textiles in order to prevent or retard furniture products from igniting when exposed to flames and in many cases are required as part of Member State fire safety Regulations. Broadly speaking, FR's can be split into "halogenated" or "non-halogenated" compounds.

Halogenated organic FR's have a wide structural variety and may differ in toxicological properties for products within the same group. However, they encompass a large number of substances that are harmful to health and environment, are highly toxic to aquatic organisms, carcinogenic or harmful to human health. Furthermore, they do not degrade readily in the environment. Of the specifically excluded halogenated FR's listed in Table 3 in criterion 2(e), HBCDD, TCEP, SCP and decaBDE are banned because have hazardous properties listed in Article 57(1) of REACH Regulation (No. 1907/2006) and are restricted in use. octaBDE and pentaBDE are restricted substances under entry 45 in REACH Annex XVII and likewise TRIS (entry 4), TEPA/APO (entry 7) and PBB are also restricted substances.

When incinerated, halogenated organic compounds contribute to the formation of highly toxic and persistant organic pollutants, such as dioxins and furans. Depending on the operating conditions of the incineration plant, these compounds may be emitted directly to the atmosphere or deposited in fly ash or in gas-scrubbing sludges.

During the 1st AHWG meeting the exclusion of halogenated flame retardants was welcomed. These compounds are banned in the Nordic ecolabel (Furniture and Fitments R41) and in the Blue Angel (RAL UZ 117), which mentions specific alternative groups of acceptable FR substances. However, some comments received from industry pointed out that exclusion of whole families of products is not science-based and any exclusion of any individual substance should be based on the properties of that particular substance. The case of TRIS (TDCPP – CAS 13674-87-8) was brought up. One stakeholder commented that TRIS (TDCPP) is the most commonly flame retardant used at least around Denmark but has been included in California´s Proposition 65 list due to its adverse environmental effects.

The listing of a chemical under Prop. 65 does not automatically require product manufacturers to include a product label. Product labels are only required if a product contains a listed chemical where consumer exposure would exceed a safe exposure threshold (known as a safe harbor level), as determined by California´s Office of Environmental Health Hazard Assessment (OEHHA). California has established a standard for defining the safe harbor level: A person must not have a one-in-100,000 chance of developing cancer over a 70 year period as a result of exposure.

In 2008, the EU completed a comprehensive Risk Assessment of TDCPP[21] and concluded that there were no concerns for consumers in relation to cancer from potential inhalation or exposure to children via the oral route. The recently voted Bed Mattress EU Ecolabel criteria do not specifically exclude all halogenated FR's and so a similar approach is proposed for Ecolabel furniture criteria.

Alternative non-halogenated flame retardants

Due to the interest in non-halogenated FR's expressed by the stakeholders and the stances taken against halogentated FR's by other Ecolabel schemes.

As stated in the document provided by PINFA[22] (Phosphorus, Inorganic and Nitrogen Flame Retardants Association), rigid PU foams are inherently flammable. The fire performance of rigid PU foams is influenced by several parameters such as:

- Raw materials used (nature of the polyols, blowing agent, etc.)
- Foam density
- The isocyanate (NCO): polyol (OH) ratio. Rigid PU foams with a lower ratio show a higher flammability than rigid PU foams with a higher ratio.

In order to pass various fire standards, flame retardants have to be added to PU foams. Regarding the information facilitated by PINFA, different halogen free flame retardants can be used to fulfill these requirements. The most common are phosphorus based flame retardants.

Regarding textiles, the most common fabrics used in upholstered furniture are: cotton, polyester, polyamide, wool and their respective blends. These fibres each have inherently different ignitability and flammability and FR treatments will vary.

With flame retarded textiles in clothing or other products that will be washed regularly, it is important to ensure that the flame retardant function is retained even after many wash cycles. This is not an issue with furniture and so is not specified in the criteria for textiles.

Polymeric flame retardants (such as polymeric phosphates) are another future trend likely to be seen because polymeric flame retardants are not easily bioaccumulated and do not easily migrate out of a polymer that they have been blended into. A polymer/polymer blend presents a much better environmental profile than a polymer/small molecule blend. Currently, the only high molecular weight polymeric PIN flame retardant commercially available is the NOFIA group of polyphosphonates.

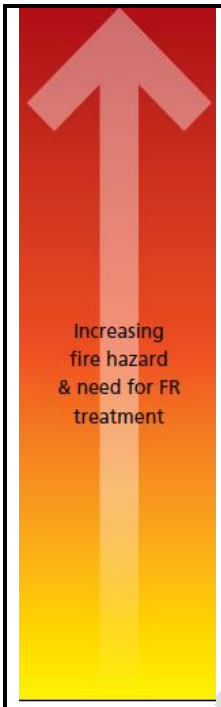
Alternatives to Flame Retardants: fire blocking technologies

[21] For more information, see details in the report available online at: http://echa.europa.eu/documents/10162/13630/trd_rar_ireland_tdcp_en.pdf

[22] PINFA– Phosphorus, Inorganic and Nitrogen Flame Retardants Association, "Innovative and Sustainable Flame Retardants in Building and Construction". For more information, see details in the report available online at website: http://www.pinfa.org/documents/Library/Brochures/pinfa_bc_edition-2013.pdf

Only textiles and upholstery in furniture are widely considered as possible ignition sources. In particular the underlying upholstery can be protecting from fire without adding potentially hazardous chemicals to consumer products via the appropriate use of an interliner, made of an inherently non-flammable material, placed between the foam padding and the covering fabric. Different fibres have different flammability properties, as illustrated in Table 5.

Table 5. Reaction to fire of various fibres.



Fibre	
Cotton Flax Silk	Ignite easily Burn heavily with white smoke formation Do not melt away from the flame
Cellulosic fibres Rayon	Burn rapidly like cotton May melt away from the flame (with or without burning)
Acetates	Burn heavily May melt away from the flame without burning Form burning drops
Acrylics	Burn rapidly Form burning drops Form dense black smoke
Polyamide Polyolefins Polyesters Other syn. fibres	Burn slower while releasing a high amount of heat May melt away from the flame without burning Form burning drops May continue glowing after flame extinction
Modified acrylics ("Modacrylics")	Burn very slowly Tend to melt away from the flame without burning May self-extinguish under certain conditions
Aramid	Does not burn, strong char formation

Interliners should behave as a fire barrier. The paper titled[23] "A review of fire blocking technologies for soft furnishing", published in 2012, states that fire barrier fabrics are expected to play an increasingly important role in complying with existing and proposed soft furnishing flammability Regulations. The flammability behavior of soft furnishings is very complex because of the large number of different variables: materials, design (construction) and geometries. This is reflected by the wide range of commercial fire blocking technologies available. In summary, the desired level of fire protection requires appropriate matching of the barrier fabric to the desired characteristics of the soft furnishing. Several fire blocking technologies have been explored to reduce the flammability of soft furnishing by preventing or delaying direct flame impingement and heat transfer from the flames or molten polymer to the core components.

Other trends in current research include the use of nanoclays with textile fabrics. Polymer/clay nanocomposite fibers and nanocomposite coatings for textile applications have demonstrated significant reduction in flammability, increased tensile strength, and reduced thermal shrinkage of the fabrics (Rahatekar et al. 2009; Jain et al. 2008). Based on current knowledge, the nanoclays do not have any EHS restrictions to date.

[23] Nazaré and Davis: A review of fire blocking technologies for soft furnishings. Fire Science Reviews 2012 1:1.

The potential of carbon nanofibers (Davis & Kim 2010a) and multi wall carbon nanotubes (Davis & Kim 2010b) into layer-by-layer deposition techniques to-form thin film coatings have shown promising results (55% ± 6% reduction in PHRR[24] and 21% ± 3% reduction in total burn time). The research[25] is now focused for using such coatings with PU foam and barrier materials. These newly engineered nanomaterials may lower heat release in future furnishing fires, but on the other hand there are still uncertainties regarding health and safety issues. In this sense, a proper framework is needed to assess toxicological and ecotoxicological properties of nanomaterials as well as to define guidelines (standardized testing tools) for quantifying the performance of fire blocking barrier fabrics.

In this article, it was indicated that with a fire barrier material, most cover fabrics will have a greater than 85% passing rate for the Cal TB 133 test, which is a 10-50% improvement in pass rates compared to tests without using a barrier material.

California Technical Bulletin 117 is a Californian law requiring upholstered furniture to meet strict inflammability standards. The previous version of TB-117 required PUR foam in furniture to withstand exposure to a small flame for 12 seconds. The most effective way to pass this “flame test” was to inject the foam with flame retardants chemicals. However, the new version of TB-117 (Jan, 2014) has replaced the “flame test” with a "smolder resistance test": a lighted cigarette placed on the fabric outside the foam. Therefore, the new TB-117 only changes the testing method but the new law does not ban flame retardants per se.

The fire resistance test result largely depends on the nature of the cover fabric. Due to their low mass, it represents a relatively low quantity of fuel compared with other organic materials. However, most of them pose other fire risks, such as their ignitability, their potential to propagate the flame and their ability to melt and produce burning droplets.

Although alternatives to flame retardants exist, whether or not these can be used in Ecolabel furniture that contains synthetic textile fibres or PU/latex foam upholstery will depend on the flexibility of Member State fire safety test methods.

<u>National and EU Regulations and standards for the ignitability of upholstered furniture</u>

There is no harmonized approach to fire safety Regulations across the EU. Each Member State decides on what furniture products must be tested (e.g. bedding, mattresses, seats, filling etc.), what tests they shall be subjected to and what shall be defined as an acceptable result. Despite the differences, there are three main test methods that are used by a considerable number of Member States:

- EN 597-1 and -2: "*Assessment of the ignitability of mattresses and upholstered bed bases*", where the ignition source is either a smouldering cigarette or a match flame.
- EN 1021-1 and -2: "*Assessment of the ignitability of upholstered furniture*", where the ignition source is either a smouldering cigarette or a match flame.
- EN ISO 12952: "*General test to bedding items by a small open flame*".

[24] PHRR: Peak heat release rate

[25] Kim et al. 2011; Davis & Kim 2010a; Davis & Kim 2010b

The most stringent fire Regulations in the EU are those of the UK, which is mainly due to the option to specify stronger ignition sources in BS 5852 and BS 7177 than simply a smouldering cigarette or a simulated match flame used in EN 597 and EN 1021.

To avoid possible barriers to the sale of EU Ecolabel furniture products in the UK, the wording for derogations for flame retardants states that one of the conditions for their use is that compliance with fire safety standards in the country of sale was required, without tying the condition down to a particular standard.

According to the 1st AHWG meeting, it was proposed not to make a distinction between reactive and additive flame retardants, in line with recently developed criteria for other EU Ecolabel products.

Doubts were raised over the precise definition of "additive" and "reactive" FR's, stating that it is still open to interpretation. Such uncertainty was claimed to be a potentially limiting factor to manufacturers applying for the EU Ecolabel.

According to a recent study published by Defra[26], it was agreed that it was impossible to meet existing safety Regulations in the UK if all additive flame retardants were banned. The study indicates that at present flame retardant systems primarily use chlorinated phosphorus compounds, which satisfy the risk phrase based criteria but that these are examples of additive FR´s. Existing technologies for foams already avoid the use of brominated flame retardants for which most concerns are raised. However, the study concludes that a general ban on halogenated (bromine- and/or chlorine-containing) or specifically brominated flame retardants would not be appropriate, nor is excluding additive flame retardants. It was indicated that alternative flame retardants systems are available which meet the risk phrase requirements for example Tris(1-chloro-2-propyl)phosphate (TCPP) or melamine and its derivatives. However, these are additive flame retardants and would have been excluded under the previously proposed criterion.

Based on a horizontal approach and taking into account that flame retardants in furniture are almost exclusively used for upholstery and textiles, this proposal should align with EU Ecolabel criteria for bed mattresses and textiles. No specific mention of "reactive" or "additive" FR's was made in the recently voted criteria for EU Ecolabel textiles or bed mattresses and so no such distinction should be made with furniture criteria either.

According to Table 12 in Annex I regarding hazardous substances restriction and derogation list, flame-retardants in textiles or upholstery shall not be used unless the product must be designed to meet ISO, EN, Member State or public sector procurement standards and fire safety Regulations in the country where the product is to be sold.

4.2.8.5 Rationale for the exclusion of plasticizers listed in criterion 2(e).

The exclusion of DPP, N-pentyl-isopentylphthalate, DEMP, DIPP, DIHP, DHP and DHNUP is justified by the fact that they are currently listed as restricted substances according to Annex XVII of the REACH Regulation (No. 1907/2006). The exclusion of BBP, DEHP, DBP and DIBP is

[26] *Fire Retardant Technologies: safe products with optimised environmental hazard and risk performance*, Defra, June 2010

justified by their classification as being Toxic to Reproduction (Article 57(c) of REACH). This is in accordance with the legal framework set out in Article 6(6) of the Ecolabel Regulation (No. 66/2010).

During the 1st AHWG, the following phthalates: DnOP, DIDP and DINP, which have no classification, were discussed. These substances were excluded under the previously voted furniture criteria in 2009. The exclusion is proposed to remain and reference is made to the background report[27], which states that DnOP, DIDP and DINP are included in Annex XVII of the REACH Regulation according to substances subjected to restriction when used in toys and childcare articles, where the concentration must be <0.1% by weight of the plasticized material. According to the last revision of phthalates entry 52 of Annex XVII to REACH (DINP, DIDP and DNOP), in January 2014[28], the European Commission concluded that the existing restrictions should be maintained but that no unacceptable risk has been characterized for the uses of DINP and DIDP in articles other than toys and childcare articles which can be placed in the mouth. On the basis of the calculated Risk Characterization Ratios, ECHA concluded that a risk from the mouthing of toys and childcare articles containing DINP or DIDP cannot be excluded if the existing restriction were lifted. Childcare articles means any product intended to facilitate sleep, relaxation, hygiene, the feeding of children or sucking on the part of children. Consequently, due to the possible interaction of children with furniture, even though it is much lower than that expected with toys, it is proposed to take a precautionary approach and extend the ban on DINP and DIDP to furniture items designed for small children.

Regarding DnOP, ECHA concluded that it is not used anymore in EU since no REACH registration dossier have been submitted to ECHA for DnOP. There is no precise information available on the possible uses of DnOP in EU. Furthermore, from the available information provided by ECPI[29], it seems that there may be a confusion between di-n-octyl phthalate (DnOP, CAS 117-84-0) and di-octyl phthalate (DOP) which is synonym name for DEHP (CAS 117-81-7). Based on this, the re-examination of the current restriction on DnOP was not assessed. Nevertheless, the restriction for DnOP is still maintained in the Annex XVII to REACH.

In summary, these phthalates will be proposed to be specifically banned from toys which may enter children´s mouths. As these may be present in baby furniture materials it may be appropriate to apply a similar ban for the EU Ecolabel within this product group, matching with the legislation for baby toys and banning those phthalates that are shown or may be shown to be harmful. Furthermore, excluding DINP, DnOP and DIDP aligns with recently voted criteria for bed mattresses.

4.2.8.6 Rationale for criteria for other substances

Not all hazardous substances used in the manufacture of the materials that may constitute

[27] For more information see details in "Background report", available online at the project's website: http://susproc.jrc.ec.europa.eu/furniture/whatsnew.html

[28] For more information see details in "Phthalates entry 52 Commission conclusions on the review clause and next steps", available on line at the website: http://ec.europa.eu/enterprise/sectors/chemicals/files/reach/entry-52_en.pdf

[29] ECPI: European Council for Plasticisers and Intermediates, ECPI workshop, 2009.

furniture according to the product scope can be grouped under dyes/pigments, biocides, flame retardants or plasticisers. A number of substances that do not lie in these groups also appear on Restricted Substances Lists (RSL's) and so it is proposed to specifically mention these RSL's as an aid to manufacturers and suppliers to better understand the restrictions that apply to hazardous substances.

4.2.9 Input from stakeholders for derogations and requests for further information regarding hazardous substances.

Stakeholders were invited to submit derogations accompanied by information on the function of the relevant substance, its content range in the final product/component and any reasoning why the hazardous substance cannot be substituted or eliminated, thus fulfilling the conditions set in Article 6(7). During the stakeholder consultation process, some requests were submitted not only for derogation but, in the case of Bisphenol A and PVC, further investigation was requested regarding their possible exclusion.

4.2.9.1 Derogation of Nickel in stainless steel

A derogation request for Nickel in stainless steel was sent to the project team. The attached supporting information and rationale was presented and the conclusions on its derogation request are explained in the section below.

Based on the analysis of the feedback submitted and the horizontal derogation provided for Nickel containing stainless steel granted for other Ecolabelled products, it is proposed to derogate the use of Nickel in stainless steel for the product group of furniture under certain conditions. When Nickel is incorporated into stainless steel, it does not behave like nor have the same hazard profile as pure Nickel. Stainless steel is an alloy and should be evaluated based on the properties of the alloy, as per Article 8(6) of the CLP Regulation (1272/2008) which states:

> "*Tests that are carried out for the purposes of this Regulation shall be carried out on the substance or on the mixture in the form(s) or physical state(s) in which the substance or mixture is placed on the market and in which it can reasonably be expected to be used.*"

Tests on stainless steel containing Nickel show that stainless steel does not exhibit the same hazard properties as Nickel and should not be classified (as concluded e.g. in the report "Review on Toxicity on Stainless Steel" by the Finnish Institute of Occupational Health in 2010). Studies of sensitization after skin contact showed that sensitization is clearly linked to the release rates of Nickel from the steel in contact with artificial sweat solutions. Release rates for low Sulphur steels (<0.007 % S), resulphurised steel (0.3 % S) and Nickel-plated steel showed Nickel release rates of <0.03, 1.0 and 100 µg/cm^2/week and positive sensitization results in test patients of 0 %, 14 % and 96 % respectively. Consequently, a distinction must be made in any criteria for stainless steel furniture components that are likely to come into direct skin contact and those where skin contact is negligible, when applying the derogation for Nickel.

The derogation conditions for Ni in stainless steel are set out in Table 12 in Annex I along with other derogations according to stakeholder feedback and following the same horizontal approach for other EU Ecolabel product groups.

4.2.9.2 Further information regarding Bisphenol-A (BPA)

During the 1st AHWG meeting the exclusion of Bisphenol-A was welcomed. However, some stakeholders pointed out that, in addition to the exclusion of Bisphenol-A as substance per se, the criterion should also address impurities and residues from incomplete polymerization process of polycarbonate. On the other hand, some other comments said that the available scientific data for BPA was not yet strong enough to classify the substance as a selective reproductive toxicant and that consequently there is no basis for using the 2002 hazard classification (H361F suspected of damaging fertility). The H361F effectively prevents any homogenous components containing more than 0.1 % BPA being used in Ecolabel furniture.

According to the draft criteria proposal[30], the product must not contain BPA and compounds thereof. The main uses are in the manufacture of plastics (polycarbonate), paints, coatings and adhesives (binding agents and hardeners) and polyols in the production of polyurethane. BPA is today one of most commonly used industrial chemicals[31]. In the EU in 2005/06[32], approximately 80 % of BPA was used to make polycarbonates, 18 % for the manufacture of epoxy resins which are used for flooring, as coating for household appliances, linings for beverage and food cans and a wide variety of other products.

According to the harmonized classification of table 3.1 of Annex VI to CLP Regulation, bisphenol A (4,4'-isopropylidenediphenol EC 201-245-8, CAS 80-05-7) is classified as:

- Repr. 2 H361: Suspected of damaging fertility or the unborn child. Specific effect: H361f: Suspected of damaging fertility
- STOT Single Exp. 3 H335: May cause respiratory irritation.
- Eye Damage 1 H318: Causes serious eye damage.
- Skin Sens. 1 H317: May cause an allergic skin reaction.

Regarding information extracted from registered substances received from manufacturers and importers from ECHA[33] the same classification was appointed, plus the following classification was added in accordance with the requirements of the 2nd ATP of Regulation (EC) N° 1272/2008:

- Aquatic Chronic 2 H411: Toxic to aquatic life with long lasting effects.

The 2nd Adaptation to Technical Progress (ATP)[34] entered into force on 19th April 2011 and the new rules apply to substances from 1st December 2012 and to mixtures from 1st June 2015.

[30] For more information see details in "Draft criteria proposal", available online at the project's website: http://susproc.jrc.ec.europa.eu/furniture/whatsnew.html

[31] Consumption in EU27 671 000 t [AMI, 2011; Plastics Europe 2012].

[32] For more information see details in the report "SUBSPORT Specific Substances Alternatives Assessment – Bisphenol A", available online at: http://www.subsport.eu/wp-content/uploads/data/bisphenol_A.pdf

[33] More information available on-line at: http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances.

[34] Commission Regulation (EU) N° 286/2011 of 10 March 2011.

Regarding to environmental release, in general, BPA mainly enters the environment through wastewater. Small amounts of BPA may be released from wastewater-treatment plants and BPA production and processing plants into environment. Once released, BPA residues can remain in sewage sludge. If this sludge is used for farmland fertilization, BPA can enter into the soil. Microorganisms can degrade BPA in water under aerobic conditions. Laboratory tests show that BPA is degraded almost completely within 2 – 17 days (EC, 2010). This means BPA is not expected to be persistent in the environment. However, it is toxic to aquatic organisms (2nd ATP of Regulation (EC) N° 1272/2008).

The European Union Risk Assessment Report on BPA published by the European Commission and European Food Safety Authority (EFSA) in 2006 and reviewed in 2008, 2009, 2010[35] and 2011, concluded that BPA-based products, such as polycarbonate plastics and epoxy resins, are safe for consumers and the environment when used as intended, due to the intake fractions of BPA through food and drink were all below the Tolerable Daily Intake. The EFSA set a Tolerable Daily Intake (TDI) of 0.05 mg/kg of body weight (mg/kg-bw/day) for this substance. The TDI is an estimate of the amount of a substance, expressed on a body weight basis that can be ingested daily over a lifetime without appreciable risk.

Nevertheless, in February 2012 and based on further consideration of new scientific studies, it was decided to undertake a full re-evaluation of the human risks associated with exposure to BPA through the diet, also taking into consideration the contribution of non-dietary sources to the overall exposure to BPA. In January 2014[36], EFSA presented the second part of the draft opinion relating to the human health risks posed by exposure to BPA. It therefore recommended that the current TDI be lowered from its current level of 0.05 mg/kg-bw/day to 0.005 mg/kg-bw/day. The Authority also noted that uncertainties remained over a number of other health hazards considered as less likely. As a result the proposed TDI should be set on a temporary basis pending the outcome of research from the US National Toxicology Program (NTP) which will address many of these current uncertainties about the potential health effects of BPA. Main findings of this draft opinion on the toxicity of BPA are:

- EFSA concludes that exposure to BPA is likely to adversely affect the kidney and liver, as well as causing effects on the mammary gland.
- The opinion additionally considers the possible effects of BPA on the reproductive, nervous, immune, metabolic and cardiovascular systems, as well as in the development of cancer. EFSA concluded that they may be of potential concern for human health and they add to the overall uncertainty about the risks of the substance.

EU AND NATIONAL PROVISIONS REGARDING BPA

BPA was authorized in Europe by the Commission Directive 2002/72/EC to be used as monomer and additive for the manufacture of plastic materials and articles intended to come in contact with foodstuffs together with a specific migration limit of 0.6 mg/kg food. This

[35] For more information see details in "European Union Risk Assessment report, Part 1: Environment and Part 2: Human health", available online at the website: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/15063/1/lbna24588enn.pdf and http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/15069/1/lbna24589enn.pdf

[36] More information available online at: http://www.efsa.europa.eu/en/consultations/call/140117.htm

Directive was amended by the Commission Directive 2011/8/EU, placing a temporary ban on the use in the manufacture of polycarbonate infant[37] feeding bottles as from 1 March 2011 and the placing on the market of these feeding bottles as from 1 June 2011. Since May 2011 Directive 2002/72/EC is replaced by Regulation (EU) No. 10/2011, which has maintained the ban of BPA in polycarbonate infant feeding bottles and kept the current restriction for BPA as a monomer with a specific migration limit (SML) of 0.6 mg/kg food permitted for used in food contact materials.

Bans on the use of BPA for food packaging intended for young children (0-3 years old) have been proposed by several EU Member States. The EU (2010), Canada, China, South Africa and Malaysia have already banned BPA in baby bottles between 0 and 3 years of age. In addition, ten US states have barred BPA from children's products or infant formula cans, and the French National Assembly will impose a use restriction on all BPA-based food contact packaging in France. The ban will come into effect on 1 January 2015.

In Japan, most major manufacturers voluntarily changed their can linings in 1997 to cut or eliminate the use of BPA because of concerns about health effects. Furthermore, consumer unions claim that manufacturers and government agencies should act to eliminate the use of BPA in all materials that come into contact with food.

Most concerns with BPA have been expressed with regards to contact with food and beverage grade materials. Clearly BPA in furniture materials presents a lower risk of ingestion/exposure to humans than BPA in food and beverage packaging. Consequently, it is proposed that BPA impurities be tested in any material that uses BPA in its manufacture and that the impurity limit should have to be below 0.01 % (100mg/kg). The main concern with BPA impurities is with polycarbonate plastics, which use BPA directly as a monomer component.

4.2.9.3 Further information regarding PVC (Polyvinyl chloride)

According to the final report "Life Cycle Assessment of PVC and of principal competing materials" commissioned by the European Commission[38], only 1% of PVC demand in Europe is for use in furniture.

A number of other thermoplastics are also used in hard furniture components such as PS, ABS, PE and PP used in tables and plastic lawn furniture. Although furniture is not an important end market for PVC producers, it should be noted that PVC is the third-most widely produced plastic worldwide, after PE and PP.

The production of PVC involves polymerization of vinyl chloride monomer (VCM or chloroethene) classified as Carc. 1A according harmonized CLP classification and containing high chlorine content (ca. 57%). Residual traces of unreacted monomer remain in PVC. Members who sign up to the charter of the EVCM undertake to produce PVC resins with <5 mg/kg VCM impurities for general purpose PVC and <1 mg/kg for food grade resins. However,

[37] The definition of infant in Directive 2006/141EC6, namely children under the age of 12 months, applies.

[38] For more information see details in "Life Cycle Assessment of PVC and of principal competing materials", report available on line at the website: http://ec.europa.eu/enterprise/sectors/chemicals/files/sustdev/pvc-final_report_lca_en.pdf

it is uncertain what impurities could be found in PVC from other suppliers who have not signed up to the EVCM charter and who may use less stringent purification processes. A standard test (EN ISO 6401) exists for VCM monomer impurities in PVC resin or compounded PVC that has a detection limit of around 0.1 mg/kg.

Furthermore, it is common to add plasticisers to PVC to improve their flexibility and durability. In soft PVC (e.g. in faux leather or cabling) much higher doses of plasticisers are required than in the hard PVC typically associated with furniture components. An extensively used group of plasticisers in PVC are phthalate compounds. Several phthalate compounds have been listed as restricted substances under Annex XIV of REACH (Regulation No. 1907/2006) and these compounds have been linked with allergies in children. Furthermore, a study on DEHP and BBP found that phthalates may mimic the female hormone oestrogen.

Another concern with PVC is the chlorine content that, should PVC be incinerated, may contribute to increased development of dioxins in the waste gas from the waste incineration plant. Dioxins are commonly regarded as highly toxic compounds that are environmental pollutants and persistent organic pollutants (POPs). Although PVC can be recycled, often a typical consumer will not distinguish between PVC components and other plastic components in furniture. Recycling of PVC is more successful only in products that are well known to contain 100% PVC such as window frames, doors and piping. Therefore a large part of the PVC waste ends up in mixed plastic waste streams that are often combusted, even though PVC is defined as unsuitable for combustion. Another concern is if PVC furniture is exported to non-European countries where incineration controls are less stringent. The poor suitability of PVC in combustion is the main rationale behind the Nordic Ecolabel, restriction on the use of PVC in furniture.

Other voluntary ecolabels and certifications also restrict PVC in plastic parts such as TCO and EPEAT for TV's, desktop and notebook computers, as well as the Blue Angel and Nordic Swan for fitments, indoor and outdoor furniture and playground equipment. In other EU Ecolabel product groups such as personal computers and laptops, currently under revision, plastic parts shall not contain chlorine content greater than 50% by weight.

Several environmental and consumer NGOs have been advocating the phasing out of PVC in consumer goods following the World Health Organization precautionary principle whenever a potentially hazardous chemical is identified if a clearly safer alternative exists. In some applications, and recognizing the feasibility of existent alternatives, many brands are on the way to becoming PVC-free. This approach has been adopted by Hewlett Packard, Asics, Nokia, Sony Ericsson, Apple, Sony, Nike, Esprit, Adidas, Puma, and Timberland, among others. In the case of furniture, manufacturers such as Herman Miller, Knoll, Steelcase, Teknion and IKEA have some products marked as PVC-free. Steelcase set a goal to be 100% PVC-free by 2012. The alternatives are increasingly well known and well developed, and in many cases are already cost-competitive with PVC.

According to the background report, PVC has been at the centre of a controversial debate during the last two decades. A number of diverging scientific, technical and economic opinions have been expressed on the question of PVC and its effects on human health and the environment. Some Member States have recommended or adopted measures related to specific aspects of the PVC life cycle. However, these measures vary widely.

From a PVC life cycle perspective, the production of intermediates, particularly the processes from the resource extraction of crude oil and rock salt up to the VCM production, play a major role for the environmental impacts. Exposure to and possible release of hazardous substances is a particular concern with PVC. Thus, PVC is discussed in terms of human health and environmental impacts mainly due to the use of the chlorine and additives such as phthalates. Transitioning away from PVC can have the added benefit of eliminating these toxic compounds, as well.

It is proposed that plastic parts (> 50g) shall align with other Ecolabel criteria and state that plastics shall not contain a Chlorine content greater than 50% (w/w). For plastic parts <50g, any PVC should contain VCM impurities <1 mg/kg.

4.3 Criterion 3: Wood and wood-based materials

This criterion applies to all wood and wood-based materials, including materials such as bamboo and rattan used in furniture.

4.3.1 Origin, traceability and sustainability of wood and wood-based materials

i) All wood and wood-based materials shall be traceable to their origin through chain of custody certificates issued by independent third party certification schemes.

ii) At least 70 % of wood in the final furniture product (excluding packaging) shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent. Recycled wood, following the definition of recycled as given in ISO 14021, shall also be considered as sustainably sourced materials.

Assessment and verification: The applicant shall provide valid, independently certified chain of custody certificates and demonstrate that wood has been grown 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. With regards to recycled wood, the geographical origin and nature (pre- or post-consumer) shall be declared and a chain of custody certificate presented.

4.3.2 Free formaldehyde in resin formulations in the production of wood-based materials

The resin formulation (resins/adhesives plus hardeners) used for the production of wood-based panels shall not contain more than **0.2 % (w/w) free formaldehyde**.

Assessment and verification: The applicant shall provide test reports in accordance with ISO 11402 that show the resin formulation to contain <0.2 % (w/w) free formaldehyde. Additional information such as a MSDS regarding the hazard classification of the resin formulation to demonstrate compliance with the restrictions in criteria 2a) and b) shall also be provided.

4.3.3 Formaldehyde emission from untreated raw wood-based materials:

Where wood-based panels that contain formaldehyde-based resins are used, formaldehyde emissions from panels prior to machining or coating shall be lower than the threshold value allowing them to be classified as E1 as per EN 13986 annex B or equivalent methods.

Assessment and verification: The applicant shall provide a third party certification from an accredited laboratory stating that the wood-based materials and production process is consistent with E1 requirements. Equivalent methods must show a proven correlation between the EN 717-1 chamber test and the equivalent method (which include JAS MAFF 233, ASTM D 6007 and ASTM E 1333).

4.3.4 Contaminants in recycled post-consumer wood

Post-consumer recycled wood fibres shall not exceed the limits for contaminants set out in the "*EPF Standard for delivery conditions of recycled wood*" (2002).

Assessment and verification: Test reports will provide results from the relevant analytical methods specified in the "*EPF standard conditions for delivery of recycled wood*" document showing compliance with the limit values for the contaminants listed in Table 20 in Annex III.

4.3.5 Genetically modified wood

The product shall not contain GMO wood.

Assessment and verification: The applicant shall provide a declaration stating that no genetically modified wood has been used.

4.3.6 Rationale for wood and wood-based material criteria

4.3.6.1 Traceability of wood to its origin

During the 1st AHWG meeting the criterion on traceability of wood origin was welcome and it was not seen as redundant regarding the Timber Trade Regulation. Nevertheless some comments from stakeholders pointed out that basic legal requirements should not be part of Ecolabel. Some others comments said that Timber Regulation does not apply to furniture industry since it is a requirement to operators.

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 Asia[39]. This wood can enter to Europe if furniture products or furniture components are imported from these countries.

Although the EU Timber Regulation (No. 995/2010) effectively bans the entry and commercialization of illegally harvested timber in the EU, its scope does not cover all furniture products. For example, under headings 9401 and 9403 the following is excluded:

"*seats (other than those of heading 9402), whether or not convertible into beds, and parts thereof*" and

"*Furniture of bamboo or rattan*"

Furthermore, the Regulation obliges operators to comply but does not oblige final manufacturers to maintain chain of custody certificates. 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 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 timber comes from.

[39] *Illegal Logging Trade Decimates Forests*, Africa: AllAfrica.com, 2012, retrieved 18 October 2012

4.3.6.2 Sustainable wood

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 may be not stringent enough and should be revised upwards. Although 100 % certified wood is desirable, it could be difficult to maintain due to possible fluctuations in market supplies. This is part of the reasoning behind grouping certified sustainable forestry wood and recycled wood under the term "sustainable wood". By having a uniform requirement of 70 % sustainable wood for solid wood and wood-based panels, no arguments can be raised regarding disparities between solid wood and wood-based panel requirements.

Wood-based panels represent an obvious destination for recycled wood fibres with obvious environmental benefits. One study calculated a potential reduction of 0.52 tonnes of CO_2 eq. per ton of panels produced with recycled fibres[40].

The main Non-Wood Forest Products (NWFP) that can be found in furniture products are bamboo, rattan, cane, wicker, hemp, osier, sisal, cork and reed. Although FSC certification is available for bamboo and cork, little certified material is available.

Outcomes from 1st AHWG meeting

Regarding % of certified/recycled solid wood, a minimum of 70 % was generally accepted by the industry, although some consumer associations asked for 100 % level. Some questioned whether the availability of certified wood was sufficient to satisfy demand. 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.

The wood-based panel industry stated that 40 % of recycled content on panels may compromise quality characteristics. However, by combining recycled wood and certified wood under a uniform criterion for 70 %, it is possible to manufacture wood-based panels with 0 % recycled wood so long as the 70 % requirement is met by primary certified wood fibres.

4.3.6.3 Formaldehyde in wood-based panels

Formaldehyde is recognised by the WHO as a suspect carcinogen but 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 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.

[40] Mitchell, A., Stevens, G. Life Cycle Assessment of Closed Loop MDF Recycling: Microrelease Trial 2009

The European industry (via the European Panel Federation-EPF) has been very progressive and proactive in this area during the last 20 years and led the development of the E1 standard. A framework for free-formaldehyde emission testing of wood-based panels is given in EN 13986 (Annex B). Each of these methods provides test results with different numerical values but which can be translated into the E1 standard value. Although the Nordic Ecolabel and French NF 217 standard criteria opt for limits based around 50 % of E1 values and the recently revised French NF 217 standards for furniture also require 50 % of E1, the Blue Angel criteria in RAL UZ 38 simply require compliance with the E1 limit. Based on feedback received during the 1st AHWG meeting, it was decided to opt for the less stringent requirement of E1 and not to compromise quality and potential market availability of wood-based panels.

Outcomes from the 1st AHWG meeting

Concern was expressed over the original wording of the proposal for free-formaldehyde restrictions on resins to be used in wood-based panels, which was as follows:

"The content of free formaldehyde in binding agents, adhesives, and glues for plywood panels or laminated wood panels shall not exceed 0.2 % (w/w)."

It was stated that such a restriction could effectively prohibit all aminoplast based resins from EU Ecolabel products. Instead, it was suggested that the limit should apply to the "resin formulation" (resin plus hardener), rather than individual components of the formulation. It was stated that the revised wording aligns with the recent Nordic ecolabel criteria. Further the industry stakeholder argued that concerns over risks from higher free formaldehyde ingredients are controlled by automated handling processes. It was also communicated that for verification purposes, reference should be made to ISO 11402 tests for free-formaldehyde contents.

Regarding formaldehyde emissions from untreated wood-based panels, it was postulated that the requirement of 50 % of E1 was too challenging and there was discussion about this topic. Concerns were raised about market availability and technical quality of products. Some problems experienced by the introduction of 50 % of E1 limits introduced in other ecolabels were mentioned. A future shift to the E1 plus standard under development in EN 13986 is envisaged in subsequent revisions of this criterion. Also concerns about VOC emissions (including formaldehyde) from the final furniture product, and not just from untreated wood-based panels were raised.

4.3.6.4 Recycled fibre contaminant requirements

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 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 were 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 the 1st AHWG meeting

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. Although one stakeholder suggested that limits stricter than those defined by the EPF should be followed, 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 although this could be reconsidered in the future in collaboration with EPF.

4.3.6.5 Genetically modified wood

The issue of genetically modified (GMO) plants and trees remains a controversial issue for environmentalists and there is no obvious benefit to the furniture industry by permitting the use of wood from such species. Although very small quantities of GMO wood are thought to exist, GMO wood is to continue being prohibited from EU Ecolabel furniture. This same criterion can be found in other schemes (e.g. Nordic Ecolabel and FSC).

4.4 Criterion 4: Surface treatments and adhesives

Components and fittings that may be subject to physical wear such as hinges, screws and gas-lifts in office chairs are excluded from these requirements.

4.4.1 Paints and varnishes

i) The hazardous substance criteria for criterion 2 shall be respected. For water borne surface coatings, an exemption for biocides exists as described in Annex I.

ii) The VOC content of surface coating mixtures shall not exceed 5 %.

iii) If the VOC content exceeds 5 %, then the total content of VOC applied shall be calculated and not exceed 10 g/m^2 of coated area for bedroom furniture, 30 g/m^2 for other domestic furniture and 60 g/m^2 for furniture used in schools, offices and other public buildings. Guidance for the calculation process is provided in Annex IV.

Assessment and verification: The applicant shall provide documentation such as Material Safety Data Sheets stating the VOC content of any coating substance or mixture that is added to the product. If the VOC content is greater than 5 % then the total quantity of VOC applied to the coated surface shall be calculated and be expressed in g/m^2.

4.4.2 Anti-corrosion coatings

General criterion 2 (a) and (b) on hazardous substances shall be respected. An exception is given for the surface treatment of metal for products containing Chromium, Nickel or Zinc labeled with H412 (R52/53).

Any electroplated metals should still be suitable for recycling at End-of-Life. Suitable components for electroplating are limited to those that are subject to heavy physical wear and not in frequent skin contact with users. Electroplated metals shall not be used in metal arm-rests or handles. Under no circumstances shall Chromium (VI) chemicals be used for any electroplating process.

Assessment and verification: The applicant shall provide a declaration from the metal component supplier regarding any coating or electroplating applied to the material.

4.4.3 Adhesives

The VOC[41] content of adhesives used in the assembly of furniture shall not exceed 3 % (w/w). It should be noted that an exemption for R40 substances is granted for isocyanate adhesives under the conditions mentioned in Annex I.

Assessment and verification: A declaration shall be provided by the applicant indicating all adhesives used in the assembly of furniture, as well as compliance with this criterion.

[41] VOC shall mean any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use.

4.4.4 Rationale for surface treatments and adhesives criteria

4.4.4.1 Coating products

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. The limits provided for different furniture types align with the Nordic ecolabel criteria and a guide to a possible calculation method is given in Annex IV. Regarding anti-corrosion coatings, Chromium VI is excluded due to itself high toxicity and risk to workers, coupled with the fact that less hazardous Chromium III-based alternatives exist.

4.4.4.2 Adhesives

The limit set for VOC content follows the same rationale against VOC´s in surface treatments and effectively limits adhesives to water-based varieties. If higher adhesive performance is required, particularly with PU foam upholstery, then the option exists to use R40 derogated isocyanate-based adhesives. Formulations on the market today cure completely and leave no residue free isocyanate. It should be noted that these adhesives are effectively VOC-free.

Outcomes from the 1st AHWG

Several stakeholders requested a derogation from R40 substances in the case of isocyanate-based binders. The original proposed criteria regarding harmful substances was criticised for its lack of clarity and concerns were expressed about the 5 % and 3 % limits for VOC's in coatings and adhesives respectively. Some stakeholders stated that the option to use higher VOC content coatings should be allowed for higher quality finishes in public furniture in the same way as the Nordic ecolabel approach, which limits the total VOC content applied per unit surface area but not the VOC content of the original coating compound.

4.5 Criterion 5: Plastics

Definition: Plastics in this criterion are considered as hard plastics used as structural or functional components in the furniture product. This section does not apply to other polymers such as melamine-formaldehyde, polyurethane, urea-formaldehyde and soft PVC (faux leather), which are covered in separate criteria.

4.5.1 Marking of plastic parts

Plastic parts with a weight ≥50 g shall be visibly marked in accordance with the requirements of EN ISO 11469 so that 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: Documented and photographic evidence demonstrating the markings on all plastic components are marked shall be provided by the applicant. If a component should be categorized under "other polymer type" designation, the applicant will provide data sheets from the supplier that state the nature of the polymer used in any individual plastic parts ≥50g in weight. The nature of the polymer can also be verified by testing samples directly from the final product if necessary.

4.5.2 Hazardous substances

Virgin plastic shall comply with criterion regarding hazardous substances. Any plastic components weighing 50 g or more that involve chlorine containing compounds in their manufacture shall not have a chloride content greater than 50 % by weight.. Additionally, where any polyvinyl chloride (PVC) plastic components are used (i.e. in components <50 g) the residual vinyl chloride monomer content must be less than 1 mg/kg. Where any polycarbonate (PC) plastic components are used, the residual bis-phenol-A (BPA) monomer residue must be less than 100 mg/kg.

Assessment and verification: The applicant shall provide a declaration, with supporting evidence from any suppliers where relevant, that no excluded hazardous substances as mentioned in criterion 2 have been used. For any plastics manufactured with the use of chlorine/chloride, the applicant shall provide a declaration from the supplier stating the chlorine/chloride content of the compounded plastic material. In addition, for any PVC components, the final PVC material shall be tested for vinyl chloride monomer impurities according to the headspace-gas chromatography analysis procedure defined in in EN ISO 6401. Any polycarbonate (PC) plastic components should be tested for residual BPA monomer by the following or equivalent methods: the PC is dissolved completely in dichloromethane (10 ml per g PC sample weight). Once dissolved, the polymer fraction is re-precipitated by adding methanol (5 ml per g original PC sample weight) and refluxing for approximately 2 hours before filtration. Then after storing the filtrate in a refrigerator for at least 6 hours, it can be analysed by high performance liquid chromatography equipped with fluorescence and UV detectors.

4.5.3 Recyclable plastics

Any plastic polymers used in components ≥50 g in weight shall be inherently recyclable due to their physical and chemical properties. This can be checked against a list of known

thermoplastic (and hence recyclable) polymers against the label required in criterion 5a). The furniture manufacturer should describe how and where plastic components can be returned at the end-of-life either to their own premises, that of the plastics supplier or an appropriate 3rd party that possesses suitable recycling facilities. Whichever entity permits the return of plastic components must demonstrate the in-house capability to recycle the plastic, or at least a signed agreement with a 3rd party that is capable of recycling the plastic, into new single polymer or mixed polymer products. Thermosets and composite plastics shall not be used in EU Ecolabel furniture under any circumstances if the material cannot be recycled in a similar manner to thermoplastics.

Assessment and verification: The labeling of plastic components as per criterion 5a) shall be sufficient to identify the polymer. The applicant shall provide the Competent Body with a dossier describing the contact details and address(es) of where the plastic components can be accepted for recycling in the same country as where the product was initially placed on the market and a declaration that they will accept such materials with no additional charge. These details shall also be provided in consumer information. Where any 3rd parties are involved in the recycling process and the chain of custody of plastic wastes, signed agreements between the collector of the plastic waste, and any 3rd parties up to the point at which the plastic can be recycled shall be provided.

4.5.4 Recycled content

Additional requirements where the final furniture product (not including packaging) consists of >10 % by weight plastic are:

i. Plastic materials (not including packaging) must consist of at least 30 % by weight recycled materials for indoor furniture.
ii. Plastic materials (not including packaging) must consist of at least 50 % by weight recycled materials for outdoor furniture.

Recycled plastic materials must be sourced either from pre-consumer off-cuts which would otherwise be disposed of as waste and that can be accompanied by a declaration from the producer stating that the off-cuts are free of the banned hazardous substances mentioned in criteria 2c), 2e) and 2f) or from post-consumer PE, PP or PET, accompanied by a declaration from the supplier with regards to their origin of collection.

Assessment and verification: The product description mentioned in criterion 1 should specify the overall plastic content (w/w) in the furniture product and whether or not it is intended for outdoor use. Where the plastic content of the furniture product is >10 %, a declaration from the manufacturer or plastic supplier stating the proportion of recycled content and stating that the source of the recycled plastic is either: post-consumer PE, PP or PET, or pre-consumer production off-cuts that do not contain any of the substances listed in criteria 2c), 2e) and 2f).

4.5.5 Rationale for plastics criteria

There is a need to distinguish between plastics used in furniture based on their application. The perfect example is PVC, which can be used in hard plastic components or in soft upholstery (as faux leather). Consequently this set of criteria is dedicated to hard plastic

components. Any other plastics used in any other furniture components shall be covered in the most relevant criteria area.

The labelling of plastics should be required in order to facilitate potential recycling at end of product life. In situations where recycling does not occur, labelling is still important if plastics end up being incinerated, the case in point being PVC which, unlike the majority of other plastics, can be a problematic source of potential dioxin formation due to its chloride content. The Nordic ecolabel effectively bans PVC although the latest revision of the French NF 217 criteria does not. The Ecolabel Regulation (66/2010) permits the exclusion of substances based on their hazardous properties but hard PVC in itself does not present any such properties during its useful life. Only during incineration may PVC contribute to dioxin formation in incinerators although many conflicting arguments have been reported in the literature on this subject.

Plastic recycling rates in the EU are relatively low. Success with plastic recycling is limited to post-consumer collection of pure plastic containers and highly specialised initiatives such as recycling of PVC and UPVC windows and frames. Recycling of plastic from furniture is complicated due to poor labelling and the difficulty of separating components at end of life. This is despite the fact that most hard plastics used in furniture are thermoplastics and can be melted and re-extruded or re-moulded. Unlike wood, which is generally downcycled, and metal, which is normally sent to large scale processors, there is potential to close the plastics loop in the furniture industry via take back schemes because plastic components can be manufactured using small scale extrusion equipment. Furthermore, the recyclability criterion is important to avoid the use of composite plastics (such as glass fibre reinforced plastic) in ecolabel furniture, which cannot be recycled.

The requirement for recycled plastic content when plastics constitute more than 10 % 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 choice of ≥30 % recycled content for indoor furniture reflects the generally higher aesthetic and technical expectations compared to outdoor furniture. Recycled content creates concerns with possible incompatibility between additives in recycled and virgin resins. The choice of 30 % was also influenced by examples of recycled plastic furniture already available on the market and some with environmental product declarations (EPD´s) that state the actual recycled content. A higher limit for outdoor furniture was specified due to a number of companies that are currently marketing outdoor plastic furniture (chairs, tables and benches) with almost a 100 % recycled plastic content.

Concerns with potentially hazardous impurities are covered 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 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. Limiting the sources of recycled plastics to relatively well defined inputs should minimise possible concerns with polymer incompatibility when processing mixed recycled plastics into new products. It is worth noting that a number of

compounds are available (compatibilizers) that can help improve the uniformity of products made from recycled plastic.

Outcomes from 1st AHGW

In reference to the new criterion on marking polymer parts, plastic industry stated that this marking did not facilitate the recycling at the end of life and that a voluntary norm shall not be part of Ecolabel. But although marking of plastics is not a legal requisite, Ecolabel should be expected to exceed some minimum legal and even voluntary requirements. Marking plastic parts ensures that the polymeric components can be efficiently identified improves consumer information and facilitates separation and processing for recycling at end-of-life.

Other stakeholders proposed another scheme for marking plastic parts such as the SPI resin identification coding system launched by the Society of the Plastics Industry (SPI). Nevertheless other EU Ecolabel product groups have this criterion and it is proposed to maintain it.

The proposal on recycled content was not generally accepted by industry stakeholders, especially the plastic industry and furniture associations. They claim difficulties due to technical aspects, difficulties on scrap availability and difficulties to obtain this information from component suppliers. Nevertheless, consumer associations and wooden furniture industry did ask for a criterion for plastics, in order to not favor plastics over other materials such as wood.

4.6 Criterion 6: Metals

4.6.1 Description of metal used

The type of metal used in any particular component shall be used (i.e. Aluminium, Steel, Copper etc.). Where relevant, the grade of the alloy and the main metals included in the alloy formulation shall be stated.

Assessment and verification: The applicant shall, as part of the product description mentioned in criterion 1, detail the types and weights of metals used in any components in the furniture product.

4.6.2 Hazardous substances

Metal materials used shall respect criteria 2 and criteria 4 regarding the use of hazardous substances and surface treatments respectively.

4.6.3 Recyclable metals

Although all metals are inherently recyclable, the furniture manufacturer shall describe how and where metal components can be returned at the end-of-life, either to their own premises, that of the metal supplier or an appropriate 3rd party that possesses suitable recycling facilities. Whichever entity permits the return of metal components must demonstrate the in-house capability to recycle the metal, or at least a signed agreement with a 3rd party that is capable of recycling the metal.

Assessment and verification: The applicant shall provide the Competent Body with a dossier describing the contact details and address(es) of where the metal components can be accepted for recycling in the same country as where the product was initially placed on the market and a declaration that they will accept such materials with no additional charge. These details shall also be provided in consumer information. Where any 3rd parties are involved in the recycling process and the chain of custody of metal wastes, signed agreements between the collector of the metal waste, and any 3rd parties up to the point at which the metal can be recycled shall be provided.

4.6.4 Recycled content

Where any individual type of metal comprises ≥30 % (w/w) of the furniture product (not including packaging), the following additional restrictions shall apply depending on what is the type of metal in question:

i) For Aluminium contents above the threshold, the average declared recycled content of Aluminium in the furniture must be ≥ 50% (w/w).

ii) For steel contents above the threshold, the average declared recycled content of steel in the furniture must be ≥ 30% (w/w). Note that different grades of steel are **not** considered as distinct metals for the purposes of this particular criterion.

iii) For any other metal above the threshold, the average declared recycled content in the furniture must be ≥20% (w/w).

Assessment and verification: The product description mentioned in criterion 1 should specify the overall metal content (w/w) in the furniture product. Where the total content of metal exceeds the 30 % threshold, the applicant must provide to the Competent Body a declaration of recycled content for all the different metals used that account for at least 3 % of the total furniture product weight. This shall include tracing the metal supply back to the smelter or foundry of origin via supply chain documentation. The declared recycled content shall be accepted as the average recycled content of the metal output during the most recent business or calendar year reporting period for which data is available, so long as it is within a maximum of 24 months of the date that the metal was produced.

4.6.5 Rationale for metals criteria

The most relevant types of metals for the production of furniture are Aluminium and steel. Although these industries are associated with much more significant environmental impacts (e.g. mining, land contamination, high energy consumption etc.) than wood, they do offer a number of technical properties in furniture items that wood cannot (e.g. high tensile strength, durability and fire resistance). Metal components are widely used in modern furniture items although it is necessary that they should have to meet some environmentally related criteria as is the case for plastics and wood.

The Nordic ecolabel for furniture and fitments requires that metal components be easily separated from the furniture, that surface treatments of metals meet certain requirements and that if the total metal content exceeds 50 % of the furniture weight, minimum recycled contents are specified. The recently revised (Jan 2014) French NF 217 avoids direct criteria for metals and is attempting to shift towards an overall requirement that favours lower embodied energy materials (and thus metal or plastic or wood recycled content).

The biggest argument in favour of metal over wood or plastic is that it can be recycled over and over again without any appreciable loss of its properties. Recycled metal has a substantially lower embodied energy than virgin metal, especially Aluminium. This has resulted in metal recycling being economically viable and already high recycling rates are achieved across Europe. Nonetheless, a requirement for the applicant to provide information about recycling systems and/or operators is justified in terms of better informing the customer and the Competent Body, in particular if an unusual metal such as Magnesium is used in ultra-lightweight furniture.

Although metal recycling rates are almost at their maximum, it is necessary to require recycled content criteria for metals in a similar manner as with plastics so the criteria cannot be perceived as overly burdening plastic materials. A higher threshold for “virgin metal” (30 %) than that for virgin plastic (10 %) is justified by the fact that “virgin steel” or aluminium already often has a certain minimum recycled content. Regardless, the recycled content limits set for Aluminium and steel are achievable considering EPD´s that were analysed for indoor furniture products where the average % of recycled steel/total steel was 32 % and the average % of recycled aluminium/total aluminium was 54 %.

The availability of recycled aluminium and steel in Europe is high. In 2007, the production of secondary steel represented the 56% of the total European steel production[42]. More than half of all Aluminium currently produced in the EU originates from recycled raw materials and that trend is increasing. The higher requirement for recycled Aluminium is justified based on its extremely high embodied energy (ca. 160 MJ/kg) compared to that of steel (ca. 30 MJ/kg). In any case, both of these recycled contents are considered to be achievable. The main obstacle for furniture manufacturers using high quantities of metals is to better understand their supply chains and traceability to the origin of materials they use, which is a common theme across these criteria for furniture materials.

Outcomes from 1st AHGW meeting

This initial proposal for a minimum recycled metal content was not generally accepted by stakeholders from metal industry. They stated that criteria on metals should be based on End of Life and not on recycled content. Their argument is that although the recycling rate for metals is 90-95 %, the recycled content is currently limited by scrap availability and is still today between 30-50 %. Outputs of the furniture industry generally echoed these sentiments and further stated that it is not practical to specify a particular batch of metal with a particular recycled metal content from suppliers.

[42] http://ec.europa.eu/enterprise/sectors/metals-minerals/steel/index_en.htm

4.7 Criterion 7: Leather

Definitions: "**Leather**" is a general term for hide or skin, with its original fibrous structure more or less intact, tanned to make it rot-proof/imputrescible, where hair or wool may or may not have been removed and which may be split into layers or segmented before or after tanning. If a surface coating is applied to leather, it shall be termed "**coated leather**" if the layer should exceed 0.15 mm. Any products that involve the mechanical disintegration or tanned hides/skins into fibrous particles, small pieces or powders shall not be termed leather.

This criterion refers only to leather from animal hides/skins. Faux leather is not included from the product scope.

4.7.1 animal origin

Raw hides and skins must come from animals that are raised primarily for meat and/or milk production. Wild, endangered or vulnerable species according to International Union for Conservation of Nature (IUCN) Red List of Threatened Species and hides from wild animal populations shall be explicitly excluded.

Assessment and verification: The applicant shall provide a declaration stating that no hides or skins of wild animal populations or endangered species according to the IUCN classification are used. Records that demonstrate traceability of the leather back to the tannery, hide distributors and abattoir of origin, shall be presented.

4.7.2 Final effluent discharged from tannery site

(i) The total quantity of Chromium (Cr) present in final effluent leaving the wastewater treatment system for the tannery site (or cluster of sites) must not exceed 1 mg/l.

Assessment and verification: The applicant shall provide a test report regarding the analysis of the final tannery effluent by either EN 1233 or EN ISO 11885 for total Cr and demonstrating monthly average values that comply with the limit over a 6 month period.

(ii) Where final effluent from the wastewater treatment system of a tannery site (or cluster of sites) is discharged directly to the environment, the monthly average value of Chemical Oxygen Demand (COD) of the effluent must not exceed 250 mg/l.

Assessment and verification: The applicant shall provide a test report regarding the analysis of the final tannery effluent by ISO 6060 or equivalent for COD, demonstrating that the monthly average value complies with the limit over the previous 6 month period.

(iii) Where final effluent from the wastewater treatment systems of a tannery site (or cluster of sites) is discharged to the municipal sewerage network, the requirement in part (ii) for COD shall not apply, so long as consent has been approved by the relevant authority and that the municipal wastewater treatment plant is compliant with 91/271/EEC.

Assessment and verification: The applicant shall provide documentation showing the consent for discharge of tannery effluent to the sewerage network and showing that the municipal waste water treatment plant that accepts the effluent is 91/271/EEC compliant.

4.7.3 Final product leather requirements

(i) The total Cr(VI) in final leather shall be below the limit of detection (3 ppm).

Assessment and verification: The applicant shall either declare that the leather was produced using a Chromium-free process or provide a test report demonstrating that no Cr(VI) was detected in the final leather product sample prepared according to EN ISO 4044 and tested according to the method described in EN ISO 17075 or equivalent.

(ii) Total extractable Cr in the final leather shall be < 200 ppm.

Assessment and verification: The applicant shall either declare that the leather was produced using a Chromium-free process or provide a test report demonstrating that extractable Cr was < 200 ppm according to ISO 17072-1 or equivalent.

(iii) The amount of free or partly hydrolysable formaldehyde in the final leather must not exceed 75 ppm.

Assessment and verification: The applicant shall provide a report following testing according to EN ISO 17226-1 or equivalent showing that the limit is complied with.

(iv) The final leather shall not contain residues above the limits (in brackets) of the following substances: chlorophenols (1mg/kg), bromophenols (1 mg/kg) and methylene bis(thiocyanate) (MBT) (5 mg/kg).

Assessment and verification: The applicant shall provide a test report with results following the methods described Appendix 1 of the RAL UZ 148 criteria document (Jan 2010 version) or equivalent methods that show compliance with the limits above.

(v) The tear strength of leather shall be at least 20 N.

Assessment and verification: The applicant shall provide a report following testing according to EN ISO 3377 or equivalent showing that the limit is complied with.

4.7.4 Hazardous substances

The conditions set out in criterion 2 for flame retardants, biocides and dyes permitted in the leather production process shall be respected. In addition, alkylphenolethoxylates (APEO), perfluorooctanoic acids (PFOA) or perfluorooctane sulphonates (PFOS) shall not be used.

Assessment and verification: The applicant shall provide a declaration stating that no flame retardants, APEO, PFOS or PFOA have been used in the leather and that no biocide has been added to the leather for a final disinfective effect. Any preservatives used during the storage and transport of raw hides or semi-finished leather products shall be declared and these shall belong to the approved substances as listed according to the Biocidal Products Regulation No. 528/2012. Any dyes used shall comply with criterion 2b).

4.7.5 Rationale for leather criteria

The calculated environmental impact of leather is reduced greatly if it is considered as a co-product of the meat, daily and wool industries. The leather industry is already dominated by hides from bovine and ovine species that are slaughtered for meat production. Restricting hides and skins to those of farmed animals would have little impact on normal practices but prevents undesirable scenarios of potentially unethical practices involving the hunting of wild or endangered animals being associated with Ecolabel furniture.

Final effluent criteria are set for total Cr regardless of whether the effluent goes to a Directive 91/271/EEC compliant wastewater plant or is directly discharged to the environment. The input of Cr from tanneries to domestic wastewater could have potentially negative impacts on municipal sewage sludge quality. Limits for total Cr in final tannery effluent encourage the tanning industry to either avoid using Cr salts, to use high exhaustion Cr tanning techniques or to recover and recycle Cr by precipitation techniques.

Final product testing follows the Nordic ecolabel criteria because it is essential that the furniture product is durable enough and that poor quality of leather should not represent a limiting factor in the furniture product lifetime. Testing is required for total Cr(VI) in final leather because it can provoke allergies, is toxic and it is envisaged that the Commission will amend the REACH Annex XVII (Reg. 1907/2006) to prohibit the sale of new leather articles containing >3 ppm Cr(VI). This limit would in principle be lower but actually represents the detection limit of the main cost effective method available (ISO 17075). Extractable Cr is based on the mobility of Cr in leather when in contact with an artificial perspiration solution (EN ISO 17072). It could represent a useful measure to producers as an indication of tanning accuracy where Cr salts are used. Further justification is the risk that leather could act as a potential source of mobile Cr to the wider environment where it could later oxidise to the toxic Cr(VI) form. A limit of 200 ppm would be in line with the Japanese Eco Mark standard. The same test could also be used to analyse for other heavy metals at the same time. Formaldehyde emissions to air from the final product are a concern since the compound is considered as a suspected carcinogenic and has been clearly linked to allergies in a number of studies. A value of 75 ppm would align with the criteria for EU Ecolabel footwear, the Nordic Swan and the Japanese Eco Mark criteria for leather likely to come into skin contact. The analysis for chlorophenols, bromophenols and MBT is an indirect way of ensuring that many of the banned biocides have not been used during storage and transportation of raw and semi-finished hides and is especially important when semi-finished hides are imported from different countries.

4.8 Criterion 8: Textiles (fabrics and fibres)

Definition: For the purposes of this criterion, textiles are considered as natural fibres (such as cotton, flax and wool), synthetic fibres (such as acrylic, elastane, polyamide, polyester and polypropylene) and man-made cellulose fibres (such as lyocell, modal and viscose). The fibres may be woven together to form fabrics used in the covering of upholstered furniture or simply be used as filling in furniture upholstery. All the following requirements shall be respected for the material cover where applicable.

These criteria shall apply to all textile fibres used as coverings but not in padding material unless explicitly stated otherwise. Any textile fibres/fabrics with the EU Flower Ecolabel shall be exempt from the following requirements.

4.8.1 Cotton

Any cotton used in textiles must meet requirements i) and iv) or requirements ii), iii) and iv):

i) At least 10 % of the cotton shall be certified as organic.

Assessment and verification: Organic content should be certified by an independent control body to have been produced in conformity with the production and inspection requirements laid down in Regulation (EC) No 834/2007 the US National Organic Programme or equivalent legal obligations set by trade partners of the EU. Verification shall be provided on an annual basis for each country of origin.

ii) At least 20 % of the cotton shall be grown according to Integrated Pest Management (IPM) principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme, or Integrated Crop Management (ICM) systems incorporating IPM principles, and shall comply with the pesticide restrictions in part iii) below.

Assessment and verification: The applicant shall provide evidence that the cotton has been grown by farmers that have participated in formal training programmes of the UN FAO or Government IPM and ICM programmes and/or that have been audited as part of third party certified IPM schemes. Verification shall either be provided on an annual basis for each country of origin or on the basis of certifications for all IPM cotton bales purchased to manufacture the product.

iii) Cotton used shall not be sourced from genetically modified plants

Assessment and verification: Non-genetically modified IPM cotton used in combination with organic cotton shall be verified in conformity with Regulation (EC) No. 1830/2003 concerning the traceability and labelling of genetically modified organisms. IPM schemes that exclude genetically modified cotton shall be accepted as proof of compliance for IPM content.

iv) Conventional and IPM cotton shall be grown without the use of the following pesticides:

Alachlor, aldicarb, aldrin, campheclor (toxaphene), captafol, chlordane, 2,4,5-T, chlordimeform, chlorobenzilate, cypermethrin, DDT, dieldrin, dinoseb and its salts, endosulfan, endrin, glyphosulfate, heptachlor, hexachlorobenzene,

hexachlorocyclohexane (total isomers), methamidophos, methyl-o-dematon, methylparathion, monocrotophos, neonicotinoids (clothianidine, imidacloprid, thiametoxam), parathion, phosphamidon, pentachlorophenol, thiofanex, triafanex, triazophos

Cotton shall not contain more than 0.5 ppm in total of the substances listed above.

Assessment and verification: Conventional of IPM cotton shall be tested for the listed substances. A test report shall be provided based on the following methods, where relevant:

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

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

US EPA 8141 B (organophosphorus compounds);

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

4.8.2 Elastane

Organotin compounds shall not be used to manufacture elastane fibres. For clarity, organo-tin compounds are defined as compounds where a carbon-Tin bond exists in the structure.

Assessment and verification: the applicant shall provide the Competent Body with a declaration of non-use from the fibre manufacturer(s).

4.8.3 Polyamide (Nylon).

Fibres shall be manufactured using a minimum content of 20 % nylon that has been recycled from pre and/or post-consumer waste.

Assessment and verification: recycled content shall be traceable back to the reprocessing of the feedstock. This shall be verified by independent certification of the chain of custody or by documentation provided by suppliers and processors.

4.8.4 Polyester

Polyester fibres shall comply with at least one of the following requirements:

i) The level of antimony present in the polyester fibres shall not exceed 260 ppm. Polyester fibres manufactured from recycled PET bottles are derogated from this requirement.

Assessment and verification: the applicant shall either provide a declaration of non-use or a test report using the following test methods: direct determination by Atomic Absorption Spectrometry or Inductively Coupled Plasma (ICP) Mass Spectrometry. The test shall be carried out on a composite sample of raw fibres prior to any wet processing. A declaration shall be provided for fibres manufactured from recycled PET bottles.

ii) Fibres shall be manufactured using a minimum content of 20 % PET that has been recycled from pre-consumer and/or post-consumer waste.

Assessment and verification: recycled content shall be traceable back to the reprocessing of the feedstock. This shall be verified by independent certification of the chain of custody or by documentation provided by suppliers and processors.

4.8.5 Hazardous substances

The textile product and production process shall comply with the restrictions laid out in criterion 2 and where relevant, any derogations specified in Annex I. In addition, alkylphenolethoxylates (APEO), perfluorooctanoic acids (PFOA) or perfluorooctane sulphonates (PFOS) shall not be used.

Assessment and verification: The applicant shall provide a written declaration stating compliance with criterion 2, mentioning any specific chemicals and relevant conditions where a derogation was used and stating that APEO, PFOA and PFOS compounds have not been used.

4.8.6 Final product testing

i) Extractable formaldehyde and heavy metals from the textile fabric by an artificial sweat solution shall not exceed the following limits:

Table 6. Limits for extractable substances in furniture textile fabrics

Compound – limit	
Formaldehyde (75 mg/kg)	Cobalt (1.0* or 4.0 mg/kg)
Antimony (30 mg/kg)	Copper (25* or 50 mg/kg)
Arsenic (0.2* or 1.0 mg/kg)	Lead (0.2* or 1.0 mg/kg)
Cadmium (0.1 mg/kg)	Nickel (1.0* or 4.0** mg/kg)
Chromium (1.0 or 2.0** mg/kg)	Mercury (0.02 mg/kg)

* applies to textiles used in furniture designed for small children (<36 months of age)

**the lowest value and the highest limit applies to normal textiles or cases where metal complex dyes have been used.

Assessment and verification: The applicant shall provide results from tests where 5 g of material is immersed in 100 g of an artificial sweat solution as defined in EN ISO 105-E04:2013 in a water bath at 40 °C for 1 hour. The solution is then filtered and analysed by ICP-OES or ICP-MS for the heavy metals listed above. In the case of formaldehyde, testing according to EN ISO 14184-1 shall only be required for textiles where an "easy care finish"

has been applied. Otherwise the formaldehyde test is not required and shall be replaced by a declaration of non-use of such substances.

4.8.7 Rationale for textile criteria

Textiles are used in upholstered furniture such as seats, backs of chairs, sofas and arm rests. A huge range of potential fibre sources exists, each with very different environmental impacts at various points in the cradle to gate section of the fibre life cycle. This is reflected to some degree in the complexity of existing EU Ecolabel criteria for textiles. Although full alignment is desirable, because textiles only contribute a very small part of the total furniture weight, it could be argued that requirements would be disproportionately excessive by fully aligning requirements for furniture textiles with those for EU Ecolabel textiles. The criteria are worded so that only dominant fibres in textiles (≥10 %) will have to comply and even then only if it is made of cotton, elastane, polyamide or polyester.

The requirements for cotton are the most demanding but this is reflected by the great degree of attention paid to organic and IPM cotton farming.

It is important to require some level of final product testing for furniture textile fabrics because these are likely to come into direct skin contact with consumers. Unlike with textile clothes, wash resistance durability testing is not necessary with furniture textiles simply because furniture textile fabrics are rarely if ever washed.

It is important to ensure compliance with hazardous substances, particularly with dyes, since similar criteria can be applied to dyes in leather. Many derogations listed in Annex I are specifically listed for textiles.

Outcomes from 1st AHGW meeting

It was generally agreed that a harmonization between EU for textiles is desirable. However, care has to be taken that the criteria for hazardous substances are aligned as well together with the fitness for use.

4.9 Criterion 9: Padding Materials (upholstery)

The criteria below for padding/upholstery foams are aligned with those developed for EU Ecolabel bed mattresses (Decision 2013/xxx/EC). Any padding foam already certified for use in EU Ecolabel bed mattresses shall be exempt from the following criteria. Where textile fibres are used in padding materials, they shall comply with the criteria for textiles mentioned in criterion 8.

4.9.1 Latex foam requirements

(i) Where latex foam consists of at least 5 % of padding material, the limits for chlorophenols (Method A), heavy metals (Method B), pesticides (Method C) and butadiene (Method D) as listed in Table 7 shall be respected.

Table 7. Restricted substance criteria for latex foams.

GROUP OF SUBSTANCES	SUBSTANCE	LIMIT VALUE (ppm)
Chlorophenols	mono- and di-chlorinated phenols (salts and esters)	1
	Other chlorophenols	0.1
Heavy metal	As (Arsenic)	0.5
	Cd (Cadmium)	0.1
	Co (Cobalt)	0.5
	Cr (Chromium), total	1
	Cu (Copper)	2
	Hg (Mercury)	0.02
	Ni (Nickel)	1
	Pb (Lead)	0.5
	Sb (Antimony)	0.5
Pesticides* (only applies when natural latex constitutes at least 20% of the foam).	Aldrin	0.04
	o,p-DDE	0.04
	p,p-DDE	0.04
	o,p-DDD	0.04
	p,p-DDD	0.04
	o,p-DDT	0.04
	p,p-DDT	0.04
	Diazinone	0.04
	Dichlorfenthion	0.04
	Dichlorvos	0.04
	Dieldrin	0.04
	Endrin	0.04
	Heptachlor	0.04
	Heptachlorepoxide	0.04
	Hexachlorbenzene	0.04
	Hexachlorcyclohexane	0.04
	Lindane	0.04
	Malathion	0.04
	Methoxichlor	0.04
	Mirex	0.04
	Parathion-ethyl	0.04
	Parathion-methyl	0.04
Others	Butadiene	1

Assessment and verification: Test reports by the latex foam supplier shall demonstrate that the material complies with the above limits using the methods A-D described below. These methods may be used for random quality control testing in final furniture products.

For **chlorophenols**, **Method A**: 5 g of sample shall be milled and chlorophenols extracted in phenol form (PCP), sodium salt form (SPP) or as esters. The extracts shall be analysed by means of Gas Chromatography using a mass spectrometer or electron capture detector.

For **heavy metals**, **Method B**: A known weight of 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 an inductively coupled plasma instrument coupled with (optical/atomic emission spectrometry or mass spectrometry detectors) or by atomic absorption spectrometry using a hydride/cold vapour process.

For **pesticides**, **Method C**: This method is only required where the latex foam is composed of at least 20 % natural latex by weight. A 2 g sample is extracted in an ultrasonic bath with a hexane/ dichloromethane mixture (85/15). The extract is cleaned up by agitation in acetonitrile or by adsorption chromatography over florisil. Measurement is determined by gas chromatography with a mass spectrometry or electron capture detector.

For **Butadiene**, **Method D**: Milled latex foam material is placed in a headspace analyser and the headspace gas analysed by gas chromatography with a flame ionisation detector.

(ii) Emission of specified volatile organic compounds (SVOV, VOC, VVOC). Where latex foam is used as padding material, the limits for the compounds listed in Table 8 shall be respected.

Table 8. List of VOC emission limits for latex foams.

SUBSTANCE	LIMIT VALUE (mg/m³)
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)	0.30
VOCs (total)	0.5
* Alternatively, the concentration of formaldehyde shall not exceed 20 ppm as measured with EN ISO 14184-1.	
** 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: Test reports by the latex foam supplier shall demonstrate that the material complies with the limits in Table 8 using a test chamber method in accordance with ISO 16000-9 and analytical techniques as described below.

A sample of latex foam shall be wrapped for a period of at least 24 hours prior to being unwrapped and immediately transferred to a test chamber where it is placed on a sample holder that facilitates air access from all sides. The climatic factors of the chamber shall be adjusted as per 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. Air sampling shall be carried out 24 +/-1 hour after loading the sample in the chamber. Air samples will be passed across DNPH cartridges for 1 hour for subsequent analysis of formaldehyde and other aldehydes and for 1 hour on Tenax TA cartridges for the analysis of other volatile organic compounds. Sampling durations may be longer for other compounds but shall in all cases be completed before 30 hours have elapsed in the test.

Analysis of **formaldehyde** and **other aldehydes** shall comply with ISO 16000-3. Unless otherwise specified, analysis of **other volatile organic compounds** shall comply with ISO 16000-6. Tests that follow CEN/TS 16516 methods shall be considered as equivalent to those of the ISO 16000 series.

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

(iii) **Dyes**. Dyes shall not be used in the latex foam except where required to distinguish different qualities of foam in the same type of padding material. When dyes are used, they shall comply with the requirements of Criterion 2b) and not include any of the dyes listed in Annex II.

Assessment and verification: The applicant shall provide a declaration of non-use of dyes from the foam manufacturer or, in case of use, a declaration of compliance with this criterion together with supporting documentation.

4.9.2 polyurethane (PUR) foam

(i) Where polyurethane (PUR) foam is used as padding material, the limits for biocides, phthalates and other specified substances, heavy metals, plasticisers, TDA and MDA and Organotin substances as listed below shall be respected.

Table 9. List of restricted substances in PU foam in Ecolabel furniture.

	SUBSTANCE (ACRONYM, CAS No., ELEMENT NAME)	LIMIT VALUE
Biocides	Criterion 2 (a), (b) and 2 (c) (ii) on hazardous substances shall be respected.	Not added intentionally
Heavy Metals	As (Arsenic)	0.2 ppm
	Cd (Cadmium)	0.1 ppm
	Co (Cobalt)	0.5 ppm

	Cr (Chromium), total	1 ppm
	Cr VI (Chromium VI)	0.01 ppm
	Cu (Copper)	2 ppm
	Hg (Mercury)	0.02 ppm
	Ni (Nickel)	1 ppm
	Pb (Lead)	0.2 ppm
	Sb (Antimony)	0.5 ppm
	Se (Selenium)	0.5 ppm
Plasticizers	Di-iso-nonylphthalate (DINP, 28553-12-0)	-
	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 (DIBP, 84-74-2)	-
	Sum	0.01 % w/w
Phthalate plasticizers	Not added intentionally	
TDA and MDA	2,4 Toluenediamine (2,4 TDA, 95-80-7)	5.0 ppm
	4,4‟ Diaminodiphenylmethane (4,4‟ MDA, 101-77-9)	5.0 ppm
Tinorganic substances	Tributyltin (TBT)	50 ppb
	Dibutyltin (DBT)	100 ppb
	Monobutyltin (MBT)	100 ppb
	Tetrabutyltin (TeBT)	-
	Monooctyltin (MOT)	-
	Dioctyltin (DOT)	-
	Tricyclohexyltin (TcyT)	-
	Triphenyltin (TPhT)	-
	Sum	500 ppb
Others	Chlorinated or brominated dioxines or furans	Not added intentionally
	Chlorinated hydrocarbons (1,1,2,2-Tetrachloroethane, Pentachloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethylene)	Not added intentionally
	Chlorinated phenols (PCP, TeCP, 87-86-5)	Not added intentionally
	Hexachlorocyclohexane (58-89-9)	Not added intentionally
	Monomethyldibromo–Diphenylmethane (99688-47-8)	Not added intentionally
	Monomethyldichloro-Diphenylmethane (81161-70-8)	Not added intentionally
	Nitrites	Not added intentionally
	Polybrominated Biphenyls (PBB, 59536-65-1)	Not added intentionally
	Pentabromodiphenyl Ether (PeBDE, 32534-81-9)	Not added intentionally
	Octabromodiphenyl Ether (OBDE, 32536-52-0)	Not added intentionally
	Polychlorinated Biphenyls (PCB, 1336-36-3)	Not added intentionally
	Polychlorinated Terphenyls (PCT, 61788-33-8)	Not added intentionally
	Tri-(2,3-dibromo-propyl)-phosphate (TRIS, 126-72-7)	Not added intentionally
	Trimethylphosphate (512-56-1)	Not added intentionally
	Tris-(aziridinyl)-phosphinoxide (TEPA, 5455-55-1)	Not added intentionally
	Tris(2-chloroethyl)-phosphate (TCEP, 115-96-8)	Not added intentionally
	Dimethyl methylphosphonate (DMMP, 756-79-6)	Not added intentionally

Assessment and verification: The applicant shall provide test reports demonstrating that the foam material complies with the limits stated above using the appropriate method described below (A-E). These methods are also appropriate for random quality control testing in final furniture products.

For **biocides**, **phthalates** and **other specified substances** above, the applicant shall provide a declaration from the foam manufacturer confirming that the listed substances have not been intentionally added to the PUR foam material.

For the **heavy metals** listed above, the method consists of eluting a sample of milled PUR foam in accordance with the DIN 38414-S4 procedure or equivalent where the solid:liquid ratio is 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 an inductively coupled plasma instrument coupled with (optical emission/atomic emission spectrometry or mass spectrometry detectors) or by atomic absorption spectrometry using a hydride or cold vapour process.

For the total amount of **plasticisers**, a composite sample of 6 pieces to be taken from beneath each sample face (up to a maximum of 2 cm from each face surface) is analysed. Extraction shall be performed with dichloromethane using a validated method and followed by analysis with gas chromatography with a mass spectrometry detector or by high performance liquid chromatography with an ultraviolet detector.

For **TDA** (2,4-Toluenediamine) and **MDA** (4,4-Diaminodiphenylmethane) a composite sample of 6 pieces to be taken from beneath each sample face (up to a maximum of 2cm from each face surface) is analysed. Extraction is carried out with 1 % aqueous acetic acid solution at sample weight to liquid volume ratio of 1:5 and repeated three further times. The four extracts are then combined and diluted to a known volume, filtered and analysed by high performance liquid chromatography with an ultraviolet detector or mass spectrometry detector.

For **Organotin substances**, a composite sample of 6 pieces to be taken from beneath each sample face (up to a maximum of 2 cm from each face surface) is analysed. Extraction shall be performed for 1 hour in an ultrasonic bath at room temperature. The extracting agent shall be a mixture composed as 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 2000ml. After extraction, the alkyl-tin species shall be derivatized by adding sodium tetraethylborate solution in tetrahydrofuran. 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.

(ii) Emission of specified volatile organic compounds (SVOV, VOC, VVOC). Where latex foam is used as padding material, the limits for the compounds listed below shall be respected.

Table 10. Limits for VOC emissions from PU foam samples

SUBSTANCE (CAS NUMBER)	LIMIT VALUE (µg/m³)
Formaldehyde (50-00-0)	5
Toluene (108-88-3)	100
Styrene (100-42-5)	50
Each detectable compound classified as categories C1A or C1B according to the Regulation (EC) No 1272/2008	5
Sum of all detectable compound classified as categories C1A or C1B according to the Regulation (EC) No 1272/2008	40
Aromatic hydrocarbons	500
VOCs (total)	500

Assessment and verification: Test reports by the polyurethane foam supplier shall demonstrate that the material complies with the limits above using the following procedure or equivalent:

The foam sample is placed on the bottom of an emission test chamber and is 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 rate (L) of 0.4 m^2/m^3 (i.e. the total exposed sample surface area divided by the chamber volume in accordance with ISO 16000-9 and 16000-11. Sampling shall be done 72 +/- 2 hours after loading of the chamber and samples collected during a period of 1 hour on Tenax TA and DNPH cartridges for VOC and formaldehyde analysis respectively.

Determination of **formaldehyde** concentrations shall be determined as per ISO 16000-3. The determination of **VOC** emissions trapped in the Tenax TA cartridge shall in accordance with ISO 16000-6. Results are semi-quantitatively expressed as **toluene equivalents**. All results above the limit of 0.001 mg/m^3 shall be reported.

Total VOC content shall be the sum of all individual VOC values with results greater than 0.001 mg/m^3 that elute within the retention time window from n-hexane (C6) to n-hexadecane (C16) inclusive.

The sum of all detectable compounds classified as **catergories C1A or C1B** according to EC Regulation No. 1272/2008 shall be the sum of all such substances with a concentration >0.001 mg/m^3. In case the test results exceed the standard limits, substance specific quantification needs to be reported. CEN/TS tests shall be considered as equivalent to the ISO 16000 series.

(iii) **Dyes**. Dyes shall not be used in the polyurethane foam except where required to distinguish different qualities of foam in the same type of padding material. When dyes are used, they shall comply with the requirements of Criterion 2b) and not include any of the dyes listed in Table 13 and Table 15 in Annex II.

Assessment and verification: The applicant shall provide a declaration of non-use of dyes from the foam manufacturer or, in case of use, a declaration of compliance with this criterion together with supporting documentation.

(iv) Total chlorine content of isocyanates

Should mixed isomers of **toluene diisocyanate** be used in the production of the PUR foam, the total chlorine content of these isocyanates shall not exceed 0.07 % by weight.

Assessment and verification: The applicant shall provide either a declaration of non-use from the foam manufacturer or the results of test methods carried out in accordance with ASTM D4661-93 or equivalent.

(v) Blowing agents

Halogenated organic compounds shall not be used as blowing agents or as auxillary blowing agents.

Assessment and verification: The applicant shall provide a declaration of non-use from the foam manufacturer.

4.9.3 Rationale for padding material criteria

It was generally agreed that a harmonization between EU Ecolabel for bed mattresses (latex and PU foams) is desirable. However, care has to be taken that the criteria for hazardous substances are aligned as well together with the fitness for use. The flame retardant TCEP (CAS No. 115 96 8) for example is currently excluded in the furniture proposals, while allowed in bed mattresses if not intentionally added. A remark was made on what to do with natural padding materials. The question was raised if also here a certain limit % of weight should be introduced. The intentional addition of TCEP is proposed to remain excluded in EU Ecolabel furniture due to being a suspected carcinogen (H351).

Around 90% of all padding materials used in furniture consist of PU or latex foam and so the criteria are focused on these substances. The impacts of padding materials are mainly due to the presence of hazardous substances that may be present in or emitted from the foam products.

The criteria align with those for EU Ecolabel bed mattresses[43], which in turn, for PU foam at least, reflect very closely the industry standards under the CERTIPUR initiative. Consequently the limits and criteria are highly relevant to industry and laboratories are already geared up to these tests. Although banned from use as a biocide, an exemption for the use of Organotin substances is granted with PU foams when used as a catalyst and so long as the residual contents are less than the limits in Table 9. The use of isocyanate adhesives (R40) is also exempted due to their particularly high performance with PU foam. Unlike with criteria for plastic, metals and glass, no recyclability or recycled content criteria have been introduced

[43] Commission decision of 3 September 2002 establishing revised ecological criteria for the award of the Community eco-label to bed mattresses, available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:236:0010:0015:EN:PDF

because to date no widespread recycling systems are available. There are limited cases of PU foam being used in carpets or as underlay but a significant barrier to recycling is the long lifetime of the product (>10 years) and the possible presence of contaminants, both in foam production residues and from possible dust mites, mould and microbes that may gather during the product life or after disposal. The best environmental option is considered to be shredding and either recovering the metal before or after incineration in energy recovery plants.

It is proposed to ban biocides although flame retardants are permitted following the derogation conditions in Table 12 in Annex I.

4.10 Criterion 10: Glass

4.10.1 Recyclability of glass

Although all glass is inherently recyclable, different formulations are not compatible and may melt at different temperatures, ruining entire batches. For this reason, the definition of glass recycling shall extend to the reuse of crushed/milled glass as aggregate in cement based materials, even though this is technically downcycling rather than recycling. The furniture manufacturer shall describe how and where glass components can be returned at the end-of-life, either to their own premises, that of the glass supplier or an appropriate 3rd party that possesses suitable recycling facilities. Whichever entity permits the return of glass components must then demonstrate the in-house capability to recycle the glass, or at least a signed agreement with a 3rd party that is capable of recycling the metal.

Assessment and verification: The applicant shall provide the Competent Body with a dossier describing the contact details and address(es) of where the glass components can be accepted for recycling in the same country as where the product was initially placed on the market and a declaration that they will accept such materials with no additional charge. These details shall also be provided in consumer information. Where any 3rd parties are involved in the recycling process and the chain of custody of glass wastes, signed agreements between the collector of the glass waste, and any 3rd parties up to the point at which the glass can be recycled shall be provided.

4.10.2 Hazardous substances.

All glass shall respect criterion 2a) regarding hazardous substances. Lead glazing and crystal glass are specifically excluded and mirror glass is only permitted up to 10 % of the total furniture product weight.

Assessment and verification: The applicant shall provide a declaration from the supplier stating that no hazardous substances have been intentionally used in the manufacture of the glass. In the case of mirror glass, any metals and coating compounds used in the back coating shall be stated.

4.10.3 Recycled content

In furniture items where glass accounts for more than 10 % of the total product weight, the average recycled content of glass cullet shall be at least 20 %. Recycled cullet is defined as pre-consumer glass that could not be reused within the same process that generated it or post-consumer glass, both of which would otherwise have been discarded as waste.

Assessment and verification: The applicant shall provide a declaration from the supplier stating the recycled cullet content of any glass used in furniture where glass constitutes more than 10 % if the product weight. The average recycled glass content shall be at least 20 %.

Outcomes from 1st AHWG meeting and post-meeting comments

The initial proposal was to exclude some types of glass based on the recyclability potential and the use of metals. Regarding the banning of certain types of aesthetic glass, no objections were found to exclude lead glazing, crystal glass or mirror glass in products where glass is used more than 10 % by weight. For these reasons, this criterion is maintained.

The proposal to ban some reinforced glass that could be difficult to recycle was not supported, since these reinforced glass are used in furniture for safety requirements. For this reason, the explicit banning of wire-reinforced and laminated glass has been removed.

A proposal for setting a criterion asking a certain % of recycled glass was formulated, it was welcome during the meeting but no input has been given. Nevertheless some stakeholders pointed out that the recycling content of flat glass used in furniture would need to be adapted to the practice in the supplying industry which may lead to different recycling rates in safety glass, laminated glass or wire-reinforced glass.

Glass industry states that recycling of glass and the use of the cullet in flat glass is an effective measure to minimize the impact of the flat glass industry. In general terms, each 10 % increase in cullet usage results in an energy saving of 2 – 3 % in the melting process and each tonne of cullet used saves 230 kg of CO_2 emitted.[44] The cullet share introduced in the furnace is typically around 20-25 % of the total inlet mixture. However, this share can range from 10 % to 40 % for a float furnace (pre and post-consumer cullet).

4.10.4 Rationale for glass criteria

Glass is often present in furniture such as storage units, cabinets and tables. No discrimination is explicitly stated against different types of glass because glass in furniture must comply with the General Product Safety Directive (2001/95/EC). Some standards for glass provide methods for evaluating performance relating to stability, structural strength and durability. In that sense, 'ordinary', or 'annealed' glass, will break into dagger-like shards, and so is often not suitable for use in furniture. Glass used in furniture is normally treated to be more resistant to breakage and to break in a more predictable way when it does break, such as Toughened glass (treated with a thermal tempering process), laminated glass (made of layers of glass and polymeric material) or wire-reinforced glass.

Being consistent with requirements for plastic and metal, recyclability criteria are set for processed glass like laminated glass (with a polymer layer) or mirrored glass (with a metal layer). 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 the entire batch. 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 any 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.

[44] Recyclable waste flat glass in the context of the development of end-of-waste criteria Glass for Europe input to the study on recyclable waste glass. June 2010 (http://www.glassforeurope.com/images/cont/167_86498_file.pdf)

With mirror glass, the use of a metal coated backing layer is required to provide its inherent reflective properties and this must be separated prior to recycling/downcycling the glass. This can be achieved by crushing and separation of components by sedimentation or floatation.

A requirement for recycled content is also required, again following the same rationale applied to plastics and metals (i.e. leading to savings in raw material and energy consumption). Once properly treated and with appropriate quality control in place, post-consumer cullet can also be used in flat glass (furniture glass) manufacturing although its current use is low as it depends on a few variables such as, the system in place for waste collection, segregation and processing and most importantly its quality levels. Within the European Union, there is a significant heterogeneity in the level of development of glass waste infrastructure and management. Due to the variations of potential cullet content depending on the type of glass and the waste management system in different countries, it is proposed to set a criterion asking for a 20 % of recycled content.

4.11 Criterion 11: Final product

4.11.1 Product performance (Durability, safety, strength etc.)

All furniture products shall meet any relevant EN standards establishing requirements for durability, strength, safety, stability, ergonomics, fitness for use and dimensions of furniture and components when relevant. In cases where no applicable EN standards exist, the Competent Body involved shall seek the advice of CEN/TC 207 to determine whether any specific evaluation procedure exists and whether such a procedure should be incorporated into national norms.

Assessment and Verification: Applicants shall provide appropriate test reports by accredited laboratories with ISO 17025 to demonstrate compliance with the corresponding standards".

4.11.2 Design for Reparability/Refurbishment/Re-use

For furniture consisting of multiple components and fittings, the manufacturer shall guarantee the possibility of acquiring spare parts upon request throughout the actual period that the product is manufactured and for an extended period of 5 years after production of the relevant product is stopped.

Reversible assembly methods shall be used in order to allow disassembly and re-use /remanufacturing. The same information shall be included with the product and also be made available online. Assembly and disassembly shall be possible with basic DIY tools and not require special training.

Assessment and Verification: The applicant and/or his supplier shall provide a paper copy with product assembly-disassembly instructions and contact details of how to acquire spare parts. The same information shall be included with the product and also made available online. Assembly and disassembly shall be possible with basic DIY tools and not require special training. The only exemptions permitted to reversible assembly techniques shall be gluing of wood-based panels or upholstery or other situations where normal fixtures and fittings are not technically feasible. Nonetheless, at End-of-Life, these components should be inherently separable from the rest of the furniture during disassembly (i.e. when no reassembly is foreseen).

4.11.3 End of Life guidance

Following on from the disassembly instructions described above, the product must also provide information regarding the best practical end-of-life disposal option for each of the furniture components. For certain materials such as PU foam upholstery, this may simply be energy recovery. For other materials, recycling will be more advantageous.

Assessment and verification: For glass, plastic and metals, the applicant can provide the same information as required in criteria 10a), 5c) and 6c) respectively. For textiles, upholstery, solid wood, wood-based panels and leather the applicant shall need to provide rationale for the best practicable environmental disposal option at end-of-life. This should follow the same waste hierarchy principles as described in Article 4 of Regulation No.

2008/98/EC, and take into account the technical options available in the country where the product is to be marketed and sold.

4.11.4 VOC emissions

For any furniture products containing components where volatile organic compound containing paints, varnishes or finishing agents have been used and/or where VOC's applied to certain surfaces exceed 30 g/m2, the VOC emissions from those components or the entire furniture product shall be assessed according to a chamber test and comply with the following limits:

Table 11. Limits for final product VOC testing

Product	Emissions limits (µg/m³)	
	3 days	28 days
TVOC's	10,000	1,500
SVOC's	-	100
Formaldehyde	-	60
Carcinogens (CMR) -trichloroethylene, -benzene -DEHP -DBP	10 - sum total of the four substances	1 – per individual substance

Assessment and verification: The applicant shall provide a declaration of the chamber test results according to CEN/TS 16516 or EN ISO 16000-9 or equivalent procedures provided from an accredited laboratory.

4.11.5 Low energy light bulbs

Any light bulbs that are fitted to EU Ecolabel furniture must be classified as energy class A, in accordance with Regulation No. 874/2012, supplementing Directive 2010/30/EU. A derogation for Mercury in compact fluorescent light bulbs shall apply so long as the bulbs are energy class A (see Table 12 Annex I).

Assessment and verification

Where the furniture product is supplied with light bulbs, the applicant shall provide product information from the light bulb manufacturer/supplier that states compliance with energy class A as per Regulation No. 874/2012. The applicant must also provide information to both the Competent Body and consumer regarding the correct disposal of light bulbs.

Outcomes from 1st AHWG regarding final product criteria

Some stakeholders argued that ergonomics are not related to environmental aspects and thus is should not be included in EU Ecolabel Scheme but instead the wider concept of "product performance" should be covered. Regarding the new criterion on assembly/disassembly, that aims to promote design for remanufacturing and re-use, some stakeholders stated that for some furniture products, it is not possible to use reversible assembly methods and adhesives are needed (e.g. chairs).

Most stakeholders agreed that EN standards for furniture technical requirements should be followed where available. Consequently, a list of relevant EN standards from CEN/TC207 is provided in Annex V for reference, as was proposed during the meeting.

Regarding the criterion that says that all components shall be separable, some stakeholders pointed that it is too general and that this fact could be difficult to demonstrate.

4.11.6 Rationale for Final Product criteria

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.".

Furniture is a product with a potentially long life span, which will be strongly related to durability and technical quality. LCA studies show that reusing/refurbishing/remanufacturing furniture products like chairs and desks leads to both energy and economic savings. Hence the importance of design for durability, maintenance, reparability and remanufacturing shall be guaranteed for ecolabelled products. Ergonomic and fitness for use is an important parameter, especially for office furniture where worker comfort is a priority.

Feedback to the stakeholder questionnaire revealed that 42% supported criteria based on "Design for disassembly" principles. Ease of disassembly facilitates the replacement of broken components with spare parts and aids remanufacturing or reuse.

A standard piece of furniture has a lifespan of 30 years, which means that most often when furniture comes to the end of its life (average lifespan is 15 years) it still has residual life.[45] This indicates that extending the life of furniture is the best choice to save impacts derived from the manufacturing of new items. The key factors to success repair or extension of furniture life are: information to the consumer, the ease of the repair process and the availability of spare parts. Each of these criteria are covered in the Final Product criteria for this reason.

Waste & Resources Action Programme (WRAP)[46] studied the environmental, economic and social benefits of reusing office furniture (desks and office chairs) and domestic furniture (sofas and dining tables). Several key environmental benefits associated with reuse were identified, besides economic and social benefits. Important benefits on three environmental indicators: (i) greenhouse gas emissions, (ii) energy demand and (iii) resource depletion reduction are achieved thank to the displacement of new purchases (e.g. saving of 55 kg CO_2-eq per sofa and 10 kg CO_2-eq per dining-table).

According to statistics released by the European Federation of Furniture Manufacturers (UEA), furniture waste in the EU accounts annually for more than 4 % of the total municipal solid waste (MSW). 80-90 % of is incinerated or dumped in landfills, whereas the remaining part is

[45] Sahni, S. , Boustani, A.,Gutowski, T.,, Graves, S. Furniture Remanufacturing and Energy Savings. 2010

[46] WRAP. Benefits of Reuse Case Study: Domestic Furniture. 2011; WRAP. Benefits of Reuse Case Study: Office Furniture. 2011

recycled[47]. LCA studies analysed in the background report showed that on average, the end-of-life stage can account to 15 % on average of contribution to the different key environmental impact indicators. Design for disassembly, coupled with well-informed consumers will help maximize the recycling rates of furniture waste. For non-recyclable components (such as wooden boards) energy recovery has a lower impact than disposal in landfill. Recyclability of furniture will depend on the recyclability of its components and materials and the possibility of separating the different components. At the end-of-life, reuse and remanufacturing should be promoted as preferable options.

Concerns are growing in 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), a horizontal approach to indoor VOC emissions has been developed, resulting in the publication of CEN/TS 16516. This method brings together the various EN ISO 16000 standards. Furthermore, the French government has adopted a labelling scheme for VOC emission from construction products, with the following classes: A+, A, B and C. The values chosen above would correspond with the A class equivalent limits.

Regarding emissions of the CMR substance trichloroethylene (CAS No. 79-01-6), the French government has effectively banned the sale of any construction products (for structural or decorative purposes) that show emissions of trichloroethylene above 1 µg/m^3 under defined test conditions based on ISO 16000-9.

[47] Consultancy and Research for Environmental Management (CREM). Eco-label Furniture. Extension of the Scope. Final report. August 2004. Report number 04.728

4.12 Criterion 12: Packaging

4.12.1 Cardboard / paper

Where cardboard or paper is used for the final packaging, they shall be made of at least 80 % recycled material and shall not have been bleached with Chlorine gas.

4.12.2 Plastic and plastic bags

Where plastic bags are used for the final packaging, they shall be made of at least 75 % of recycled material or they shall be biodegradable or compostable, in agreement with the definitions provided by the EN 13432 or equivalent. All plastics will be easily separable from other materials for recycling purposes.

4.12.3 Other materials

Any other packaging materials must either be:

- recyclable material according to current EU post-consumer schemes
- made of materials sourced from renewable resources
- made of materials with at least 50 % recycled content

Assessment and verification:

The applicant shall declare compliance with these requirements and copies of material specifications from packaging material suppliers, shall also be provided to the awarding competent body. Only primary packaging, as defined in European Parliament and Council Directive 94/62/EC is subject to the criterion.

4.12.4 Rationale for packaging criteria

In some cases, especially with small furniture, the weight of the packaging can represent an important percentage of the total weight of the packed furniture (7-13 % on average according to some EPD´s). Regarding materials, the main component of packaging is usually corrugated cardboard, but packaging can also contain plastic, paper, or metal pieces. The use of single-use packaging in the furniture industry is common practice. The main environmental problems related to packaging come from the consumption of raw materials and packaging waste, hence the benefit of using the recyclable, reusable and/or recycled materials.

The restriction on bleaching with Chlorine gas, a H400 (very toxic to aquatic life), H315 (causes skin irritation), H319 (causes serious eye irritation), H331 (toxic if inhaled) and H335 (may cause respiratory irritation) substance. The Chlorine bleaching process is known to generate dioxins (PCDDs) and furans (PCDFs), recognized as Persistent Organic Pollutants. This aligns with EU Ecolabel criteria for tissue paper[48] and for copying and graphic paper[49].

[48] Commission Decision 2009/568/EC of 9 July 2009 establishing the ecological criteria for the award of the Community Eco-label for tissue paper, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:197:0087:0095:EN:PDF.

[49] Commission Decision 2011/332/EU of 7 June 2011 EU Ecolabel criteria for copying and graphic paper, available online at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:149:0012:0024:EN:PDF.

4.13 Criterion 13: Information for consumers

The following information shall be made available to customers in documentation that comes with the product.

4.13.1 Documentation supplied with the product

- Product description as per criterion 1.
- Assembly and disassembly instructions
- A list of spare parts with any relevant codes
- Contact details, including at least one email address for technical support and stating where electronic copies of the same product consumer information can be found online.
- Compliance of the final furniture product with any relevant technical standard(s).
- Whether the product is suitable for only indoor or also outdoor use.
- Guidance for cleaning and care of the final product.
- A statement that the use of hazardous substances is restricted in the product
- A declaration of non-use of biocides or, where relevant, which components have been treated (only textiles or upholstery may be treated).
- A declaration of non-use of flame retardants or, where relevant, which components have been treated.
- The species and origin of any solid wood used.
- The % sustainable certified and % recycled wood contents.
- The type of metal used and where appropriate, it's recycled metal content.
- The type of plastic(s) used and where appropriate, their recycled content.
- The species from which the raw hide for any leather used was sourced.
- The type of textile(s) used and where appropriate, their recycled or organic content.
- The type of upholstery material used.
- The type of glass used and where appropriate, the recycled content.
- Certified organic cotton content of textiles (where appropriate)
- Recycled polyester content of textiles or upholstery (where appropriate)
- End of Life instructions for the best practical environmental disposal route for each furniture component that can be disassembled.
- A statement that that the product can be considered as low VOC emission furniture.

4.13.2 Information on the packaging

The following text shall appear on the packaging:

"For more information as to why this product has been awarded the Flower, please visit the website: http://www.ecolabel.eu "

The following text (or equivalent text) shall also appear on the packaging and in the user manual:

"For more information visit the European Eco-label website. Additional information can be obtained at: name/address of the consumer department of the applicant".

4.13.3 Information appearing on the eco-label

- Wood from sustainably managed forests.
- Restricted hazardous substances.
- Promoting renewable, recycled and recyclable materials.
- Design for disassembly and refurbishment/remanufacturing
- Low VOC emission furniture.

Outcomes from 1st AHGW

In general stakeholders agreed with the criterion proposal. Some stakeholders asked to include more relevant technical information such as: load capacity, resistance to abrasion, resistance to fading, resistance to chemicals and heat resistance as well as suitable fastening devices where furniture products are to be attached to wall, floors or ceilings. Other stakeho*l*ders pointed that only environmental information should be provided under Ecolabel requirements, since technical information should already be given to consumers.

4.13.4 Rationale for consumer information

Furniture products can be complex items consisting of many different materials. However, the consumer should be informed about each material present at some basic level and in particular be armed with appropriate information that will aid in understanding the potential to repair and refurbish the product and, finally at the End-of-Life, how to best dispose of the individual components from an environmental point of view. An instruction for the replacement of *all replaceable parts* and not only glass is a consequence of the possible scope widening. Also the instructions needed for disassembly can be related to that.

Minimum technical information should also be included as per legal requirements in the country where the product is placed on the market

Annex I: List of derogated hazardous substances and conditions

The following substances are specifically exempted from the obligation in Article 6(6) of Regulation (EC) No 66/2010 following application of Article 6(7) of the same Regulation.

Table 12. List of derogated hazardous substances and relevant conditions

SUBSTANCE / FUNCTION	DEROGATION CONDITIONS
Flame retardants (H317(1B), H373, H411, H412, H413). **Antimony Trioxide - ATO** (H351)	Applies to **textile fabrics and upholstery foams/filling materials**. The product must be designed in order to meet ISO, EN, Member State or public sector procurement standards and regulations. Any ATO used must be as a catalyst in polyester or as flame retardant synergist in textiles fibres used either in fabrics or filling/upholstery
Optical brightners (H411, H412, H413)	Optical brighteners may only be used in **textile covering fabrics** and specifically for white coloured printing but also when used with polyamide or polyester batches that contain recycled fibres.
Organotin compounds	Only when used as catalysts in the manufacture of **PU foam** and when the concentration limits of organotin residues comply with those set out in Table 9
Dyestuff for dyeing and non-pigment printing (H301, H311, H331, H317, H334) H411, H412, H413	Dust free dye formulations and/or automatic dosing and dispensing of dyes shall be used to minimise worker exposure. For reactive, direct, vat and sulphur dyes: Dye houses using these dyes must meet one of the following requirements: - Use of high affinity dyes - Achievement of a reject rate of less than 3.0%. - Use of colour matching instrumentation - Use of standard Operating Procedures for dyeing
Metal complex dyes	Metal complex dyes based on Copper, chrome and Nickel shall only be permitted in the dyeing of: **wool fibres, polyamide fibres or blends of wool and/or polyamide with man-made cellulose-based fibres**.
Water, dirt and stain repellents (H413)	Fluorinated compounds (including PFOA and PFOS) shall not be used as water, stain and oil repellent treatments for furniture materials. Non-fluorinated alternatives shall be readily or inherently biodegradable or eliminable according to relevant standard tests (see footnotes).
Auxillary compounds (e.g. carriers, levelling agents, dispersing agents, surfactants, thickeners and binders). **(**H301, H311, H331, H371, H373, H317(1B), H334, H411, H412, H43, EUH070.	Applies to **textile fibres** and only when recipes are formulated using automated dosing systems in processes that follow standard operating procedures. Substances classified as H311, H331 or H317(1B) shall not be present in the final textile covering product at concentrations greater than 1.0% (w/w). At least 95% by weight of any softeners, complexing agents and surfactants shall be readily biodegradable[50], inherently biodegradable[51] or eliminable[52] in wastewater treatment plants according to the relevant OECD or ISO standards. (see footnotes).
N,N-Dimethylacetamide (127-19-5)	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

[50] Readily biodegradable: (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)

[51] Inherently biodegradability: (ISO 14593, OECD 302 A, ISO 9887, OECD 302 B, ISO 9888, OECD 302 C)

[52] Eliminability: (OECD 303A/B, ISO 11733)

	followed by gas or liquid chromatography with a mass spectrometer detector.
Metals Nickel (H317, H351, H372) Chromium, Zinc (H412) Mercury (H330,H360,H372,H400, H410)	The substance must be contained in stainless steel. For furniture components likely to come into skin contact with users, the stainless steel must not be Nickel-plated or a resulphurised steel (S content >0.15%). Only when used in anti-corrosive coatings for Iron or steel. Only when used in Compact fluorescent light bulbs and when total concentration represents less than 0.1% of the light bulb.
Glues and adhesives (H351**)** (H304, H317, H334, H341, H362. H371, H373, H400, H410, H411, H412, H413, EUH059, EUH029, EUH031, EUH032, EUH070)	The restriction for H351 substance applies only to isocyanate-based adhesives. All adhesives used shall also comply with criterion 4c).
In-can preservatives in paints and varnishes H331(R23), H400(R50), H410(R50/53), H411(R51/53), H412(R52/53), H317(R43). Limits for specific individual in-can preservatives	In-can preservatives classified with these derogated classifications must also meet the following derogation conditions: • The sum total concentration shall not exceed **0.060% w/w**. • Substances classified with H400 (R50) and/or H410 (R50/53) shall be non-bioaccumulative. Non-bioaccumulative substances shall have a Log Kow ≤ 3.2 or a Bioconcentration Factor (BCF) ≤ 100. • Evidence shall be provided that Authorisation conditions under Directive 98/8/EC and Regulation (EC) N° 528/2012 are respected for the product. Isothiazolinone compounds: • Sum total Isothiazolinone compounds in any product (0.050% w/w) • 1,2-Benzisothiazol-3(2H)-one (BIT): H301(R25)(0.050% w/w) • 2-Octyl-2H-Isothiazol-3-one (OIT): H311(R24)(0.050%w/w) • 5-chloro-2-methyl-4-isothiazolin-3-one (CMIT) / 2-methyl-4-isothiazolin-3-one (MIT): H301(R24), H311(R25)(0.0015 w/w)

Annex II: Restricted substances list for dyes

Table 13. Carcinogenic aromatic amine dyes to be tested for by EN 14362-1 and -3

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

Table 14. Indicative list of dyes that may cleave to carcinogenic aromatic amines.

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

Table 15. List of dyes that are CMR or potentially sensitising

Dyes that are CMR (carcinogenic, mutagenic or toxic to reproduction)		
C.I. Acid Red 26	C. I. Direct Black 38	C.I. Disperse Blue 1
C.I. Basic Red 9	C. I. Direct Blue 6	C.I. Disperse Orange 11
C.I. Basic Violet 14	C. I. Direct Red 28	C. I. Disperse Yellow 3
Disperse dyes that are potentially sensitising		
C.I. Disperse Blue 1	C.I. Disperse Blue 124	C.I. Disperse Red 11
C.I. Disperse Blue 3	C.I. Disperse Brown 1	C.I. Disperse Red 17
C.I. Disperse Blue 7	C.I. Disperse Orange 1	C.I. Disperse Yellow 1
C.I. Disperse Blue 26	C.I. Disperse Orange 3	C.I. Disperse Yellow 3
C.I. Disperse Blue 35	C.I. Disperse Orange 37	C.I. Disperse Yellow 9
C.I. Disperse Blue 102	C.I. Disperse Orange 76	C.I. Disperse Yellow 39
C.I. Disperse Blue 106	C.I. Disperse Red 1	C.I. Disperse Yellow 49

Annex III: Restricted substances lists

Table 16. Restricted substance list for alkylphenols/ethoxylates in leather/textile processes.

Alkylphenol	CAS
Nonylphenol, mixed isomers	25154-52-3
4-Nonylphenol	104-40-5
4-Nonylphenol, branched	84852-15-3
Octylphenol	27193-28-8
4-Octylphenol	1806-26-4
4-tert-Octylphenol	140-66-9
Alkylphenolethoxylates (APEOs)	
Polyoxyethylated octyl phenol	9002-93-1
Polyoxyethylated nonyl phenol	9016-45-9
Polyoxyethylated p-nonyl phenol	26027-38-3

Assessment and verification

A declaration of non-use shall be provided by the applicant and any relevant textile/leather suppliers. In the absence of a declaration, testing may be required according to ISO/DIS 18218-1 (Direct method), ISO 18218-2 (Indirect method) or equivalent.

Table 17. Restricted substance list for organic solvents used in any processes.

Chemical name	CAS	Chemical name	CAS
2-Methoxyethanol	109-86-4	N,N-dimethylformamide	68-12-2
Bis(2-methoxyethyl) ether	111-96-6	4,4'- Diaminodiphenylmethane	101-77-9
1,2,3-trichloropropane	96-18-4	1,2-Dichloroethane; ethylene dichloride	107-06-2
- 2-Ethoxyethanol	110-80-5	Benzene-1,4-diamine dihydochloride	
- Formamide	75-12-7	N,N-dimethylacetamide (DMAC)	127-19-5
N-methyl-2-pyrrolidone; 1-methyl-2-pyrrolidone	872-50-4	Trichloroethylene	79-01-6

Assessment and verification

The applicant shall provide a declaration of non-use, supported by declarations by suppliers.

Table 18. Restricted substance list for Polycyclic Aromatic Hydrocarbons in plastics.

Chemical name	CAS	Chemical name	CAS
Naphthalene	91-20-3	Benzo[a]anthracene	56-55-3
Acenaphthylene	208-96-8	Benzo[b]fluoranthene	205-99-2
Acenaphthene	83-32-9	Benzo[k]fluoranthene	207-08-9
Fluorene	86-73-7	Benzo[a]pyrene*	50-32-8
Phenanthrene	85-1-8	Dibenzo[a,h]anthrance ne	53-70-3
Anthracene	120-12-7	Indeno[1,2,3-c,d]pyrene	193-39-5
Fluoranthene	206-44-0	Benzo[g,h,i]perylene)	191-24-2
Pyrene	129-00-0	Benzo[j]fluoranthen	205-82-3
Chrysene	218-01-9	Benzo[e]pyren	192-97-2

Assessment and Verification

The total limit of the combined concentrations of the PAH's listed above shall not exceed 10mg/kg following analysis according to ZEK 01.2-08. The limit of benzo(a)pyrene alone shall not exceed 1mg/kg according to the same method.

Table 19. Restricted chlorinated paraffin compounds in textile/leather manufacture

Substance	Limit
Short chain chlorinated paraffins (C10-13)	Not to be used at all
Medium chain chlorinated paraffins (C14-17)	1000 mg/kg (0.1%) in material

Assessment and verification

The applicant shall provide a declaration of non-use and provide test results in accordance with EN ISO DIS 18219 or equivalent tests.

Table 20. Restricted substances in recycled wood (EPF* standard limits)

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

*European Panel Federation "Standard for delivery conditions of recycled wood (2002)".

Assessment and verification

The applicant shall provide appropriate test reports from accredited laboratories using methods defined in the 2002 "EPF Standard conditions for the delivery of recycled wood" that demonstrate compliance of the recycled wood samples with the above limits.

Annex IV: Guidance for calculating VOC used in surface coatings

The calculation method requires the following information:

- The surface area to be coated per unit.
- 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.
- The efficiency of the coating technique used (see Table 21 below).

Table 21. Efficiency factors for coating techniques:

Coating technique	Effectiveness	Efficiency factor
Spraying device without recycling	50%	0.5
Spraying device with recycling	70%	0.7
Electrostatic spraying	65%	0.65
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.

An example calculation is as follows:

- The surface area to be coated per unit = **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**
- The efficiency of the **electrostatic spraying** technique used = **0.65.**

Total area coated = 4 x 1.5m^2 = **6m²**.

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

Total volume* of coating compound on surface = 6L x 0.65 = **3.9L**.

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

Total VOC applied per m^2 = 468g/6m^2 = **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.

ANNEX V: EUROPEAN FURNITURE STANDARDS

A.1. CEN Committee (CEN/TC 207) - Furniture

A.1.1. Upholstered furniture

- EN 1021-1:2006 Furniture - Assessment of the ignitability of upholstered furniture - Part 1: Ignition source smoldering cigarette
- EN 1021-2:2006 Furniture - Assessment of the ignitability of upholstered furniture - Part 2: Ignition source match flame equivalent

A.1.2. Office furniture

- EN 527-1:2011 Office furniture - Work tables and desks - Part 1: Dimensions
- EN 527-2:2002 Office furniture - Work tables and desks - Part 2: Mechanical safety requirements
- EN 527-3:2003 Office furniture - Work tables and desks - Part 3: Methods of test for the determination of the stability and the mechanical strength of the structure
- EN 1023-1:1996 Office furniture - Screens - Part 1: Dimensions
- EN 1023-2:2000 Office furniture - Screens - Part 2: Mechanical safety requirements
- EN 1023-3:2000 Office furniture - Screens - Part 3: Test methods
- EN 1335-1:2000 Office furniture - Office work chair - Part 1: Dimensions - Determination of dimensions
- EN 1335-1:2000/AC:2002 Office furniture - Office work chair - Part 1: Dimensions - Determination of dimensions
- EN 1335-2:2009 Office furniture - Office work chair - Part 2: Safety requirements
- EN 1335-3:2009 Office furniture - Office work chair - Part 3: Test methods
- EN 1335-3:2009/AC:2009 Office furniture - Office work chair - Part 3: Test methods
- CEN/TR 1335-4:2009 Office furniture - Office work chair - Part 4: Clarifications to EN 1335-1:2000 (Dimensions)
- CEN/TR 14073-1:2004 Office furniture - Storage furniture - Part 1: Dimensions
- EN 14073-2:2004 Office furniture - Storage furniture - Part 2: Safety requirements
- EN 14073-3:2004 Office furniture - Storage furniture - Part 3: Test methods for the determination of stability and strength of the structure
- EN 14074:2004 Office furniture - Tables and desks and storage furniture - Test methods for the determination of strength and durability of moving parts
- CEN/TR 14699:2004 Office furniture – Terminology

A.1.3. Hardware for furniture

- CEN/TR 15349:2006 Hardware for furniture - Terms for extension elements and their components
- CEN/TR 15588:2007 Hardware for furniture - Terms for hinges and their components
- EN 15570:2008 Hardware for furniture - Strength and durability of hinges and their components - Hinges pivoting on a vertical axis
- EN 15706:2009 Hardware for furniture - Strength and durability of slide fittings for sliding doors and roll fronts
- CEN/TR 15709:2008 Hardware for furniture - Terms for slide fittings for sliding doors and roll fronts
- EN 15828:2010 Hardware for furniture - Strength and durability of hinges and their components - Stays and hinges pivoting on a horizontal axis
- EN 15939:2011+A1:2014 Hardware for furniture - Strength and loading capacity of wall attachment devices
- CEN/TR 16015:2010 Hardware for furniture - Terms for locking mechanisms
- EN 16014:2011 Hardware for furniture - Strength and durability of locking mechanisms
- EN 16337:2013 Hardware for furniture - Strength and loading capacity of shelf supports

- EN 15338:2007+A1:2010 Hardware for furniture - Strength and durability of extension elements and their components

A.1.4. Outdoor furniture

- EN 581-1:2006 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 1: General safety requirements
- EN 581-2:2009 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 2: Mechanical safety requirements and test methods for seating
- EN 581-3:2007 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 3: Mechanical safety requirements and test methods for tables
- CEN/TR 581-4:2005 Outdoor furniture - Seating and tables for camping, domestic and contract use - Part 4: Requirements and test methods for durability under the influence of climatic conditions

A.1.5. Seating furniture

- EN 1022:2005 Domestic furniture - Seating - Determination of stability
- EN 1728:2012 Furniture - Seating - Test methods for the determination of strength and durability
- EN 1728:2012/AC:2013 Furniture - Seating - Test methods for the determination of strength and durability
- EN 12520:2010 Furniture - Strength, durability and safety - Requirements for domestic seating
- EN 12727:2000 Furniture - Ranked seating - Test methods and requirements for strength and durability
- EN 13759:2012 Furniture - Operating mechanisms for seating and sofa-beds - Test methods
- EN 14703:2007 Furniture - Links for non-domestic seating linked together in a row - Strength requirements and test methods
- EN 16139:2013 Furniture - Strength, durability and safety - Requirements for non-domestic seating
- EN 16139:2013/AC:2013 Furniture - Strength, durability and safety - Requirements for non-domestic seating

A.1.6. Tables

- EN 1730:2012 Furniture - Tables - Test methods for the determination of stability, strength and durability
- EN 12521:2009 Furniture - Strength, durability and safety - Requirements for domestic tables
- EN 15372:2008 Furniture - Strength, durability and safety - Requirements for non-domestic tables

A.1.7. Kitchen furniture

- EN 1116:2004 Kitchen furniture - Co-ordinating sizes for kitchen furniture and kitchen appliances
- EN 14749:2005 Domestic and kitchen storage units and worktops - Safety requirements and test methods

A.1.8. Beds

- EN 597-1:1994 Furniture - Assessment of the ignitability of mattresses and upholstered bed bases - Part 1: Ignition source: Smouldering cigarette
- EN 597-2:1994 Furniture - Assessment of the ignitability of mattresses and upholstered bed bases - Part 2: Ignition source: Match flame equivalent
- EN 716-1:2008+A1:2013 Furniture - Children's cots and folding cots for domestic use - Part 1: Safety requirements
- EN 716-2:2008+A1:2013 Furniture - Children's cots and folding cots for domestic use - Part 2: Test methods
- EN 747-1:2012 Furniture - Bunk beds and high beds - Part 1: Safety, strength and durability requirements
- EN 747-2:2012 Furniture - Bunk beds and high beds - Part 2: Test methods
- EN 1129-1:1995 Furniture - Foldaway beds - Safety requirements and testing - Part 1: Safety requirements
- EN 1129-2:1995 Furniture - Foldaway beds - Safety requirements and testing - Part 2: Test methods
- EN 1130-1:1996 Furniture - Cribs and cradles for domestic use - Part 1: Safety requirements
- EN 1130-2:1996 Furniture - Cribs and cradles for domestic use - Part 2: Test methods
- EN 1334:1996 Domestic furniture - Beds and mattresses - Methods of measurement and recommended tolerances

- EN 1725:1998 Domestic furniture - Beds and mattresses - Safety requirements and test methods
- EN 1957:2012 Furniture - Beds and mattresses - Test methods for the determination of functional characteristics and assessment criteria
- EN 12227:2010 Playpens for domestic use - Safety requirements and test methods

A.1.9. Storage Furniture

- EN 16121:2013 Non-domestic storage furniture - Requirements for safety, strength, durability and stability
- EN 16122:2012 Domestic and non-domestic storage furniture - Test methods for the determination of strength, durability and stability

A.1.10. Glass in furniture

- EN 14072:2003 Glass in furniture - Test methods

A.1.11. Surface resistance and characteristics

- EN 12720:2009+A1:2013 Furniture - Assessment of surface resistance to cold liquids
- EN 12721:2009+A1:2013 Furniture - Assessment of surface resistance to wet heat
- EN 12722:2009 Furniture - Assessment of surface resistance to dry heat
- EN 12722:2009+A1:2013 Furniture - Assessment of surface resistance to dry heat
- EN 13721:2004 Furniture - Assessment of the surface reflectance
- EN 13722:2004 Furniture - Assessment of the surface gloss
- EN 15185:2011 Furniture - Assessment of the surface resistance to abrasion
- EN 15186:2012 Furniture - Assessment of the surface resistance to scratching
- EN 15187:2006 Furniture - Assessment of the effect of light exposure
- CEN/TS 16209:2011 Furniture - Classification for properties for furniture surfaces

A.1.12. Other types of furniture

- EN 1729-1:2006 Furniture - Chairs and tables for educational institutions - Part 1: Functional dimensions
- EN 1729-2:2012 Furniture - Chairs and tables for educational institutions - Part 2: Safety requirements and test methods
- EN 13150:2001 Workbenches for laboratories - Dimensions, safety requirements and test methods
- EN 14434:2010 Writing boards for educational institutions - Ergonomic, technical and safety requirements and their test methods
- EN 14727:2005 Laboratory furniture - Storage units for laboratories - Requirements and test methods

A.2. CEN Committee (CEN TC 112 - Wood-based panels)

- EN 120:1992 Wood based panels - Determination of formaldehyde content - Extraction method called the perforator method
- CR 213:1984 Particle boards - Determination of formaldehyde emission under specified conditions - Method called: formaldehyde emission method
- EN 300:2006 Oriented Strand Boards (OSB) - Definitions, classification and specifications
- EN 309:2005 Particleboards - Definition and classification
- EN 310:1993 Wood-based panels - Determination of modulus of elasticity in bending and of bending strength
- EN 311:2002 Wood-based panels - Surface soundness - Test method
- EN 312:2010 Particleboards - Specifications
- EN 313-1:1996 Plywood - Classification and terminology - Part 1: Classification
- EN 313-2:1999 Plywood - Classification and terminology - Part 2: Terminology
- EN 314-1:2004 Plywood - Bonding quality - Part 1: Test methods
- EN 314-2:1993 Plywood - Bonding quality - Part 2: Requirements
- EN 315:2000 Plywood - Tolerances for dimensions
- EN 316:2009 Wood fibre boards - Definition, classification and symbols

- EN 317:1993 Particleboards and fibreboards - Determination of swelling in thickness after immersion in water
- EN 318:2002 Wood based panels - Determination of dimensional changes associated with changes in relative humidity
- EN 319:1993 Particleboards and fibreboards - Determination of tensile strength perpendicular to the plane of the board
- EN 320:2011 Particleboards and fibreboards - Determination of resistance to axial withdrawal of screws
- EN 321:2001 Wood-based panels - Determination of moisture resistance under cyclic test conditions
- EN 322:1993 Wood-based panels - Determination of moisture content
- EN 323:1993 Wood-based panels - Determination of density
- EN 324-1:1993 Wood-based panels - Determination of dimensions of boards - Part 1: Determination of thickness, width and length
- EN 324-2:1993 Wood-based panels - Determination of dimensions of boards - Part 2: Determination of squareness and edge straightness
- EN 325:2012 Wood-based panels - Determination of dimensions of test pieces
- EN 326-1:1994 Wood-based panels - Sampling, cutting and inspection - Part 1: Sampling and cutting of test pieces and expression of test results
- EN 326-2:2010 Wood-based panels - Sampling, cutting and inspection - Part 2: Initial type testing and factory production control
- EN 326-3:2003 Wood-based panels - Sampling, cutting and inspection - Part 3: Inspection of an isolated lot of panels
- EN 382-1:1993 Fibreboards - Determination of surface absorption - Part 1: Test method for dry process fibreboards
- EN 382-2:1993 Fibreboards - Determination of surface absorption - Part 2: Test method for hardboards
- EN 622-1:2003 Fibreboards - Specifications - Part 1: General requirements
- EN 622-2:2004 Fibreboards - Specifications - Part 2: Requirements for hardboards
- EN 622-2:2004/AC:2005 Fibreboards - Specifications - Part 2: Requirements for hardboards
- EN 622-3:2004 Fibreboards - Specifications - Part 3: Requirements for medium boards
- EN 622-4:2009 Fibreboards - Specifications - Part 4: Requirements for softboards
- EN 622-5:2009 Fibreboards - Specifications - Part 5: Requirements for dry process boards (MDF)
- EN 635-1:1994 Plywood - Classification by surface appearance - Part 1: General
- EN 635-2:1995 Plywood - Classification by surface appearance - Part 2: Hardwood
- EN 635-3:1995 Plywood - Classification by surface appearance - Part 3: Softwood
- CEN/TS 635-4:2007 Plywood - Classification by surface appearance - Part 4: Parameters of ability for finishing, guideline
- EN 635-5:1999 Plywood - Classification by surface appearance - Part 5: Methods for measuring and expressing characteristics and defects
- EN 636:2012 Plywood - Specifications
- EN 717-1:2004 Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
- EN 717-2:1994 Wood-based panels - Determination of formaldehyde release - Part 2: Formaldehyde release by the gas analysis method
- EN 717-2:1994/AC:2002 Wood-based panels - Determination of formaldehyde release - Part 2: Formaldehyde release by the gas analysis method
- EN 717-3:1996 Wood-based panels - Determination of formaldehyde release - Part 3: Formaldehyde release by the flask method
- EN 1058:2009 Wood-based panels - Determination of characteristic 5-percentile values and characteristic mean values
- EN 1087-1:1995 Particleboards - Determination of moisture resistance - Part 1: Boil test
- CEN/TS 1099:2007 Plywood - Biological durability - Guidance for the assessment of plywood for use in different use classes
- EN 1156:2013 Wood-based panels - Determination of duration of load and creep factors
- EN 12369-1:2001 Wood-based panels - Characteristic values for structural design - Part 1: OSB, particleboards and fibreboards
- EN 12369-2:2011 Wood-based panels - Characteristic values for structural design - Part 2: Plywood

- EN 12369-3:2008 Wood-based panels - Characteristic values for structural design - Part 3: Solid-wood panels
- EN 12775:2001 Solid wood panels - Classification and terminology
- EN 13017-1:2000 Solid wood panels - Classification by surface appearance - Part 1: Softwood
- EN 13017-2:2000 Solid wood panels - Classification by surface appearance - Part 1: Hardwood
- EN 13353:2008+A1:2011 Solid wood panels (SWP) – Requirements
- EN 13354:2008 Solid wood panels (SWP) - Bonding quality - Test method
- EN 13446:2002 Wood-based panels - Determination of withdrawal capacity of fasteners
- EN 13879:2002 Wood-based panels - Determination of edgewise bending properties
- EN 14272:2011 Plywood - Calculation method for some mechanical properties
- EN 14279:2004+A1:2009 Laminated Veneer Lumber (LVL) - Definitions, classification and specifications
- EN 14322:2004 Wood-based panels - Melamine faced boards for interior uses - Definition, requirements and classification
- EN 14755:2005 Extruded particleboards – Specifications
- CEN/TS 14966:2005 Wood-based panels - Small scale indicative test methods for certain mechanical properties

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