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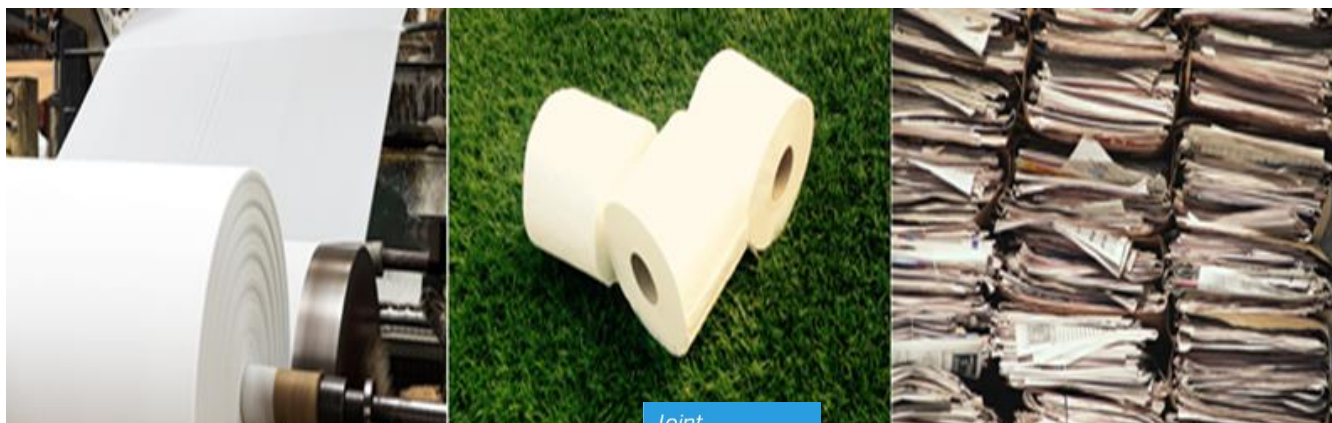
Revision of the European Ecolabel criteria for: Copying and Graphic Paper, Newsprint Paper and Tissue Paper

*Technical Report 1.0
Draft criteria proposal for the
revision of ecological criteria*

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May 2016



Joint
Research
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JRCxxxxx

EUR xxxxx xx

ISBN xxx-xx-xx-xxxxx-x (print)

ISBN xxx-xx-xx-xxxxx-x (PDF)

ISSN xxxx-xxxx (print)

ISSN xxxx-xxxx (online)

doi:xx.xxxx/xxxxx (print)

doi:xx.xxxx/xxxxx (online)

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How to cite: Authors; title; EUR; doi

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Draft

Abstract

The Ecolabel criteria for Copying & Graphic Paper, Newsprint Paper and Tissue Paper are under revision and new and updated product scopes and criteria have to be defined in line with market advances, changes to the legal framework and technical innovation.

A draft Preliminary Report (PR) has been published in parallel with this Technical Report (both May 2016) ahead of the 1st AHWG meeting to be held in June 2016 in Seville. The PR examines the three paper product groups in the current legal, political market context. The technical aspects of pulp and paper production are presented and considered from an LCA perspective – attempting to identify the main hot-spots.

This Technical Report (TR) presents the existing scopes, definitions and EU Ecolabel criteria for the three product groups. Any modified criteria are presented immediately below the existing criteria with the main changes highlighted **in yellow**. Supporting rationale for any changes are provided with particular reference to any comments received from stakeholders so far, to Commission statements, other similar ecolabel criteria and LCA-based evidence where relevant.

The most significant proposals are:

- To merge the scope for copying and graphic paper with newsprint paper;
- To expand the scope for Tissue Paper to specifically include more products
- To update current emission limits of COD, Sulphur (S), NO_x and Phosphorous (P) in line with the new BREF ranges and to discuss what specific benchmark to use;
- To reduce current AOX emission limits in line with the new BREF ranges and to discuss what specific benchmark to use;
- To reduce current CO₂ emission limits;
- To consider a more restrictive approach to the use of EDTA in ECF pulp mills, in line with the Nordic ecolabel criteria;
- To introduce a common ambition level for fibre sourcing criteria for all three product types (more ambitious for Copying and Graphic Paper and Tissue Paper but less restrictive for Newsprint Paper).
- To discuss a possible new water minimisation criterion based on process and pulp type;
- To discuss possible targets for waste to landfill based on process and pulp type;

For criteria relating to emissions to water and air and to energy use, the recently published BREF document for pulp, paper and board products has a strong influence on the proposed ambition level. Due to the ranges of values that are published in BREF, and, in the case of air emissions the different units used, it is difficult to identify the appropriate ambition level for EU Ecolabel criteria.

For the above issue and several others, questions to stakeholders are embedded throughout the report in *red, italic and underlined text* where relevant. The purpose of such questions is to help frame the discussion for the 1st AHWG meeting although responses can be sent prior to the meeting as well in the hope that positions can be clarified before the meeting too.

1. Introduction

1.1. Brief background to the EU Ecolabel

The EU Ecolabel (European Commission, 2009c) is a voluntary labelling scheme created in 1992 and a key voluntary policy instrument within the European Commission's Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan (European Commission, 2008a) and the Roadmap for a Resource-Efficient Europe. The Roadmap seeks to move the economy of Europe onto a more resource efficient path by 2020 in order to become more competitive and to create growth and employment.

The EU Ecolabel promotes the production and consumption of products with a reduced environmental impact along the life cycle and is awarded only to the best (environmental) performing products in the market.

The entire life cycle of the product is considered, from the extraction of raw material through to production, packaging, distribution, use and disposal. The EU Ecolabel may define criteria that target environmental impacts from any of these life cycle phases, with the aim being to preferentially target those areas of greatest impact. The criteria development process involves scientists, non-governmental organisations (NGOs), Member State representatives and industry stakeholders. The overall ambition level for criteria should aim to target the 10% to 20% most environmentally friendly products currently on the market. Because the life cycle of each product and service is different, the criteria are tailored to address the unique characteristics of each product type. They are revised typically every four years to reflect upon technical innovation such as alternative materials or production processes, reductions in emissions and market advances.

The EU Ecolabel also has links with other policy instruments, such as Green Public Procurement (GPP) (European Commission, 2015b), the Eco-Management and Audit Scheme (EMAS) (European Commission, 2015c), the Ecodesign Directive (European Commission, 2009b) and the Environmental Technologies Action Plan (ETAP) (European Commission, 2006).

The development and revision processes are carried out in accordance with the EU Ecolabel Regulation (EC) No 66/2010. An important part of the process for developing or revising EU Ecolabel criteria is the involvement of stakeholders through publication of and consultation on draft technical reports and criteria proposals. This is achieved by stakeholder involvement in working group meetings and written consultation processes managed via an online platform.

Article 7(2) and 11(2) make provisions to encourage alignment between criteria for the EU Ecolabel and other suitable ISO 14024 Type I ecolabels for similar products. However, care must be taken to ensure that any such alignments are based on scientifically sound rationale, do not create geographical distortions for potential applicants and ultimately, that the proposed criteria are acceptable to the majority of EU Ecolabelling Board (EUEB) members who must vote on the final proposed criteria prior to its adoption.

Other ecolabel schemes of relevance to the paper products that have been identified include: the Nordic Swan (Scandinavia) (Nordic Ecolabelling, 2015), the Blue Angel (Germany) (The Blue Angel, 2015), Umweltzeichen (Austria) (Umweltzeichen, 2015) and the United States Green Seal standards (United States Green Seal, 2015).

1.2 The criteria revision process

The typical standard approach that is taken for the revision of EU Ecolabel criteria which is illustrated below:

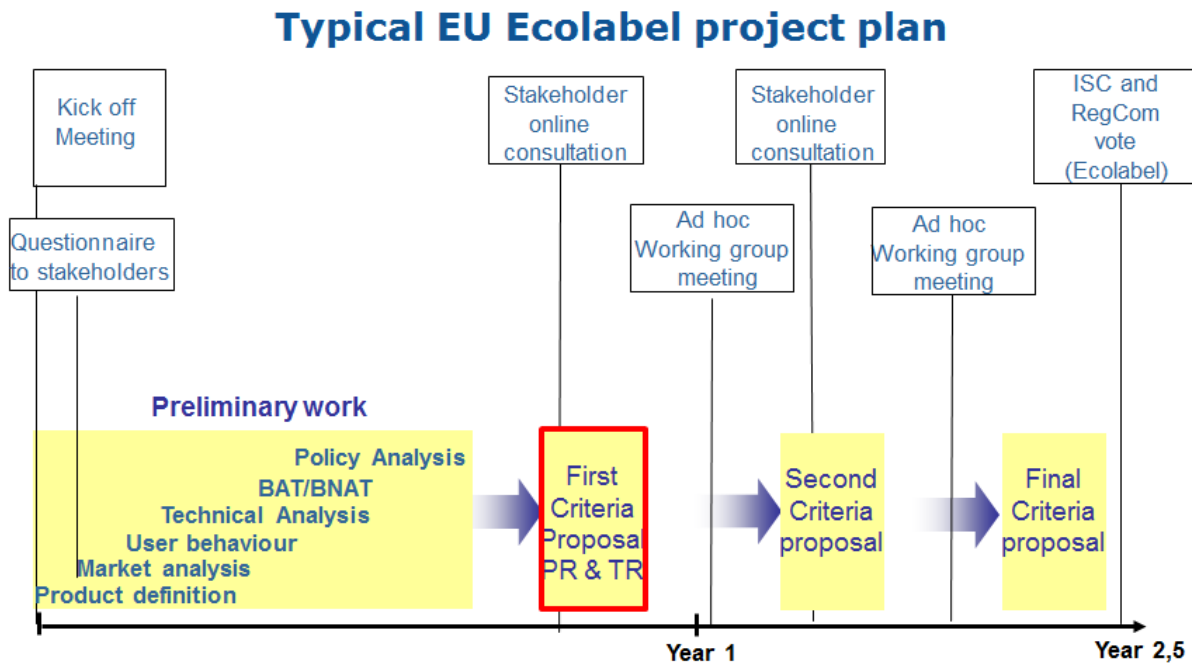


Figure 1. Overview of the typical EU Ecolabel revision process

The current stage in the process is highlighted in the red box in Figure 1. Although stakeholders have previously been invited to respond to a preliminary scoping questionnaire, it is really from this stage onwards that their input to the process will become much more significant.

A draft Preliminary Report (PR) has been published in parallel with this Technical Report (both May 2016) ahead of the 1st AHWG meeting to be held in June 2016 in Seville. The PR examines the three paper product groups in the current legal, political market context. The technical aspects of pulp and paper production are presented and considered from an LCA perspective – attempting to identify the main hot-spots.

This Technical Report (TR) presents the existing scopes, definitions and EU Ecolabel criteria for the three product groups. Any modified criteria are presented immediately below the existing criteria with the main changes highlighted in yellow. Supporting rationale for any changes are provided with particular reference to any comments received from stakeholders so far, to Commission statements, other similar ecolabel criteria and LCA-based evidence where relevant.

Questions to stakeholders are embedded throughout the report in *red, italic and underlined text* where relevant. The purpose of such questions is to help frame the discussion for the 1st AHWG meeting although responses can be sent prior to the meeting as well in the hope that positions can be clarified before the meeting too.

Several iterations of the criteria are anticipated before they will be finally voted and these will be reflected in subsequent versions of this Technical Report.

The overall aim of this project therefore is to assess the need for updating existing criteria and potentially developing new criteria where deemed appropriate. This will involve evaluating the existing Ecolabel criteria for these product groups and identifying

which are still relevant, which need revising to better address existing concerns and whether any new criteria need to be introduced for areas of concern not currently captured. The key factors to consider in this respect are:

- New technological development: where progress in existing processes or where new processes become available or economically viable that result in lower environmental impacts.
- Stricter legal requirements: which may render existing criteria obsolete or of low ambition or which may introduce new restrictions that need to be reflected (e.g. the use of hazardous substances in paper manufacturing or in waste disposal).
- Developments in other ISO 14024 Type I ecolabels: to align where possible and where a clear rationale can be established.
- Published LCA evidence: to help ensure that proposed criteria focus mainly on the environmental hot-spots of the paper production process as far as is practical.

The criteria should attempt to target the top 10% to 20% of the most environmentally friendly products currently on the market otherwise the criteria run the risk of becoming meaningless as a basis for highlighting good performance. However, it is appreciated that this is not often possible to judge accurately where multiple criteria are set on a pass-fail basis as is the case with the EU Ecolabel approach.

Report Outline

A brief explanation of the different chapters of the report is summarised here:

- Section 2 summarises the background research in the draft PR, focussing on the legal and policy context at the EU level, a market analysis, an LCA screening study and a brief technical analysis of the main industrial processes.
- Section 3 presents the proposed revisions to the name, scope and definitions of the paper products, together with supporting rationale.
- Section 4 presents the proposed revisions to the criteria text, together with supporting rationale.
- Section 5 presents the potential impacts of the proposed revisions.
- Section 6 provides concluding remarks.

2. Preliminary report summary

This section summarises the main conclusions of the PR, which presents background research carried out for the EU Ecolabel for three paper product groups: copying and graphic paper (CGP), newsprint paper (NP) and tissue paper (TP).

The full preliminary report can be found on the BATIS platform for registered stakeholders and also at the project website:

http://susproc.jrc.ec.europa.eu/Paper_products/ .

2.1 Paper product group names, scopes and definitions

The current scope and definitions for CGP, NP and TP are presented in the context of the terminology and classification systems of CEPI, ISO/TC 6, ISO 12625, EN 643 and NACE. Different paper grades can be broadly classified according to their intended use:

- Informative use (e.g. CGP and NP)
- Packaging
- Hygienic (e.g. TP)
- Speciality

Another way of splitting different paper products, which is generally used when reporting market data, is based on the raw material inputs and finishing processes that apply to the paper product, for example:

- Uncoated mechanical pulp
- Uncoated wood-free pulp
- Super-calendered paper
- Lightweight coated paper
- Wood-free Coated etc.

The existing scopes and definitions for CGP, NP and TP are presented and compared with the definitions set out in other relevant ecolabels, namely Nordic ecolabel, Blue Angel, Richtline (Austrian) and Green Seal. Considerable differences exist between each of the different ecolabels for the scopes and definitions for any given paper product. Stakeholder feedback from the scoping questionnaire was also presented which approximately one third of active respondents wanted a change in the CGP and NP scope and definition and two thirds wanted a change in the TP scope and definition.

2.2 Legal and policy context

The PR focuses on six of the pieces of legislation relating to the paper industry that are of particular relevance to EU Ecolabel criteria, namely:

- The EU Ecolabel Regulation: of particular importance to the TP criteria because the Regulation only came into force in 2010 – one year after the TP criteria.
- Chemical-related Regulations: i.e. REACH, CLP and the Biocidal Products Regulation. All EU Ecolabel product groups must have restrictions on the use of hazardous chemicals and the approach taken must be in line with these Regulations. It will be important when

dealing with chemical suppliers and especially with hazardous substances that can remain in the final product.

- The Industrial Emissions Directive: The recently published BAT report sets out limits for emissions to air and water (COD, S, NO_x, P, AOX) and specific energy consumption based in the type of process used. These will influence the relevant ambition level of current criteria.
- The Renewable Energy Directive: This will have an important indirect influence on the paper industry as the demand for renewable energy from biomass increases.
- The Air Quality Framework Directive: This sets a wider context for emissions of S, NO_x and other pollutants from pulp and paper plants.
- The Timber Regulation: places responsibilities on suppliers and importers of wood or wood-based materials in the EU market.

In terms of policy context, the climate change strategy is arguably the most directly important policy because the pulp and paper industry is included with the EU Emissions Trading Scheme.

The recently released Circular Economy Package will make an additional case for improving waste paper recovery rates (which are already quite high in Europe) but also encourage a reduction in landfilling of wastes from the pulp and paper industry.

Forest related policies, in particular Forest Europe, to which all 28 EU Member States have signed up, will be important in developing a coherent approach to the assessment, monitoring and reporting of the state of Europe's forests. However, it could be argued that market-driven initiatives (predominantly FSC and PEFC) have already taken the lead on Sustainable Forest Management in Europe.

2.3 Market analysis

The market analysis revealed that there is a positive growth in the tissue and packaging paper production, which offset the decline in global graphic paper production (WAN-IFRA, 2014). The move towards digitalisation across most developed economies in North America and Europe has meant that the global paper and pulp mills industry contracted slightly over the past five years (-0.4%), but this has been partially offset by the manufacturing boom in many emerging economies (IBIS World, 2015).

The consumption of paper and board is strongly related to standards of living and the economic situation of the user populations, so it is expected that global paper consumption will continue to grow as emerging economies grow, estimated at a rate of ~1.6% per year. It is expected that global paper consumption will reach 500 million tonnes in 2025. Alongside emerging economies, demand in Eastern Europe is also growing at a fast rate (Finish Forest Industries, 2013). Furthermore, urbanisation is associated with the increase in demand for hygienic products such as tissue paper, for which consumption is also expected to grow at an annual rate of 2.4% over the next five years.

As expected, the paper industry is dominated by a few players, with the top 20 companies generating ~40% of the total global paper and paperboard production. The biggest players are International Paper and Kimberly-Clark from the United States, Stora Enso and UPM-Kymmene from Finland, and Oji Paper and Nippon Paper Group from Japan. Europe is the second largest producer and the third largest consumer of paper and board, with North America being the leader, and Asia coming in at third place. The annual production of wood pulp in Europe is about 41.8 million tonnes/year, representing about 22% of the world's total pulp production (which is

~192.4 million tonnes) (Forestry Commission, 2005). Furthermore, in 2014, the European pulp and paper industry consumed almost 147 million m³ of wood chips and roundwood (CEPI, 2016).

Europe also plays a very important role in the recycled fibre (RCF) market. Along with North America, Europe has the highest recovery rate for paper (62% in 2013), followed by the Asia-Pacific region (51% in 2013). This is a reflection of the global increase in recycled paper collection, from 31 million tonnes to over 210 million tonnes between 1970 and 2010 (Agriculture & Agri-Food Canada, 1997). Europe also has the highest utilisation rate of fibres in the world (71.7% in 2013) (CEPI, 2014a).

However, it can now be observed that some Member States are reaching the saturation level of the paper recycling potential. Recovered paper cannot be efficiently used in all paper grades, nor can it be used indefinitely because of shortening up of the fibre length, and a decrease in its quality and usability. Fibre shortens up every time it is used and at some point, usually after 4-6 cycles, it is too short to be used in papermaking. Therefore at the macro-scale level, to ensure product quality, a certain amount of virgin pulp input will always be needed.

With regards to the EU Ecolabel, the TP and CGP product groups are two of the most successful product groups in terms of licensed products on the market. As of September 2015, a total of 192 licences had been issued for CGP, NP and TP producers, covering a total of 9,546 individual products, as shown in below.

Table 1: EU Ecolabel uptake for Tissue, Copying and Graphic and Newsprint Paper product groups

Product Group	Number of Licences	Number of Products	Awarding Competent Bodies
Tissue Paper	135	5,959	Austria (1), Belgium (1), Bulgaria (2), Czech Republic (2), Denmark (1), Finland (1), France (13), Germany(40), Italy (36), Lithuania (1), the Netherlands (3), Poland (2), Portugal (2), Slovakia (2), Slovenia (1), Spain (14), Sweden (6) and United Kingdom (7)
Copying and Graphic Paper	60	3,921	Austria (6), Finland (5), France (8), Germany(20), Italy (1), the Netherlands (2), Norway (2), Poland (2), Portugal (1), Slovenia (1), Spain (4), Sweden (7) and United Kingdom (1)
Newsprint Paper	5	32	Austria (1), Finland (2), France (1) and Spain (1)
TOTAL	192	9,546	20 countries

2.4 Life-cycle analysis

The life cycle analysis revealed that the key environmental impacts associated with the pulp and paper products are:

- Forest destruction and potential loss of biodiversity from sourcing of raw materials (although this is not well captured by land use indicators, land classification factors or biodiversity indicators using current LCA methodology);
- Emissions to air during pulp and paper production (especially CO₂, SO₂ and NO_x);
- Emissions to water during pulp and paper production (especially COD, AOX and P);
- Energy consumption during production (mainly fuel for pulp mills and electricity for paper mills);
- Water consumption during pulp and paper production
- Energy and ecotoxicity due to the production and uses of chemicals during pulp and paper production;

An illustration of the degree of importance of different normalised impacts for a representative graphic paper intermediate product is illustrated in Figure 2.

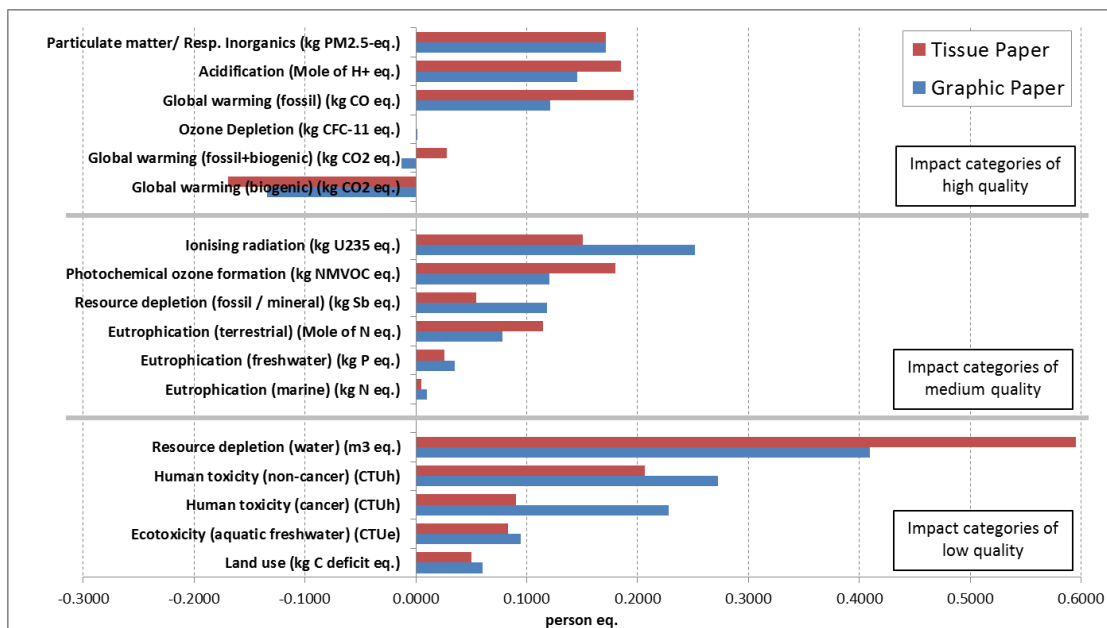


Figure 2: Identification of most relevant impact categories for a representative graphic paper intermediate product (source PEFCR screening study).

It should be noted that, due to the intermediate nature of the product, the data in Figure 2 does not include the use phase of End-of-Life (EoL). However, it is widely accepted that the use phase is negligible and that the EoL impacts are highly dependent on consumer behaviour and the local waste management infrastructure, which will influence whether paper ends up producing uncontrolled methane emissions in a landfill, is incinerated with or without energy recovery or is recycled.

Raw material acquisition was the dominant stage for global warming (biogenic), human toxicity and land use impact categories. This stage was also important for ozone depletion (mainly due to incomplete combustion of fossil fuels in chainsaws and logging machinery) and marine eutrophication (mainly due to nitrogen fertiliser production and application). All other impact categories were dominated by the pulping and/or papermaking stages.

The life-cycle analysis also looked in more detail at the hotspots identified to determine at which life cycle stage, at the level of specific processes, the largest contributions to each impact category occurred. It was found that:

- The dominant life-cycle stage for each impact category is either related to virgin pulp production or the papermaking process.
- The energy use and chemical additives in both the pulping and papermaking stages were the sources of most impacts.
- The sourcing of wood (impacts on climate change and land use) and water resource depletion (for the pulping and papermaking processes) were also identified as important.
- The most significant impacts were related to human toxicity (non-cancerous effects), climate change, acidification, photochemical ozone formation, particulate matter/respiratory inorganics and ionising radiation.

The link between the LCA and non-LCA impacts and the revised EU Ecolabel criteria are presented in Table 2 below.

Table 2: Link between the hotspots identified (LCA and non-LCA impacts) and the revised EU Ecolabel criteria

Identified hotspots (LCA impacts)	Revised or new EU Ecolabel criteria	Comments on the related criteria
Resource depletion (water)	Criterion 6 – Water minimisation	New criterion proposed for water minimisation, to ensure reduced water abstraction for the pulping and papermaking stages.
Acidification	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers.
Particulate Matter / Respiratory Inorganics	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers.
Climate change (fossil/biogenic)	Criterion 2 – Energy use Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Photochemical ozone formation	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances Transport	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking processes. Reduces use of virgin fibres and increases use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to ozone depletion. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers. Out of the scope of this policy tool
Human toxicity (non-cancer)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Paper mill infrastructure	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers. Infrastructure improvements have no direct link to EU GPP criteria, which is the main reason for not developing EU GPP criteria
Human toxicity (cancer)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Paper mill infrastructure	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping process. It limits the hazardous substances and mixtures that can be included in pulp, limiting environmental and health risks for consumers. Infrastructure improvements have no direct link to EU GPP criteria, which is the main reason for not developing EU GPP criteria

Identified hotspots (LCA impacts)	Revised or new EU Ecolabel criteria	Comments on the related criteria
Ionising radiation	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Eutrophication (freshwater)	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Paper mill infrastructure	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper, limiting eutrophication and thereby environmental and health risks for consumers. Infrastructure improvements have no direct link to EU GPP criteria, which is the main reason for not developing EU GPP criteria
Ozone Depletion	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Land use	Criterion 2 – Energy use Criterion 3 – Fibres	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking process. Reduces use of virgin fibres and increases use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to land use changes.
Resource depletion (fossil / mineral)	Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances	Reduces use of virgin fibres and increases use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to resource depletion. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Eutrophication (terrestrial)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Transport	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking process. It limits the hazardous substances and mixtures that can be included in paper, limiting eutrophication and thereby the environmental and health risks for consumers. Out of the scope of this policy tool
Eutrophication (marine)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting eutrophication and thereby the environmental and health risks for consumers.
Ecotoxicity (aquatic freshwater)	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Paper mill infrastructure	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping process. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting the environmental and health risks for consumers. Infrastructure improvements have no direct link to EU GPP criteria, which is the main reason for not developing EU GPP criteria

2.5 Technical analysis

The technical analysis outlined the well-known main processes involved in the papermaking process, to include pulping, bleaching, paper production and conversion.

The environmental analysis revealed that best practice in paper production is the result of using processes and technologies with lower environmental impacts, implementing more effective business strategies and producing products with improved quality. Combined with sustainable behaviours during the use phase, these can result in more eco-friendly products. The list of best practices by impact category is presented below.

- Switching from fuel oil or coal to natural gas in onsite CHP and/or secondary boilers.
- Switching from natural gas to biomass in onsite CHP and/or secondary boilers.
- Use degasification units for bark/black liquor processing.
- Reducing bleaching chemical consumption with optimised sequences and/or enzymes.
- Washing of lime sludge to remove sulfur prior to the lime kiln.
- Increasing the quantities of fibres sourced from sustainably managed and third party certified forests and/or locally available recovered paper.

1. Fibre sourcing: virgin, recycled and non-wood:

- Use of wood from sustainably managed sources; and
- Optimize the use of fibre from recycling;

2. Fuel and electricity consumption, CO₂ emissions and climate change:

- Substitute coal or fuel oil for natural gas, substitute natural gas for biomass
- Replace traditional boilers with Combine Heat and Power (CHP) units;
- Upgrade recovery boiler units to gasification combined cycle technology

3. Water consumption:

- Optimize the closure of water circuits; and
- Minimise water consumption, use of water savings techniques;

5. Emission to water:

- Use environmentally benign bleaching sequences;
- Minimize the use of poorly biodegradable organic substances;
- Optimise the dosing of N and P to wastewater treatment processes;

5. Emission to air:

- Reduce sources that contribute to acidification (sulphur); and
- Modernise recovery boilers, replace with gasification combined cycle units;

6. Solid waste:

- Implement integrated waste management plan, minimise waste generation and maximise recycling and waste recovery;

The analysis of best practices undertaken in the preliminary report will be expanded further following the first AHWG meeting, to reflect input from the stakeholders.

3. Product group names, definitions and scopes proposal

The following section presents the proposed revisions to the existing names, definitions and scopes of the paper product groups considered in this report. Where revisions or additions have been proposed, these have been highlighted in yellow.

3.1 Name, definition and scope of EU Ecolabel

Table 3. Existing and proposed scopes and definitions for CGP, NP and TP

Copying and graphic paper	Newsprint paper	Tissue paper
Existing criteria text		
<p>Copying and graphic paper: Comprise sheets or reels of not converted, unprinted blank paper and not converted boards up to basis weight of 400 g/m².</p> <p>It shall not include:</p> <ul style="list-style-type: none"> • newsprint paper; • thermally sensitive paper; • photographic and carbonless paper; • packaging and wrapping paper; and • fragranced paper. 	<p>Newsprint paper: Comprise paper made from pulp and used for printing newspapers and other printed products.</p> <p>It shall not include:</p> <ul style="list-style-type: none"> • copying and graphic paper; • thermally sensitive paper; • photographic and carbonless paper; • packaging and wrapping paper; and • fragranced paper. 	<p>Tissue paper: Comprise sheets or rolls of tissue paper fit for use for personal hygiene, absorption of liquids and/or cleaning of soiled surfaces. The tissue product consists of creped or embossed paper in one or several plies. The fibre content of the product shall be at least 90 %.</p> <p>The product group does not comprise any of the following:</p> <ul style="list-style-type: none"> • wet wipes and sanitary products; • tissue products laminated with other materials than tissue paper; and • products as referred to in Directive 76/768/EEC.
Proposed criteria text		
<p>Copying, graphic and newsprint paper</p> <p>Comprise sheets or reels of not converted, unprinted blank paper. It will include paper made from pulp and used for writing, printing newspapers and other printed products.</p> <p>It shall not include:</p> <ul style="list-style-type: none"> • paperboard intended for packaging conversion; • thermally sensitive paper; • photographic and carbonless paper; • packaging and wrapping paper; and • fragranced paper. 		<p>Tissue paper products</p> <p>Comprise sheets or rolls of tissue paper fit for use for personal hygiene, absorption of liquids and/or cleaning of soiled surfaces.</p> <p>Tissue paper is base paper taken from the tissue machine before conversion (typically between 10 g/m² and 50 g/m²) while "tissue product" is "tissue paper that has been converted into a finished product for end-user purposes</p> <p>It will include coloured, printed and/or fragranced tissue paper products.</p> <p>It will include tablecloths, mats and non-sanitary napkins, and other such products.</p> <p>The product group does not comprise any of the following:</p> <ul style="list-style-type: none"> • wet wipes and sanitary products, including absorbent undergarments such as disposable diapers; • coated tissue products or tissue products laminated with other materials than tissue paper; and • products as referred to in Directive 76/768/EEC.

3.2 Rationale for proposed revisions

3.2.1 Copying and graphic paper / Newsprint paper

The current EU Ecolabel scopes and definitions for CGP and NP specifically exclude certain types of paper but do not use generic paper-product specific market terms like: newsprint, uncoated mechanical, uncoated wood-free and coated mechanical. This is in contrast to CEPI's definition for graphic papers (CEPI, 2014b). CEPI also offers the following broad definition for paper:

"Paper is a generic term for a range of materials in the form of a coherent sheet or web, excluding sheets or laps of pulp as commonly understood for paper making or dissolving purposes and non-woven products, made by deposition of vegetable, mineral, animal or synthetic fibres, or their mixtures, from a fluid suspension onto a suitable forming device, with or without the addition of other substances. Papers may be coated, impregnated or otherwise converted, during or after their manufacture, without necessarily losing their identity as paper. Whereas board / paperboard is a generic term applied to certain types of paper frequently characterized by their relative high rigidity".

The Commission Statement suggested merging of newsprints and graphic and copying papers under one product group. The preliminary analysis conducted by JRC-IPTS shows that from a technical point of view at least, merging of these two product group is feasible. The similarity between two product groups is well reflected in the current criteria sets. Specifically, the current definition of copying and graphic paper will also work for newsprint paper.

Extending the scope and definition of copying and graphic paper to include newsprint paper could potentially help increase uptake as it would harmonise the definition and scope of the EU Ecolabel with that of other ecolabels. Specifically Blue Angel (The Blue Angel, 2010) and Austria's Österreichisches Umweltzeichen (Umweltzeichen, 2015), include newsprint paper in the scope of graphic paper, and have proven that a merged definition that encompasses both product groups can be successfully taken up by industry. Nordic Swan (Nordic Ecolabelling, 2015) has no criteria specific for newsprint paper but it does have a set of criteria for copy and graphic paper (they use the title "*copying and printing paper*"), while the US Green Seal (United States Green Seal, 2015) is the only other ecolabel widely used that has separate sets of criteria for copying and graphic paper and for newsprint paper.

Potentially extending the scope of copying and graphic paper has been discussed favourably by the industry during past criteria revision rounds and was mentioned in the 2009 Technical Report for revising the EU Ecolabel criteria for copying and graphic paper, indicating that this potential revision aligns with industry thinking (ISPRA and LC Engineering, 2009). The report suggested that by extending the scope and definition of copying and graphic paper to include newsprint, the applicant could also be provided with the opportunity to put the Ecolabel label on the product with a phrase such as 'Printed on Ecolabel paper', which could help raise awareness amongst consumers.

The counter argument for not extending the scope of copying and graphic paper to include newsprint paper that should be mentioned here, is that copying and graphic paper differ from newsprint paper in the production processes used, as outlined in the PR. Newsprints are mainly manufactured through mechanical treatment whereas copying and graphic paper stem from chemical or semi-chemical pulping treatments. As such, the energy consumption used in pulping and papermaking is different for each product group. Furthermore, the additives applied in paper production for preparing the surface are different between the two paper products, as are the fibre qualities and the composition of the pulp mixtures required to meet these qualities. This could be a point of concern raised to justify why the scope and definition of these products should not be merged.

We propose to discuss this further at the 1st AHWG meeting in June 2016, using the following discussion point:

Q1: Should the scope and definition of newsprint paper be merged with that of copying and graphic paper as proposed?

The current scope for copying and graphic paper results in constraints as the weight-based restrictions (upper limit of 400 g/m²) is artificial. It was proposed in the report that given that it is not clear where this value has originated from, that this upper limit value is revised, which could potentially lead to increased industry uptake. The figure of 400g/m² appears to be based on the definition of 'board substrate' in Commission Decision 2014/256/EU on the EU Ecolabel for converted paper products (European Commission, 2014a). According to this Commission Decision, board substrate is: "Paperboard, cardboard or board, unprinted and not converted, with a basis weight higher than 400 g/m²" (European Commission, 2014a). None of the other ecolabels (e.g. Nordic Swan, Blue Angel, etc.) propose weight-based restrictions for copying and graphic or newsprint paper (although it should be noted that the scopes of these other labels are not always comparable).

Another option is that the upper limit could potentially be revised to be 224g/m², to reflect the fact that anything above 224g/m² is in fact paperboard used for packaging purposes and therefore a different end-product to copying, graphic or newsprint paper. This is based on the current definition for paperboard in all ISO standards, which is: "Paperboard is paper with a grammage above 224g/m²." Following this rationale, 'not converted boards' with a grammage above 224g/m² should be removed from the scope, as these are different end-products to the ones covered by these criteria (for example these are used for display point surfaces and boards).

On the other hand, in the generic sense, the term 'paper' may be used to describe both paper and board. As the use of grammage as reference to specify the product destination is not precise and rather artificial it is propose to address product group by its functionality and end use.

It is proposed that a possible removal of the reference to any paper grammage be discussed further at the 1st AHWG meeting in June 2016, using the following discussion points:

Q: Should the weight based upper limit of 400g/m² be revised to be 224g/m² in the newly proposed scope of copying and graphic paper merged with newsprint paper?

Q: Should 'not converted board' also be removed from the scope for copying and graphic paper merged with newsprint paper?

Q.: Should reference to the paper grammage be removed and substituted by product functionality?

It is further proposed that printed, coated and converted paper products continue to not be included in the scope due to all the additional processes associated with these products that are not currently being addressed by the criteria for copying and graphic paper and newsprint paper. If these products were to be included in the scope for these two paper products, this would require additional sets of criteria to be proposed to address issues such as lamination and chemicals used in the inks. In line with this thinking, we propose revising the list of excluded products to include 'paperboard intended for packaging conversion'.

It is proposed that this is also discussed further at the 1st AHWG meeting in June 2016, using the following discussion point:

Q: Should 'paperboard intended for packaging conversion' be included in the list of excluded products from the scope of copying and graphic paper merged with newsprint paper?

Finally to reflect the revised merged scope and definition of copying and graphic paper with newsprint paper, it is proposed that the new product name is changed to 'Paper suitable for printing or other graphic purposes'. This name is similar to those used by other standards that encompass newsprint paper into copying and graphic paper, such as Blue Angel and the Austrian Ecolabel.

This can also be discussed further at the 1st AHWG meeting in June 2016, using the following discussion point:

Q: Is the new proposed name for the merged copying, graphic and newsprint paper product group of 'Paper suitable for printing or other graphic purposes' suitable and appropriate?

The stakeholder survey undertaken by the IPTS which is summarised in the Preliminary Report in Section 2, indicated that the majority of respondents were in favour of the existing scope and definition for copying and graphic paper and for newsprint paper (62.5% and 63.2% respectively). As such, no further revisions are proposed to the scope and definitions for these paper products.

3.2.2 Tissue paper

The scope set out in Commission Decision 2009/568/EC (European Commission, 2009a, p. 568) does not currently include tablecloths, mats, napkins or other such products, as well as coated tissue paper products or absorbent undergarments such as diapers.

The stakeholder survey conducted by the IPTS, which is summarised in the Preliminary Report, indicated that only 38.2% of respondents are happy with the current definition and scope for tissue paper. This is in contrast to the definitions and scope for copying and graphic paper and newsprint paper, where the majority of respondents agreed that the current scope and definitions were sufficient.

The EN ISO 12625:2011 (ISO, 2006, p. 12625) includes terms and definitions and "describes products and base paper made from lightweight, dry or wet creped and some non-creped paper".

"Tissue paper" is described as "base paper taken from the tissue machine before conversion (typically between 10 g/m² and 50 g/m²)" while "tissue product" is "tissue paper that has been converted into a finished product for end-user purposes".

Following EN ISO 12625:2011: "Tissue products form an important and growing market for single-use disposable hygiene, and industrial products. The current range of these familiar products includes, toilet tissue, facial tissue, kitchen/household towels (these three products can also be lotion treated), hand towels, handkerchiefs, table napkins, mats, industrial wipes and lotion treated products."

Unlike the current EU Ecolabel definition, the ISO 12625 standard includes table napkins and mats and other such products within the scope. In terms of the other Ecolabel standards, the US Green Seal also includes tablecloths, mats and other such products in the scope for tissue products (*Green Seal Standard for Sanitary Paper Products*, 2013). Under the Green Seal, placemats/tray liners with a basis weight of 26-40 g/m² and grammage of 38.5 – 59.2 g/m² and table coverings with a basis weight of 15-22 g/m² and grammage of 22.2 – 32.6 g/m² are included in the scope. No tensile strength or material specifications regarding ply are prescribed for these specific products. A 1-10 stretch % for water absorbency is prescribed for placemats/tray liners (none for table coverings) and the post-consumer material requirement (%) is 40% for both products. However these products, if printed, must meet specified concentration limits, fragranced products are excluded from the scope. Sanitary napkins and diapers are also excluded from the scope.

Furthermore, Blue Angel and the Austrian ecolabel also include napkins in their scope for tissue paper, but make no specific reference to tablecloths or mats. No specific reference is made to printed or fragranced products or diapers either. Nordic Swan makes no specific mention of napkins, tablecloths, mats or diapers. It however prohibits the use of fragrances but allows for printed products by referring to EN 646 and prohibiting bleeding according to the testing method outlined.

Taking into consideration the above, we propose expanding the scope for tissue paper to include non-sanitary napkins, tablecloths, mats and other such products, as long as these are un-coated. If these products are printed, coloured and/or fragranced, as is commonly the case with tissue paper products, any issues relating to the inks, dyes or fragrances used respectively, are already covered by the criterion for Hazardous chemical substances which addresses softeners, lotions, fragrances and additives of natural origin, as well as dyes and inks. As such, no additional criteria will need to be proposed. Furthermore, printed tissue paper is specifically excluded from the Commission Decision 2012/481/EU on the EU Ecolabel criteria for printed paper (European Commission, 2012b), so it is advisable to be kept under the scope of these criteria.

However if the tissue products are coated tissue paper products and were to be included in the scope, this would require additional sets of criteria to be proposed to address issues such as lamination, which are not currently addressed by the existing criteria. So these products should be excluded from the scope.

To summarise, we propose to align product group scope and definition with ISO 12625 and expand the scope for tissue paper to include non-coated tablecloths, mats, non-sanitary napkins and other such products; to clarify that printed, coloured and/or fragranced tissue paper products continue to be within the scope; and to clarify that coated tissue paper products are excluded from the scope, for the reasons aforementioned.

We propose discussing this further at the 1st AHWG meeting in June 2016, using the following discussion points:

Q: Should the scope of tissue paper be expanded to include non-coated mats, tablecloths, non-sanitary napkins and other such products?

Q: Should the scope of tissue paper continue to include printed, coloured and/or fragranced tissue paper products?

Q: If the scope for tissue paper will continue to include printed tissue paper products, should additional wording be proposed on the printing inks (as is currently the case in the Commission Decision 2012/481/EU on the EU Ecolabel criteria for printed paper under Criterion 2 on Excluded or limited substances and mixtures, part (f) on Printing inks, toners, inks, varnishes, foils and laminates (European Commission, 2012b))?

It could also be argued that the scope for tissue paper products should continue excluding products such as disposable diapers that are absorbent undergarments. Disposable diapers and other such products are excluded from the Green Seal ecolabel (they are also not referenced specifically in the scope for Nordic Swan, Blue Angel and the Austrian ecolabel). These products would rather fall under provisions of EU Ecolabel for absorbent hygienic products (Commission Decision 2014/763/EU), as follows:

'absorbent hygiene products' shall comprise baby diapers, feminine care pads, tampons and nursing pads (also known as breast pads), which are disposable and composed of a mix of natural fibres and polymers, with the fibre content lower than 90 % by weight (except for tampons).

Moreover products regulated under Council Directive 93/42/EEC concerning medical devices should be excluded from the scope.

We propose clarifying the tissue paper definition to make it clear that tissue paper products such as disposable diapers that are absorbent undergarments, are excluded from the scope.

Q: Should the scope of tissue paper be clarified to clearly exclude tissue paper products such as disposable diapers that are absorbent undergarments making reference to the Commission Decision 2014/763/EU?

3.3 Business to Business labels: pulp and paper

It is proposed to also discuss at the 1st AHWG meeting in June 2016 the possibility of introducing a new independent set of criteria specific to the intermediate pulp product, or, alternatively, the option of including a provision for business-to-business (B2B) communication on intermediate products within the existing paper product criteria. Through either alternative, intermediate products could be recognised as Ecolabel compliant, which could help paper producers ensure that the market pulp they are buying does not compromise their capability to apply for the EU Ecolabel for their paper products. It could also be useful for market development by facilitating B2B communication.

If an independent set of criteria was to be proposed, most provisions would be identical to those for paper, with some minor specific provisions relating just to pulp. However, if implementing such an approach, care must be taken to avoid possible consumer confusion with any marketing messages such as "made with EU Ecolabel pulp" for paper products which did not actually obtain the EU Ecolabel. Furthermore, how to handle integrated paper mills would need to be discussed further, as well as how the intermediate product in that instance could be disentangled as opposed to non-integrated mills which have to source the pulp from elsewhere.

Other ecolabels seem to be moving in the same direction. The Nordic ecolabel paper products are all systematically connected to two cross-cutting modules:

- A basic module that covers fibre sourcing, emissions to air and water and energy use.
- A chemicals module that sets out reporting requirements for chemicals used in the process and general restrictions that are placed on those chemicals.

Each actual paper product group (e.g. Tissue Paper or Copying and Printing Paper) then has its own supplementary module which can contain additional new specific criteria, add a higher ambition level to the cross-cutting criteria or introduce specific exemptions and derogations to the cross-cutting criteria.

The cross-cutting modular system permits licensing of market pulps (B2B certification), that meet the requirements of the basic module and chemical module. However, these pulp mills have to be inspected and, subject to approval, the mills are added to a publically available [list of approved pulp suppliers](#). The pulp manufacturer submits the documentation concerning forestry management, emissions, energy use, chemicals used and waste disposal in regard to pulp production. However, it is not permitted to use the Nordic Ecolabel logo on the market pulp so as to avoid any confusion, because technically it is not a final product and no supplementary module exists purely for pulp that would link it to its own specific licencing.

A similar approach regarding the assessment and verification of pulp mills producing market pulp, and linking this to a common database of approved mills appears feasible. This approach could greatly simplify the administrative burdens of both applicants and Competent Bodies alike and improve uptake of the license amongst the best performers within the non-integrated part of the paper industry.

The EU Ecolabel Regulation (EC) No 66/2010 refers to the final product, so market pulp itself could not be awarded the EU Ecolabel but it could be granted the certification of compliance with the criteria X, Y and Z, which would set out as being specifically applicable to pulp only. As with the Nordic approach, it could be prohibited to use the EU Ecolabel logo for pulp that has been inspected and approved this way. The real value in

the B2B approach is really to make it easy for paper producers to locate approved pulp suppliers, so the need for a common and publically available database is essential. The Nordic approach has a logical approach to how information is stored on the database and a distinction in access levels. For example, Competent Bodies should have access to all relevant documentation and data submitted while applicants and potential applicants should only have access to the bare minimum information and data that is needed to prove their compliance with the EU Ecolabel criteria. The publically available data could simply refer to the company, pulp mill site, production capacity and pulp type(s) produced. The database would also offer some tangible type of public recognition for pulp suppliers without running the risk of contravening the final product requirements of the EU Ecolabel Regulation.

Commission Decision 2011/332/EU (European Commission, 2008c, p. 332), Commission Decision 2012/448/EU (European Commission, 2012a, p. 448) and Commission Decision 2009/568/EC (European Commission, 2009a, p. 568) currently state with regards to pulp:

"The ecological criteria cover the production of pulp including all constituent sub-processes from the point at which the fibre raw-material/recycled paper passes the plant gates, to the point at which the pulp leaves the pulp mill. For the paper production processes all sub-processes from the beating of the pulp (disintegration of the recycled paper) to winding the paper onto rolls. Transport, converting and packaging of the pulp, paper or raw materials are not included."

No specific mention of intermediate products is made but no specific exclusion is outlined either. Similarly, no specific mention of intermediate products is made in the EU Ecolabel Regulation (European Commission, 2009) either, nor a specific exclusion. It seems possible therefore to consider proposing new criteria for intermediate products.

We propose discussing this further at the 1st AHWG meeting in June 2016, using the following discussion point:

Q. Which is degree of interest from market pulp suppliers about this?

Q. What is the opinion of Competent Bodies about separate pulp mill audits? Would it follow existing fee structures for licenced products?

Q. If this goes ahead, what are the key roles and responsibilities for maintaining any central database of approved pulp suppliers? Lessons learned from Nordic experience?

4. Criteria proposal

The following section presents the proposed revisions to the existing criteria. Where revisions or additions have been proposed, these have been highlighted in yellow.

4.1 Criterion 1: Emissions to water and air

All pulp and paper production processes result in significant emissions to air and water. The existing criteria were directly linked to the Best Available Technique Associated Emission Levels (BAT-AELs) set out in the BREF document issued in 2001. Article 2(11) of the IED Directive 2010/75/EU, which governs the BREF process, defines BAT as:

"the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole."

A new set of BAT-AELs for the production of pulp, paper and board have been established following the publication of Commission Implementing Decision (2014/687/EU). Hence the revision of the respective emission reference values in line with the BATs conclusion is necessary.

Emissions for indicated parameters vary for individual European mills, mainly because of technological and regional differences such as regional energy mix, fuel supplies and wood species used. To avoid possible discrimination it is proposed as the starting point of the analysis to refer mainly to the AEL ranges and questionnaire responses received during the development of BREF for pulp and paper.

It should be stated that the representative number of mills covered by the BREF questionnaires in 2011 or 2008-2009 varied for different emissions and for different pulp types. For example, BREF responses covered 35-40 out of 72 Kraft mills but only 4 out of 18 CTMP mills. Almost all sulphite mills (13 - 14 out of 16) provided data for the inventory. An overview of current reference emission thresholds per ADt of pulp and paper production is given in the Table 4 below.

Table 4. Overview of current reference emissions levels

	Air						Water								
	S			NOx			P			COD			AOX		
	NP.	CGP	TP	NP.	CGP	TP	NP.	CGP	TP	NP.	CGP	TP	NP.	CGP	TP
Pulp types															
bleached sulphate chemical pulp	0,6	0,6	0,6	1,6	1,6	1,6	0,045	0,045	0,045	18	18	18	0,17	0,17	0,25
bleached sulphite pulp	0,6	0,6	0,6	1,6	1,6	1,6	0,045	0,045	0,045	25	25	25	0,17	0,17	0,25
unbleached chem. pulp	0,6	0,6	0,6	1,6	1,6	1,6	0,04	0,04	0,02	10	10	10	0,17	0,17	0,25
CTMP	0,2	0,2	0,3	0,3	0,3	0,3	0,01	0,01	0,01	15	15	15	0,17	0,17	0,25
TMP/groundwood pulp	0,2	0,2		0,3	0,3		0,01	0,01	0,01	3	3		0,17	0,17	0,25
recovered fibre pulp	0,2	0,2	0,03	0,3	0,3	0,3	0,01	0,01		2	2	3	0,17	0,17	0,25
Paper production															
-non-integrated mills	0,3	0,3	0,03	0,8	0,8	0,5	0,01	0,01	0,01	1		2			
-other mills	0,3	0,3	0,03	0,7	0,7	0,5	0,01	0,01	0,01	1		2			

Further analysis of possible emission levels proposed was based on the reviewed scientific literature and publically available information e.g. sustainability reports.

In many cases paper only contains one type of pulp together with fillers and coating. However, there are also cases where different types of pulps are mixed. The calculation should be then weighted according to the content of each pulp in the final product.

Emissions to air are closely related to the energy consumption and fuel used in the different phases of the production process. Basic data for the energy production are needed in order to calculate total emissions of S and NO_x for the entire paper production.

Established emission thresholds are expressed as specific emission load per tonne of product (i.e. kg/ADT). In case of eucalyptus pulp the specificity of the raw material should be taken into account. Eucalyptus wood is characterised by higher yields than Nordic wood. Even when the same technology is used, eucalyptus pulp will produce in general lower emission load than other pulp. The exception is phosphorus emission which will be higher in case of eucalyptus pulp.

Following initial stakeholder feedback, it is recommended to maintain the existing scoring system with the same flexible weighting approach for emissions of S, NO_x, P and COD.

Determining emissions per type of pulp requires

1. Boundaries to be set for water emissions - e.g. when effluent is sent to a wastewater treatment plant (WWTP) which also receives wastewater from other sources, how are emissions to water of the pulp and/or paper mills assessed?
2. Allocation for situations where co-products other than pulp or paper are produced - e.g. a CHP unit supplying part of produced electricity to the public grid.

Q. How to set the most appropriate ambition level EU Ecolabel benchmarks in the context of the ranges reported for BAT-AELs in the 2014 BREF document. Specific data from existing licence holders is requested to use as a starting point for discussions.

Monitoring of emission parameters

Stakeholder feedback revealed that there are many different test methods used to monitor emissions, stemming directly from national permitting requirements. However, not all results may be comparable. If results are to be directly compared to BAT AELs, then the standard measurement methods used should respect the hierarchy of standards used for the formulation of the BAT, which is as follows:

'BAT is to monitor emissions to (...) in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards which ensure the provision of data of an equivalent scientific quality.'

The JRC Reference Report on Monitoring (ROM) of emissions to air and water from IED installations (revised final draft October 2015) summarises information on the monitoring of emissions to air and water from IED installations provides a practical guidance for the application of the BAT conclusions on monitoring in order to help competent authorities in defining monitoring requirements in the permits of IED installations.

The list of standards and methods test that addresses emission into water and air indicated in ROM document are listed below. The possibility to use continuous methods for air emission analysis should be further consulted during AHWG Meeting.

Table 5. Standards and methods for the measurement of emissions to water and air

Analyte	EN or ISO Standard	Monitoring frequency	Monitoring method	Measurements range and measurements limits	Remarks
COD	ISO 15705:2002	Periodic	Oxidation with dichromate via small-scale sealed tube method followed by a) photometric detection or b) titrimetric detection	a) 6 mg/l (LoD) to 1 000 mg/l b) 15 mg/l (LoD) to 1 000 mg/l	No EN standard; several Member States use national standards for regulatory purposes e.g. NEN 6633 in NL, NF T 90 101 in FR, or DIN 38409-41 in DE)
	ISO 6060:1989	Periodic	Oxidation with dichromate via open reflux method followed by titration	30 mg/l to 700 mg/l	
Total P	EN ISO 6878:2004	Periodic	Spectrometry using ammonium molybdate after digestion with peroxodisulphate or nitric acid	0.005 mg/l to 0.8 mg/l	-
	EN ISO 15681-1:2004 EN ISO 15681-2:2004	Periodic	Flow analysis (FIA and CFA) after manual digestion with peroxodisulphate	0.1 mg/l to 10 mg/l	
	EN ISO 11885:2009	Periodic	Inductively coupled plasma optical emission spectrometry (ICP-OES)	LoQ: ~ 0.013 mg/l	
AOX	EN ISO 9562:2004	Periodic	Determination of organically bound chlorine, bromine and iodine (expressed as chloride) adsorbable on activated carbon	10 µg/l to 300 µg/l	-
Nitrogen oxides (NOx)	EN 21258:2010	Periodic	Extraction, filtration and conditioning followed by non-dispersive infrared spectrometry	Up to 1 300 mg/m ³ at large combustion plants; Up to 400 mg/m ³ at waste (co-)incineration plants	-
Sulphur oxides (SOx)	EN 14791:2005	Periodic	Extraction and filtration followed by absorption in aqueous H ₂ O ₂ solution with subsequent sulphate determination via ion chromatography or titration	- Ion chromatography: 0.5 mg/m ³ to 2000 mg/m ³ (sampling duration 30 min) (3) (4); LoD: ≥ 0.1 mg/m ³ (flow rate of 1 l/min, 100 ml of absorption solution, sampling duration of 30 min) - Titration: 5 mg/m ³ to 2 000 mg/m ³ (sampling duration 30 min) (3) (4); LoD ≥ 2.2 mg/m ³ (flow rate of 1 l/min, 100 ml of absorption solution, sampling duration of 30 min)	-
Nitrogen oxides (NOx)	EN 14792:2005	Continuous,	Chemiluminescence, FTIR, NDIR, NDUV, DOAS.	Lowest range: ≤ 1.6 mg/m ³ (LoQ req.) to 20 mg/m ³ Highest range: to 7.5 g/m ³	AMS ¹ , SRM ² ; Certification and calibration standards: EN15267-1:2009, EN15267-2:2009, EN15267-3:2007, and EN 14181:2014.
Sulphur oxides (SOx)	EN 14791:2005	Continuous,	FTIR, NDIR, NDUV, DOAS	Lowest range: ≤ 0.8 mg/m ³ (LoQ req.) to 10 mg/m ³ Highest range: to 8.0 g/m ³	

¹ AMS - automated measuring systems (AMSs)² Validation & calibration methods using Standard Reference Methods (SRMs), after the AMS has been installed.

4.1.1. Criterion 1a) Chemical Oxygen demand (COD), Phosphorus (P), Sulphur (S), Nitrogen oxides (NOx)

Table 6. Emissions to water and air criteria – existing criteria for COD, P, S and NOx

Tissue Paper	Copying and Graphic Paper	Newsprint Paper																																																																																
Existing criteria																																																																																		
<p>For each of these parameters, the emissions to air and/or water from the pulp and the paper production shall be expressed in terms of points (P_{COD}, P_p, P_S, P_{NOx}) as detailed below.</p> <p>None of the individual points P_{COD}, P_p, P_S, or P_{NOx} shall exceed 1,5.</p> <p>The total number of points (P_{total} = P_{COD} + P_p + P_S + P_{NOx}) shall not exceed 4,0.</p> <p>The calculation of P_{COD} shall be made as follows (the calculations of P_p, P_S, and P_{NOx} shall be made in exactly the same manner).</p>																																																																																		
<p>For each pulp ‘i’ used, the related measured COD emissions (COD_{pulp,i} expressed in kg/air dried tonne — ADT), shall be weighted according to the proportion of each pulp used (pulp_i with respect to air dried tonne tissue paper). The weighted COD emission for the pulps is then added to the measured COD emission from the paper production to give a total COD emission, COD_{total}.</p>	<p>For each pulp ‘i’ used, the related measured COD emissions (COD_{pulp i} expressed in kg/air dried tonne — ADT), shall be weighted according to the proportion of each pulp used (pulp i with respect to air dried tonne of pulp), and summed together. The weighted COD emission for the pulps is then added to the measured COD emission from the paper production to give a total COD emission, COD_{total}.</p>																																																																																	
<p>The weighted COD reference value for the pulp production shall be calculated in the same manner, as the sum of the weighted reference values for each pulp used, and added to the reference value for the paper production to give a total COD reference value COD_{reftotal}. The reference values for each pulp type used and for the paper production are given in the table 1</p> <p>Finally, the total COD emission is divided by the total COD reference value as follows:</p>																																																																																		
$P_{COD} = \frac{COD_{total}}{COD_{reftotal}} = \frac{\sum_{i=1}^n [pulp_i * (COD_{pulp,i})] + COD_{papermachine}}{\sum_{i=1}^n [pulp_i * (COD_{refpulp,i})] + COD_{refpapermachine}}$																																																																																		
<p><i>Table 1</i> Reference values for emissions from different pulp types and from paper production (kg/ADT)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pulp Grade/Paper</th> <th>COD_{reference}</th> <th>P_{reference}</th> <th>S_{reference}</th> <th>NOx_{reference}</th> </tr> </thead> <tbody> <tr> <td>Chemical pulp (others than sulphite)</td> <td>18,0</td> <td>0,045</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>Chemical pulp (sulphite)</td> <td>25,0</td> <td>0,045</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>Unbleached chemical pulp</td> <td>10,0</td> <td>0,02</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>CTMP</td> <td>15,0</td> <td>0,01</td> <td>0,3</td> <td>0,3</td> </tr> <tr> <td>Recycled fibre pulp</td> <td>3,0</td> <td>0,01</td> <td>0,03</td> <td>0,3</td> </tr> <tr> <td>Tissue Paper</td> <td>2,0</td> <td>0,01</td> <td>0,03</td> <td>0,5</td> </tr> </tbody> </table>	Pulp Grade/Paper	COD _{reference}	P _{reference}	S _{reference}	NOx _{reference}	Chemical pulp (others than sulphite)	18,0	0,045	0,6	1,6	Chemical pulp (sulphite)	25,0	0,045	0,6	1,6	Unbleached chemical pulp	10,0	0,02	0,6	1,6	CTMP	15,0	0,01	0,3	0,3	Recycled fibre pulp	3,0	0,01	0,03	0,3	Tissue Paper	2,0	0,01	0,03	0,5	<p><i>Table 1</i> Reference values for emissions from different pulp types and from paper production (kg/ADT)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pulp Grade/Paper</th> <th>COD_{reference}</th> <th>P_{reference}</th> <th>S_{reference}</th> <th>NOx_{reference}</th> </tr> </thead> <tbody> <tr> <td>Bleached chemical pulp (others than sulphite)</td> <td>18,0</td> <td>0,045*</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>Bleached chemical pulp (sulphite)</td> <td>25,0</td> <td>0,045</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>Unbleached chemical pulp</td> <td>10,0</td> <td>0,02</td> <td>0,6</td> <td>1,6</td> </tr> <tr> <td>CTMP</td> <td>15,0</td> <td>0,01</td> <td>0,3</td> <td>0,3</td> </tr> <tr> <td>TMP / groundwood pulp</td> <td>3,0</td> <td>0,2</td> <td>0,3</td> <td>0,01</td> </tr> <tr> <td>Recycled fibre pulp</td> <td>3,0</td> <td>0,01</td> <td>0,03</td> <td>0,3</td> </tr> <tr> <td>Paper (non-integrated mills where all pulps used are purchased market pulps)</td> <td>1</td> <td>0,3</td> <td>0,01</td> <td>0,8</td> </tr> <tr> <td>Paper (other mills)</td> <td>1</td> <td>0,3</td> <td>0,01</td> <td>0,7</td> </tr> </tbody> </table>		Pulp Grade/Paper	COD _{reference}	P _{reference}	S _{reference}	NOx _{reference}	Bleached chemical pulp (others than sulphite)	18,0	0,045*	0,6	1,6	Bleached chemical pulp (sulphite)	25,0	0,045	0,6	1,6	Unbleached chemical pulp	10,0	0,02	0,6	1,6	CTMP	15,0	0,01	0,3	0,3	TMP / groundwood pulp	3,0	0,2	0,3	0,01	Recycled fibre pulp	3,0	0,01	0,03	0,3	Paper (non-integrated mills where all pulps used are purchased market pulps)	1	0,3	0,01	0,8	Paper (other mills)	1	0,3	0,01	0,7
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Paper (other mills)	1	0,3	0,01	0,7																																																																														
<p>*Exemption for the P reference-value of bleached chemical pulp (others than sulphite) in Table 1, up to a level of 0,1 shall be granted where it is</p>																																																																																		

	demonstrated that the higher level of P is due to P naturally occurring in wood pulp.
In case of a co-generation of heat and electricity at the same plant the emissions of NOx and S shall be allocated and calculated according to following equation The share of the emissions from the electricity generation =	In case of co-generation of heat and electricity at the same plant, the emissions of S and NO x resulting from electricity generation can be subtracted from the total amount. The following equation can be used to calculate the proportion of the emissions resulting from electricity generation:
$2 \times (\text{MWh}(\text{electricity})) / [2 \times \text{MWh}(\text{electricity}) + \text{MWh}(\text{heat})]$	
The electricity in this calculation is the net electricity, where the part of the working electricity that is used at the power plant to generate the energy is excluded i.e. the net electricity is the part that is delivered from the power plant to the pulp/paper production. The heat in this calculation is the net heat, where the part of the working heat that is used at the power plant to generate the energy, is excluded i.e. the net heat is the part that is delivered from the power plant to the pulp/paper production.	The electricity in this calculation is the electricity produced at the co-generation plant. The heat in this calculation is the net heat delivered from the power plant to the pulp/paper production.
Assessment and verification: The applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation, which shall include test reports using the specific test methods for each parameter or equivalent as indicated below: COD: ISO 6060; DIN 38409 part 41, NFT 90101 ASTM D 125283, Dr Lang LCK 114, Hack or WTW, P: EN ISO 6878, APAT IRSA CNR 4110 or Dr Lange LCK 349, NO x : ISO 11564, S(oxid.): EPA no.8, S(red.): EPA no 16A, S content in oil: ISO 8754, S content in coal: ISO 351.	Assessment and verification: the applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation which shall include test reports using the following test methods: COD: ISO 6060; NOx: ISO 11564; S(oxid.): EPA no.8; S(red.): EPA no 16A; S content in oil: ISO 8754; S content in coal: ISO 351; P: EN ISO 6878, APAT IRSA CNR 4110 or Dr Lange LCK 349.
The supporting documentation shall include an indication of the measurement frequency and the calculation of the points for COD, P, S and NOx. It shall include all emissions of S and NOx, which occur during the production of pulp and paper, including steam generated outside the production site, except those emissions related to the production of electricity. Measurements shall include recovery boilers, limekilns, steam boilers and destructor furnaces for strong smelling gases. Diffuse emissions shall be taken into account. Reported emission values for S to air shall include both oxidised and reduced S emissions (dimethyl sulphide, methyl mercaptan, hydrogen sulphide and the like). The S emissions related to the heat energy generation from oil, coal and other external fuels with known S content may be calculated instead of measured, and shall be taken into account	
Samples of the emissions to water shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In the case of a new, or a rebuilt production plant, when emission measurements are not available for a 12-month period, the results shall be based on emission measurements taken once a day for 45 consecutive days, after the plants emissions values have stabilised.	Measurements of emissions to water shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In case of a new or a rebuilt production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign. In case of integrated mills, due to the difficulties in getting separate emission figures for pulp and paper, if only a combined figure for pulp and paper production is available, the emission values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.

The existing criteria for emissions to water and air are very similar for CGP, NP and TP. Common text is presented in the table above in merged cells except for paragraphs where some significant differences in wording exist, which are highlighted in red in split cells. The proposed criteria are presented below.

Table 7. Emissions to water and air – proposed criteria for COD, P, S and NOx

Tissue Paper	Copying and Graphic Paper	Newsprint Paper		
Proposed Criteria				
None of the individual points P_{COD} , P_{S} , P_{NO_x} , P_{P} shall exceed 1,5.				
The total number of points ($P_{\text{total}} = P_{\text{COD}} + P_{\text{S}} + P_{\text{NO}_x} + P_{\text{P}}$) shall not exceed 4,0.				
The calculation of P_{COD} shall be made as follows (the calculations of P_{P} , P_{S} , and P_{NO_x} shall be made in exactly the same manner.				
For each pulp 'i' used, the related measured COD emissions ($\text{COD}_{\text{pulp},i}$ expressed in kg/air dried tonne — ADT), shall be weighted according to the proportion of each pulp used (pulp i with respect to air dried tonne of pulp), and summed together. The weighted COD emission for the pulps is then added to the measured COD emission from the paper production to give a total COD emission, $\text{COD}_{\text{total}}$.				
The weighted COD reference value for the pulp production shall be calculated in the same manner, as the sum of the weighted reference values for each pulp used, and added to the reference value for the paper production to give a total COD reference value $\text{COD}_{\text{reftotal}}$. The reference values for each pulp type used and for the paper production are given in the table 1				
Table 1. Reference values for emissions from different pulp types and from paper production				
Pulp Grade/Paper	$\text{COD}_{\text{reference}}$	$P_{\text{reference}}$	$S_{\text{reference}}$	$\text{NO}_x_{\text{reference}}$
Bleached chemical pulp (others than sulphite)	7,0 – 16,0	0,01-0,03*	0.1-0,4	1,0-1,5
Bleached chemical pulp (sulphite)	25,0	0,01-0,03	0.1-0,4	1,0-1,5
Unbleached chemical pulp	2,5 – 8,0	0,01-0,02	0.1-0,4	1,0-1,5
CTMP	12,0-15,0	0,001 – 0,01	?	?
TMP / groundwood pulp	0,9 – 3,0	0,001 – 0,01	?	?
Recycled fibre pulp	0,9 – 2,0	0,001 – 0,01	?	?
Paper (non-integrated mills where all pulps used are purchased market pulps)	0,15-1,0	0,003 – 0,0045	0,003-0,18	0,03-0,24
Paper (other mills)	0,15-1,0	0,003 – 0,0045	0,003-0,18	0,03-0,24
(*) ADT = Air dry tonne assumes a 90% dry matter content for pulp. The actual dry matter content for paper is usually around 95%. In the calculations the reference values for the pulps shall be adjusted to correspond to the dry fibre content of the paper that most often is more than 90%.				
Finally, the total COD emission is divided by the total COD reference value as follows				
$P_{\text{COD}} = \frac{\text{COD}_{\text{total}}}{\text{COD}_{\text{reftotal}}} = \frac{\sum_{i=1}^n [\text{pulp},i * (\text{COD}_{\text{pulp},i})] + \text{COD}_{\text{papermachine}}}{\sum_{i=1}^n [\text{pulp},i * (\text{COD}_{\text{refpulp},i})] + \text{COD}_{\text{refpapermachine}}}$				
In cases where co-generation of heat and electricity occur at the same plant, the emissions of S and NOx resulting from electricity generation can be subtracted from the total amount. The following equation can be used to calculate the proportion of the emissions resulting from electricity generation:				
$2 \times (\text{MWh}(\text{electricity}))/[2 \times \text{MWh}(\text{electricity}) + \text{MWh}(\text{heat})]$				

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
The electricity in this calculation is the electricity produced at the co-generation plant. The heat in this calculation is the net heat delivered from the power plant to the pulp/paper production.		
<p>Assessment and verification: the applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation which shall include test reports using the following test methods: COD: ISO 6060; NOx: ISO 11564; S(oxid.): EPA no.8; S(red.): EPA no 16A; S content in oil: ISO 8754; S content in coal: ISO 351; P: EN ISO 6878, APAT IRSA CNR 4110 or Dr Lange LCK 349.</p> <p>The supporting documentation shall include an indication of the measurement frequency and the calculation of the points for COD, P, S and NOx. It shall include all emissions of S and NOx which occur during the production of pulp and paper, including steam generated outside the production site, except those emissions related to the production of electricity. Measurements shall include recovery boilers, lime kilns, steam boilers and destructor furnaces for strong smelling gases. Diffuse emissions shall be taken into account. Reported emission values for S to air shall include both oxidised and reduced S emissions (dimethyl sulphide, methyl mercaptan, hydrogen sulphide and the like). The S emissions related to the heat energy generation from oil, coal and other external fuels with known S content may be calculated instead of measured, and shall be taken into account.</p> <p>Measurements of emissions to water shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In case of a new or a rebuilt production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.</p> <p>In case of integrated mills, due to the difficulties in getting separate emission figures for pulp and paper, if only a combined figure for pulp and paper production is available, the emission values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.</p>		

Rationale

Emissions to air

The emissions to air are closely related to the energy consumption in the different phases of the production process. It is therefore, necessary to have basic data for the energy production to be able to calculate the total emissions of S and NO_x for the entire pulp/paper production.

The characteristics and composition of the fuel used in the boilers have a considerable impact on the emissions to air and determine, together with the type and design of the boiler and the type, design and operation of the emission control measures, the final emissions to air from a boiler. The sulphur content of fuels may range from 0.05 % or even lower for biomass and low-sulphur oil up to about 4 % for high-sulphur coal and oil.

BAT 9 indicates the frequency of monitoring of parameters that addresses air emission. The recommended monitoring frequency for NO_x and S should be based on periodic or continuous measurements. BAT-AELs are reported as yearly average.

The information that supports the revised criteria represents the preliminary analysis of possible settings of emission levels. *It can be therefore anticipated that the further consultation with industry stakeholders will be conducted in order to set up a new thresholds.*

Table 8 indicates the comparison between the current emission levels established in the EU Ecolabel criteria with Nordic Swan, and emission levels indicated in BREF document as possible to be achieved when using best available techniques.

A more detailed analysis of the emission data presented in the subsequent chapters indicates that for most emitted substances and pulp types it is possible to lower the reference values.

Table 8 Overview of reference emission values in Ecolabel and Nordic Swan certification schemes and BAT emission thresholds.

	S-compounds (kg/ADT)					NO _x (kg/ADT)				
	Ecolabel		BREF*	Nordic		Ecolabel		BREF*	Nordic	
	NP, CGP	TP		CGP	TP	NP, CGP	TP		CGP	TP
Pulp types										
Bleached chemical pulp	0,6	0,6	0,09 - 0,25	0,6	0,6	1,6	1,6	1,10 - 2,05	1,5	1,5
Bleached sulphite pulp	0,6	0,6		0,6	0,6	1,6	1,6		1,5	1,5
Unbleached chemical pulp	0,6	0,6	0,09 - 0,25	0,6	0,6	1,6	1,6	1,10 - 2,05	1,5	1,5
CTMP	0,2	0,3		0,2	0,2	0,3	0,3		0,25	0,25
TMP/groundwood pulp (ntegrated)	0,2	x		0,2	0,2	0,3	x		0,25	0,25
Recovered fibre pulp	0,2	0,03		0,2	0,2	0,3	0,3		0,25	0,25
Paper production										
- non-integrated mills, all pulps purchased	0.3					0.8				
a) newsprint paper grade				0,3	0,3				0,7	0,7
b) printing and copying grade										
- uncoated				0,3	0,3				0,7	0,7
- coated				0,3	0,3				0,7	0,7
c) tissue grade		0.03					0.5			
- other mills	0.3					0.7				

The BREF unit are given in mg/Nm³ at 6 % O₂. The rough estimation per product (ADt) was done for the specific emissions using the product of fuel consumption benchmark in GJ/ADt and BAT AELs emission levels for boilers

Currently EU Ecolabel criteria does not consider emission threshold for NO_x and SO₂ as per the product type. An indication of appropriate benchmark levels for paper production could be roughly estimated by combining benchmark levels for fuel consumption for non-integrated mills (in GJ/ADt) with benchmark levels for emissions to air (in kg/GJ fuel). The fuel was assumed to be either natural gas or biomass (mainly bark). The need to introduce such requirement should be further consulted during the AHWG Meeting.

Table 9. Indication of a possible benchmark for SO₂ and NO_x emission per product type.

	a) ETS fuel bench mark	b) BAT REF emission benchmark, g/GJ				(a x b) Pseudo benchmark levels for emissions to air (kg/ADt)		As reference, Nordic Swan levels	
		natural gas		biomass		SO ₂	NO _x	SO ₂	NO _x
	GJ/Adt	SO ₂	NO _x	SO ₂	NO _x				
Newsprint paper grade	5,3	0,5	30	5	40	0,0027-0,0266	0,1598-0,2131	0,3	0,7
Printing and copying grade									
- uncoated	5,7	0,5	30	5	40	0,0028-0,0283	0,1696-0,2261	0,3	0,7
- coated	5,7	0,5	30	5	40	0,0028-0,0283	0,1696-0,2261	0,3	0,7
Tissue grade	5,9	0,5	30	5	40	0,0030-0,0297	0,1782-0,2376		

The existing EU Ecolabel criteria under revision address the allocation aspect:

"In case of co-generation of heat and electricity at the same plant, the emissions of S and NO_x resulting from electricity generation can be subtracted from the total amount. The following equation can be used to calculate the proportion of the emissions resulting from electricity generation:

$$[2 \cdot MWh_e] / [2 \cdot MWh_e + MWh_{heat}] .$$

The electricity in this calculation is the electricity produced at the co-generation plant. The heat in this calculation is the net heat delivered from the power plant to the pulp/paper production."

The defined allocation methodology might be perceived as simplified and not harmonised with generally accepted allocation methodologies applied in LCAs and in NO_x and CO₂ emission trading schemes, these being based on actual efficiencies.

Q: Given the issues mentioned, redesigning the methodology for calculating energy consumptions and emissions might be advisable.

4.1.1.1 Reference emissions loads for S-compounds

The most common and often the most economical way to control SO₂ in the pulp and paper industry is by using a low-sulphur fossil fuel. If bark alone is burnt, SO₂ emissions are low. In fluidised bed boilers, injection of lime into the boiler is an efficient measure. Secondary control technologies include spray dry scrubbers, sorbent injection processes and wet scrubbers (wet scrubbers are however not applied in the sector with the exception of recovery boilers).

For S-compounds current reference levels and proposed new reference levels are given in Table 10.

Table 10. Current and proposed reference levels for emissions of S-compounds (kg/ADt)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	0,6	0,6	0,6	0,1-0,4		
Bleached sulphite pulp	0,6	0,6	0,6	0,1-0,4		
Unbleached chemical pulp	0,6	0,6	0,6	0,1-0,4		
CTMP	0,2	0,2	0,3	?	?	?
TMP groundwood	0,2	0,2		?	?	?
TMP Recovered fibre pulp	0,2	0,2	0,2	?	?	?
Paper production						
Non-integrated mills	0,3	0,3	0,03	0,003-0,18	0,003-0,18	0,003-0,18
Other mills	0,3	0,3	0,03	0,003-0,18	0,003-0,18	0,003-0,18

The rationales that supports the preliminary proposal for reference levels are discussed separately in the subparagraphs below.

4.1.1.1.1. Bleached and unbleached sulphate pulp

Figure 3 shows the current total sulphuric emission ($\text{SO}_2\text{-S}$ and TRS-S) from all processes collected from European mill that participated in the data collection conducted by EIPPCB (JRC.2015). The total process emissions exclude emissions from auxiliary boilers or other steam and power plants.

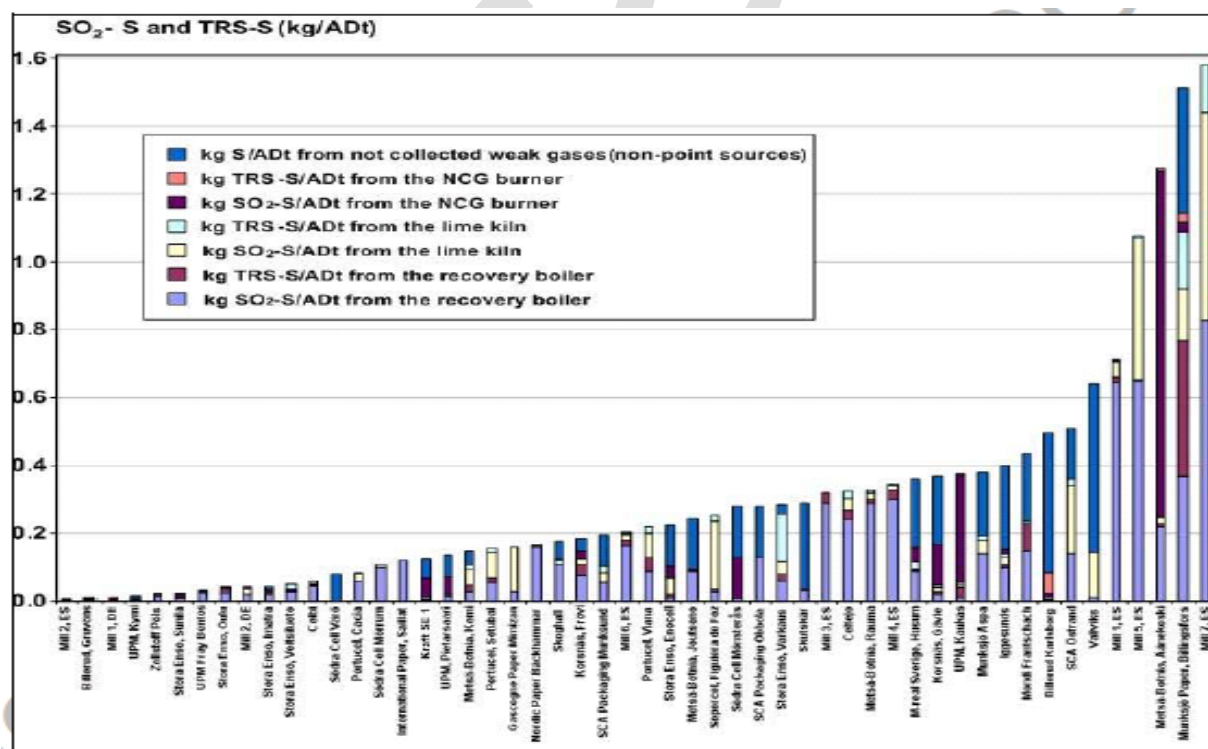


Figure 3. Total S emission load as kg S/ADt from major processes (JRC. 2015)

As indicated in Figure 3 in 2011 almost 90% of European mills that took part in the questionnaire already met existing EU Ecolabel reference values for specific sulphur

emission of 0,6 kg S/ADt. 55 % of the reporting mills (29 out of 52) oscillated within the range of 0.1 -0.4 kg S/ADt which seems a reasonable starting point for the further discussion. Almost 30% of the operational plants reported a specific emission load lower than 0,1 kg S/ADt.

4.1.1.1.2. Sulphite pulp

For sulphite pulp mills, data for emissions of S-compounds to air is more limited.

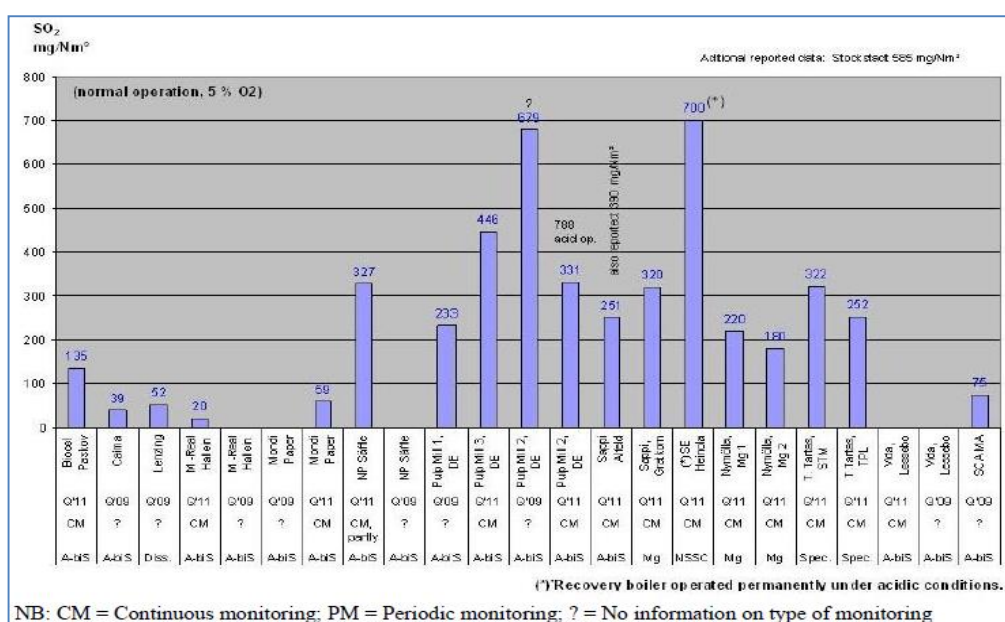


Figure 4: SO₂ emissions from the recovery boiler (JRC. 2015)

For the approximate conversion of concentration levels given in Figure 4 into kg SO₂/ADt of pulp, a flue gas volume of approximately 7.500 Nm³/ADt (5 vol% O₂) may be applied as a first estimate for the specific flue gas volume per unit of air dry pulp. The adapted estimation derived from information contained in BREF document for pulp and paper (JRC, 2015). Based on this assumption, approximate flue gas volume emission values of 0,1 - 0,3 kg S/ADt can be deduced from the lowest concentration values given in Figure 4.

No indication can be given about the representativeness of the current EU Ecolabel reference emission value for S-compounds, and whether a different value would be more representative. It is therefore proposed to assume one value for chemical pulping (sulphite and sulphate) of 0,1-0,4 kg S/ADt

Q: The stakeholders are kindly asked if more information could be provided

4.1.1.1.3. Mechanical pulp and Chemi-thermomechanical pulp (CTMP)

Because of essential differences between pulping processes BAT-AELs does not address emission of sulphur from mechanical and semi-mechanical process. Combustion of fuel for on-site energy generation might potentially be a source of SO₂ emission. It is to be considered if revised criteria should give more flexible approach for those Member States that because of existent infrastructure rely on fossil fuels.

Nordic Swan criteria establishes the threshold value at the level of 0,2 S ref/ADt.

It is to be discussed with stakeholders if the possible emissions value could be established as zero, or there is a need to introduce more flexible approach.

The proposal is based on following rationales:

- Process related emissions of S-compounds, including emissions of odorous compounds are negligible;
- There are no residues that have to be incinerated onsite, as with black liquor in sulphate pulping. The bark and other residues produced during wood preparation, pulping and waste water treatment need not be incinerated onsite. In fact, bark is frequently supplied to third parties as a fuel (JRC, 2015) or is utilized as an auxiliary in e.g. composting (SPIN, 1993). Pulp residues, rejects and sludge may also be supplied to external customers as a fuel. These may not always be pulp mills and paper mills, but also district heating plants or biomass fired power stations;
- Theoretically, heat demand for TMP pulping and chemithermomechanical pulping (CTMP) is compensated by the amount of heat that can be recovered in form of steam and/or hot water.

4.1.1.1.4. Recycled fibre

Emissions to air from paper recycling originate mainly from energy generation (steam and electricity) and less from the manufacturing process itself. In accordance with the ETS fuel benchmark preferred fuel for onsite energy generation is natural gas. Emissions of S-compounds for natural gas combustion are negligible. Nevertheless some companies incinerate rejects and sludge in on-site incineration plants generating steam used in production process. The incineration is associated with emission into air.

Nordic Swan criteria establishes the threshold value at the level of 0,2 S ref/ADt.

It is to be discussed with stakeholders if the possible emissions value could be established as zero, or there is a need to introduce more flexible approach.

4.1.1.1.5. Paper production

Heat demand for stock preparation and paper machine amounts to approximately 5±1 GJ/ADt of paper on average. In integrated plants producing chemical pulp, TMP pulp or CTMP pulp the heat demand can be (almost completely) met with heat from recovery boiler/bark boiler and mechanical pulping respectively. This implies no additional emissions have to be taken into account with respect to heat demand for paper production.

In non-integrated mills fuel for generation of the process heat required for stock preparation and paper machine should preferably be natural gas. Natural gas is also the benchmark fuel in the ETS. Nevertheless the availability of the natural gas across EU-28 should be taken into account. It is to be considered if revised criteria should give more flexible approach for those Member States that because of existent infrastructure rely on fossil fuels. Nordic Swan criteria establishes the threshold value at the level of 0,3 S ref/ADt for paper machine (coated and uncoated paper), and 0,5 for paper machine for speciality paper. As indicated in Table 11, at the beginning of the Chapter, rough estimation indicates a possible benchmark at the level of 0,003-0,18 S kg/ADt.

It is to be discussed with stakeholders if the possible emissions value could be established as zero, or there is a need to introduce more flexible approach.

4.1.1.2. Reference emissions loads for NO_x

For NO_x current reference levels and proposed new reference levels are given below.

Table 11. Current and proposed reference levels for specific emissions of NO_x (figures in kg/ADt)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	1,6	1,6	1,6	1,0-1,5	1,0-1,5	1,0-1,5
Bleached sulphite pulp	1,6	1,6	1,6	1,0-1,5	1,0-1,5	1,0-1,5
Unbleached chemical pulp	1,6	1,6	1,6	1,0-1,5	1,0-1,5	1,0-1,5
CTMP	0,3	0,3	0,3	?	?	?
TMP	0,3	0,3		?	?	?
Ground wood	0,3	0,3		?	?	?
Recovered fibre pulp	0,3	0,3	0,3	?	?	?
Paper production						
- non-integrated mills	0,8	0,8	0,5	0,03-0,24	0,03-0,24	0,03-0,24
- other mills	0,7	0,7	0,5	0,03-0,24	0,03-0,24	0,03-0,24

4.1.1.2.1. Bleached and unbleached sulphate pulp

Figure 5 shows the current total NO_x emission collected from European mills that participated in the data collection conducted by EIPPCB (JRC, 2015).

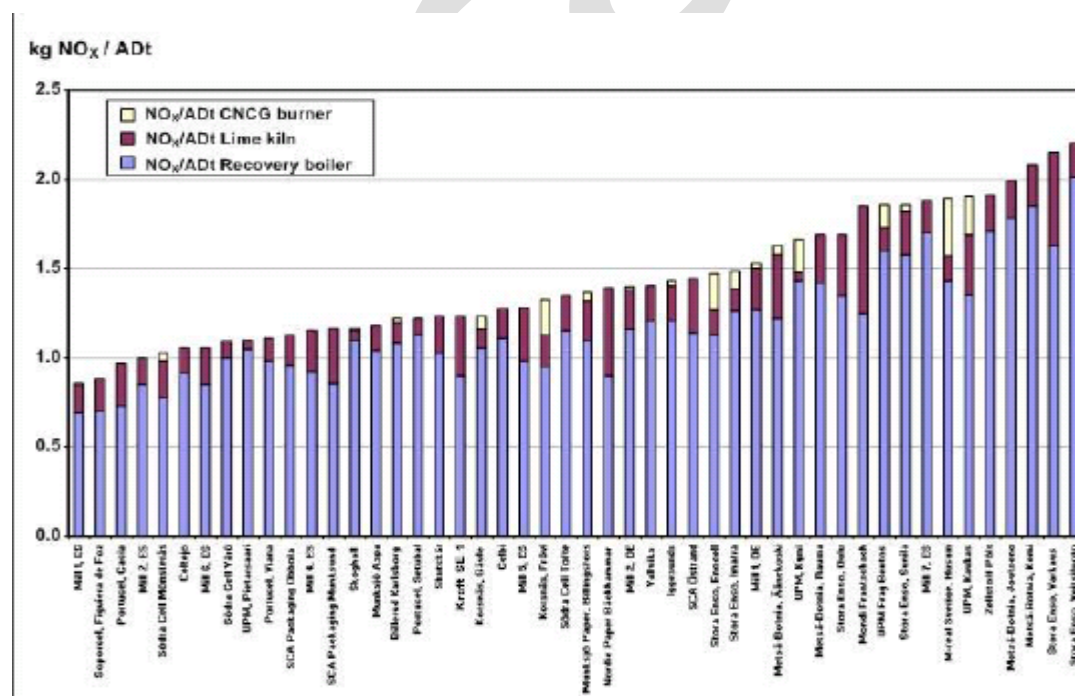


Figure 5. Total NO_x emission load (as NO₂/ADt) from major processes (recovery boiler, lime kiln, NCG burner)

In 2011 almost 80% of European mills that took part in the questionnaire already met existing Ecolabel reference value for NO_x emission of 1,6 kg NO_x/ADt, whereas 58 % of the reporting mills (28 out of 48) oscillated within the emission range of 1 -1,5 kg

NO_x/ADt which seems a reasonable preliminary proposal subjected to the further consultation.

It is relevant to state that more ambitious emission limit for NO_x is technically feasible considering that:

- In practice only primary NO_x-reduction measures are applied, such as low NO_x burners and staged combustion. It seems the full potential of primary measures is not being fully utilized. Information available at the 'Paper Environmental Footprint' website indicates that with more extensive staged combustion and integration of an OFA (over fire air) system NO_x emissions reductions of 20% - 40% could be achieved.
- Use of selective catalytic reduction (SCR); Lahti Energy RDF gasification plant with ceramic filter for high temperature removal of condensed volatile salts at 400°C illustrated that the risk of catalyst deactivation can in theory be mitigated by installing high temperature filters. These filters can even be designed to be based on catalytic ceramic materials, acting as a SCR reactor.
- Another technical option for deep removal of NO_x is wet scrubbing at low temperatures.
- New technological developments may allow application of secondary and tertiary measures such as SCR DeNO_x, currently not yet applied because of technical risks.

4.1.1.2.2. Sulphite pulp

For sulphite pulp mills insufficient information is currently available for assessing current reference emission levels. Therefore common value for chemical pulps (sulphite and sulphate) is proposed to establish as a primary proposal for the further discussion: 1 - 1,5 kg NO_x/ADt.

4.1.1.2.3. Mechanical pulp mills and Chemithermomechanical pulp (CTMP)

Based on arguments given for emissions of S-compounds, it is to be discussed with stakeholders if the possible emissions value could be established as zero, or there is a need to introduce more flexible approach. Nordic Swan criteria establishes the threshold value at the level of 0,25 NO_x/ADt.

4.1.1.2.4. Recycled fibre

Emissions to air from paper recycling originate mainly from energy generation (steam and electricity) and less from the manufacturing process itself.

According to (JRC, 2015) the technical benchmark emission values for natural gas fired boilers amounts to 30 g/GJ. In the ETS, the benchmark fuel consumption for recovered fibres is 0,6 GJ/ADt of natural gas. For market pulp an additional 2,2 GJ/ADt will be required for a flash dryer for drying the recovered pulp.

Combining NO_x BATs emission level for gas fired boilers with the above fuel requirements gives:

- 0,018 kg NO_x/ADt for recovered fibre production in an integrated paper mill
- 0,085 kg NO_x/ADt for market pulp.

The benefit of this approach is that it is consistent with the ETS methodology.

Nordic Swan criteria establishes the threshold value at the level of 0,25 NO_x/ADt.

The emission will mainly depend on the fuel used. There is a limited data availability to set up the proposal for the revised threshold value. Therefore this issue should be contrasted with stakeholders and license holders feedback.

4.1.1.2.5. Paper production

In paper mills utilizing recovered fibres or market pulp, heat demand for stock preparation and paper machine will need to be covered by fossil fuel or biomass fired boilers.

Similarly to the sulphur emission (see Table 10), it is proposed to base a preliminary proposal on the theoretical benchmark estimation which is consistent with the ETS methodology of 0,03-0,24 kg NO_x/ADt.

Nordic Swan criteria establishes the threshold value at the level of 0,7 NO_x/ADt.

The proposed change is based on the theoretical estimation and implies a considerable reduction of a revised threshold (as currently 0,5-0,7 NO_x/ADt). Therefore the feasibility to set a new requirement should be contrasted with stakeholders and license holders feedback.

Emissions to water (COD, P)

BAT 10 indicates the frequency of monitoring of parameters that addresses emission into water. The recommended monitoring frequency should be conducted daily for COD, and once a week for P. Monitoring frequency of AOX emission should be conducted once a month for bleached kraft pulp or once every two months for the other types of bleached pulp. The criterion assessment and verification has been adapted accordingly.

The comparison of the current EU Ecolabel emission thresholds (for COD and P), with the values established by Nordic Swan and BAT-AELs levels is set in Table 12.

Table 12. Overview of reference emission values in EU Ecolabel and Nordic Swan and BAT- AELs emission values

	COD					P				
	Ecolabel		BAT-REF	Nordic Swan		Ecolabel		BAT-REF	Nordic Swan	
	NP, CGP	TP		CGP	TP	NP, CGP	TP		CGP	TP
Pulp types										
Bleached chemical pulp	18	18	7 - 20	18	18	0,04 5	0,04 5	0,01 - 0,03	0,03	0,03
Bleached sulphite pulp	25	25	10 - 30	25	25	0,04 5	0,04 5	0,01 - 0,05	0,03	0,03
Unbleached chemical pulp	10	10	2,5 – 8,0	10	10	0,04	0,02	0,01 - 0,02	0,02	0,02
CTMP	15	15	12 - 20	15	15	0,01	0,01	0,001 - 0,01	0,01	0,01
TMP/groundwood pulp (ntegrated)	3	0	0,9 – 4,6	3	3	0,01	0,01	0,001 - 0,01	0,01	0,01
Recovered fibre pulp	2	3		3	3	0,01	x		0,01	0,01
a) newsprint, copying and printing			0,9 – 3,0					0,002 - 0,01		
b) tissue			0,9 – 4,0					0,002 - 0,015		
Paper production										
- non-integrated mills, all pulps purchased	1	2	0,15 – 0,15			0,01	0,01	0,003 - 0,012		
a) newsprint paper grade										
b) printing and copying grade										
- uncoated				2	2				0,01	0,01
- coated				2,5	2,5				0,01	0,01
c) tissue grade		2					0,01			
- other mills	1					0,01				

4.1.1.3. Reference emissions loads for COD

The comparison between the current COD reference values and proposed new reference levels for the further consultation are given in Table 13. The reference levels reflect BAT-AELs values. The rationale that is meant to stipulate the stakeholders' discussion for the different proposed reference levels are given in sub-paragraphs below.

Table 13. Current and proposed new reference levels for specific emissions of COD (all figures in kg COD /ADt)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	18	18	18	7 - 16	7 -16	7 - 16
Bleached sulphite pulp	25	25	25	25	25	25
Unbleached chemical pulp	10	10	10	2,5 - 8	2,5 -8	2,5 - 8
CTMP	15	15	15	12-15	12-15	12-15
TMP/ground wood pulp						
-TMP	3	3		0,9 - 3	0,9 - 3	N.R.
-Ground wood	3	3		0,9 - 3	0,9 - 3	N.R.
Recovered fibre pulp	2	2	3	0,9 - 2	0,9 - 2	0,9 - 3
Paper production						
- non-integrated mills	1		2	0,15-1	0,15-1	0,15-1
- other mills	1		2	0,15-1	0,15-1	0,15-1,5

4.1.1.3.1. Bleached sulphate pulp and unbleached chemical pulp

Figure 6 shows the current total COD from bleached kraft pulp mills after biological treatment. The emission data was collected by EIPPCB (JRC, 2015). It is possible to observe that approx. 70% of the European pulp mills already met the 18 kg COD/ADt emission threshold. Around 65% of pulp mills reported COD emission lower than 16 kg/ADt, whereas 25% lower than 10 kg COD/ADt.

BAT-AELs for bleached Kraft pulp amount to 7 – 20 kg/ADt. Nordic Swan requires COD emission not to exceed 18 kg/ADt.

That BAT associated emission level for unbleached chemical pulp is set between 2,5 and 8 kg/ADT. Nordic Swan establishes the threshold of 10 kg COD/ADt. BAT-AELs various are proposed as the starting point for the further consultation.

EU water quality standards on the other hand restrict COD emissions to 125 g/l which matches a specific emission of 3.1 – 6.2 kg COD per ADt, under assumption of a BAT AELs waste water volume of 25 - 50 m³/ADt.

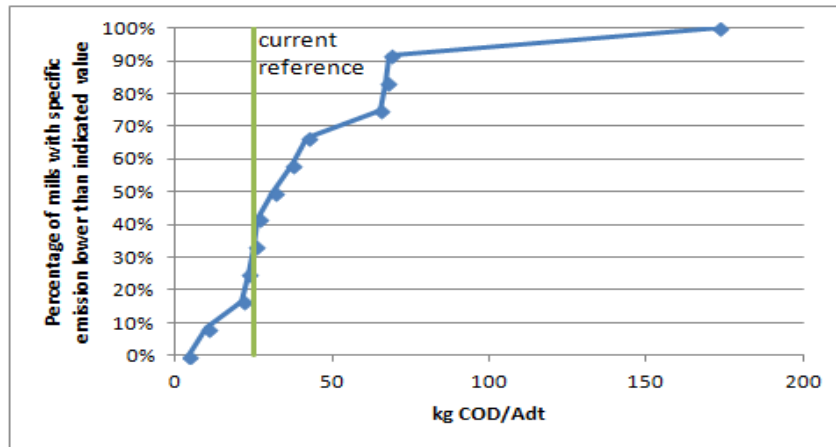


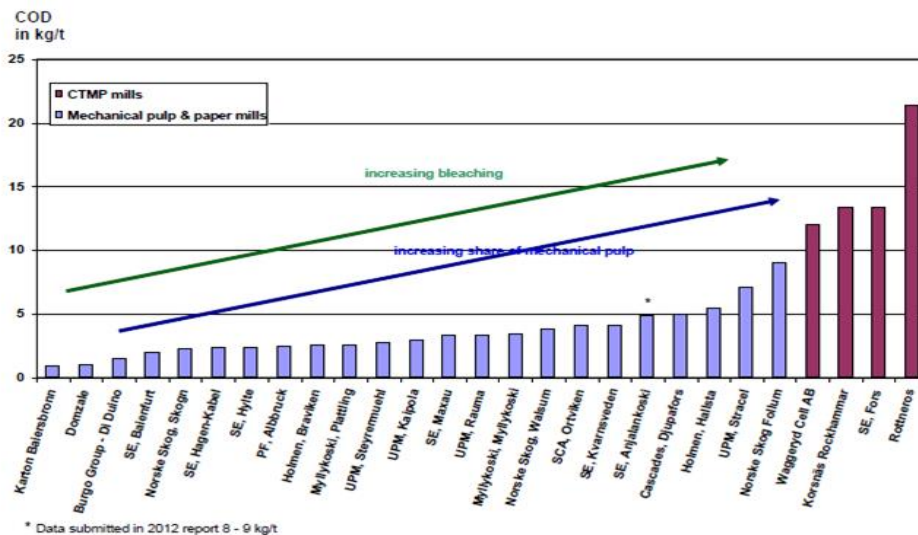
Figure 7. Percentage breakdown of sulphite pulp mills according to specific emission level for COD (JRC, 2015.)

It is therefore proposed to maintain the current COD emission threshold for sulphite pulp mills.

4.1.1.3.3. Chemi-thermomechanical pulp (CTMP)

For CTMP mills an assessment of the representativeness of the current benchmark value of 15 kg COD/ADt of pulp is not possible due to the limited information.

The available information concerns (JRC, 2015), (see Figure 8). As illustrated, this figure contains information for only 4 of a total of 18 mills, all mills for which data are given being located in Sweden. Nordic Swan sets the emission threshold at the level of 15 kg COD/ADt. BAT-associated emission levels for the direct waste water discharge to receiving waters from a CTMP or CMP pulp mill is 12 – 20 kg COD/ADT. The range of 12-15 kg COD/ADt is therefore proposed for the further consultation with stakeholders.



Source: EIPPCB data collection/questionnaires, data from 2006 and 2008, [Swedish Statistics 2008], [248, Hamm 2007]

Figure 8: COD/ADt pulp in mills (JRC, 2015)

Q: Can you provide more information about specific COD emissions (kg/ADt) from CTMP mills to complement the limited data available from BREF questionnaires?

4.1.1.3.4. Mechanical pulp

Analysis of emission data for EU mechanical pulp mills indicates that current benchmark value of 3 kg COD/ADt is representative for approx. 50% of mills that took part in the EIPPC questionnaire, see Figure 9. However, a proposal for a reasonable alternative benchmark value is difficult to give, considering the large scattering of specific emission data for individual plants.

Some aspects that may be taken into account in the discussion on current benchmark level are as follows:

- Process integrated measures such as short storage time of wood in the wood yard, dry debarking, utilizing Ca(OH)₂ or Mg(OH)₂ instead of NaOH during bleaching and pressing of the wood prior to refining may reduce COD load in untreated waste water.
- EU water quality standards restrict COD emissions to 125 g/l which matches a specific emission of 1 – 2 kg COD per ADt, given a BAT REF waste water volume of 10-15 m³/ADt³.

BAT-associated emission levels for the direct waste water discharge to receiving waters from the integrated production of paper and board from mechanical pulps produced on site is 0,9 – 4,5 kg COD/ADt. As the starting point it for the further discussion it is proposed to refer to the range of values of 0,9-3,0 kg COD/ADt, where the upper value reflects the current EU Ecolabel reference value.

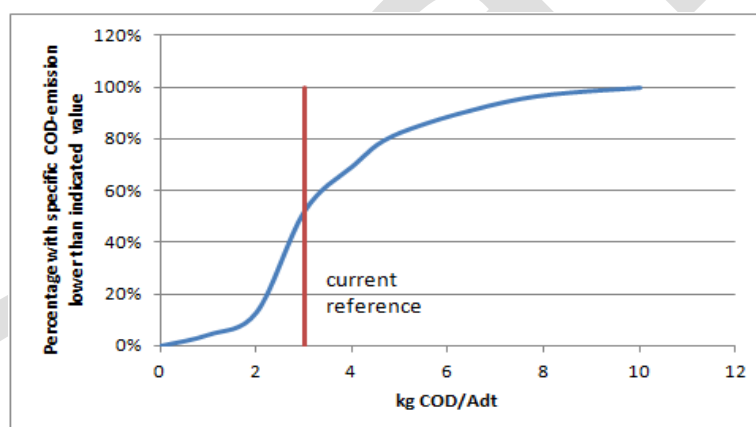


Figure 9. Percentage breakdown of mechanical pulp mills according to specific emission level for COD (based on JRC, 2015)

Q: We propose the desirability or necessity of changing current benchmark value is discussed during the stake holder meeting in Seville in early June.

4.1.1.3.5. Recovered fibre

Analysis of emission data for EU recovered fibre pulp mills indicate that the current value of 2-3 kg COD/ADt of pulp may not represents the emission level attained at the best performing mills, see Figure 10

³ BAT REF waste water volume levels amount to 9 – 16 m³/ADt (JRC, 2015)

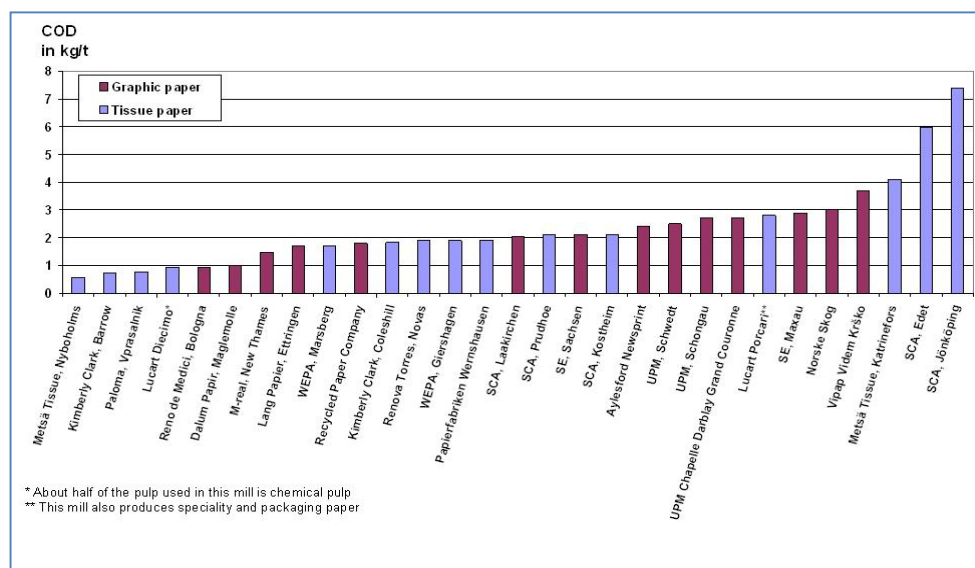


Figure 10. Specific COD load as a yearly average after waste water treatment from mills processing paper for recycling with deinking

Approximately 50% of the mentioned mills discharge less than 2 kg COD/ADt, whereas almost 90% less than 3 kg/ADt.

An aspect that may be considered in relation to this discussion is that EU water quality standards for COD emissions (125 g/l) and BAT-AELs waste water volumes (10–15 m³/ADt) give a specific emission of 1 – 2 kg COD per ADt.

BAT-associated emission levels for the direct waste water discharge to receiving waters from the integrated production of paper and board from recycled fibres pulp, produced without deinking on site is set as 0,4 – 1,4kg COD/ADt.

BAT-associated emission levels for the direct waste water discharge to receiving waters from the integrated production of paper and board from recycled fibres pulp produced with deinking on site is 0,9 – 3,0 kg COD/ADt, and 0,9 – 4,0 kg COD/ADt for tissue paper.

As the starting point it for the further discussion it is proposed to refer to the range of values 0,9-2,0 for copying and graphic papers and newsprints, and 0,9-3.0 for tissue paper.

Q: We propose the desirability or necessity of changing current benchmark value is discussed during the stake holder meeting in Seville in early June.

4.1.1.3.6. Paper mills

BAT associated emission levels for the direct waste water discharge from a non-integrated paper and board mill are established as 0,15- 1,5 kg/ADt. For copying, graphic, and newsprint papers the value range of 0,15-1 kg COD/ADt is proposed as the starting point. For tissue paper the upper value is suggested to be raised to 1,5 kg COD/ADt (Figure 11).

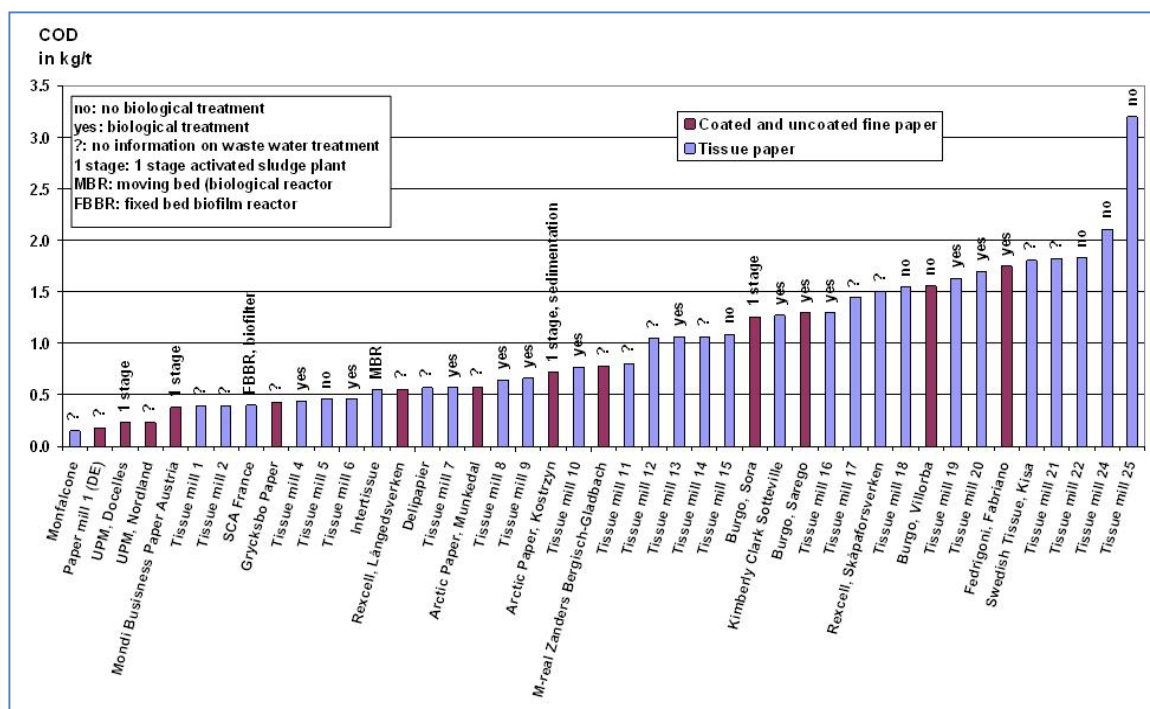


Figure 11. Examples of specific COD emissions as a yearly average after waste water treatment from non-integrated European paper mills (JRC, 2015).

4.1.1.4. Reference emissions loads for P

The discharge of phosphorus from pulping process strongly depends on the wood species processed, and applied wood pre-treatment. For example:

- Phosphorus load in untreated waste water may be reduced prior to waste water treatment with 40% by implementation of dry debarking instead of wet debarking.
- Eucalyptus contains more phosphorus and hence gives higher P-loads in untreated waste water.

Phosphorus is taken up by the biomass during the activated sludge treatment and is removed from the system with the sludge. Often additional phosphorus has to be added to stimulate micro-organism growth.

Water Framework Directive 2000/60/EC defined the risk concentration level for direct discharge of at 0,15 mg P/l . A limit of 0,15 mg P/l combined with a BAT waste water volume of 9 – 16 m³/ADt would suggest emission threshold of 0,0015 – 0,0025 kg P/ADt. This value was contrasted with the BAT-AELs and the data reported by the pulp and paper industry during the development of BREF for pulp and paper (JRC,2015).

Table 14. Current and proposed new reference levels for specific emissions of phosphorus (all figures in kg P/ADt)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	0,045	0,045	0,045	0,01-0,03	0,01-0,03	0,01-0,03
Bleached sulphite pulp	0,045	0,045	0,045	0,01 – 0,03	0,01 – 0,03	0,01 – 0,03
Unbleached chemical pulp	0,04	0,04	0,02	0,01-0,02	0,01-0,02	0,01-0,02
CTMP	0,01	0,01	0,01	0,001 – 0,01	0,001 – 0,01	0,0025 – 0,0045
Paper production						
TMP/ground wood pulp						
-TMP	0,01	0,01		0,001 – 0,01	0,001 – 0,01	N.R.
-Ground wood	0,01	0,01		0,001 – 0,01	0,001 – 0,01	N.R.
Recovered fibre pulp	0,01	0,01	0,01	0,001 – 0,01	0,001 – 0,01	0,001 – 0,01
Paper production						
-non-integrated mills	0,01	0,01	0,01	0,003 – 0,0045	0,003 – 0,0045	0,003 – 0,0045
-other mills	0,01	0,01	0,01	0,003 – 0,0045	0,003 – 0,0045	0,003 – 0,0045

4.1.1.4.1. Sulphate pulp

Figure 12 shows the current reference levels for specific emissions for bleached kraft pulp mills after biological waste water treatment (yearly average). The data was collected by EIPPCB.

Phosphorous emission loads vary between 0.003 and 0.08 kg tot-P/ADt, with the majority of mills achieving values below or well below 0.04 kg tot-P/ADt, and a few eucalyptus pulp mills discharging phosphorus emissions of up to 0.12 kg tot-P/ADt (Figure 12). Wood from Iberian eucalyptus stands contains higher levels of phosphorus compared to other forest species used for pulp production in Europe and elsewhere.

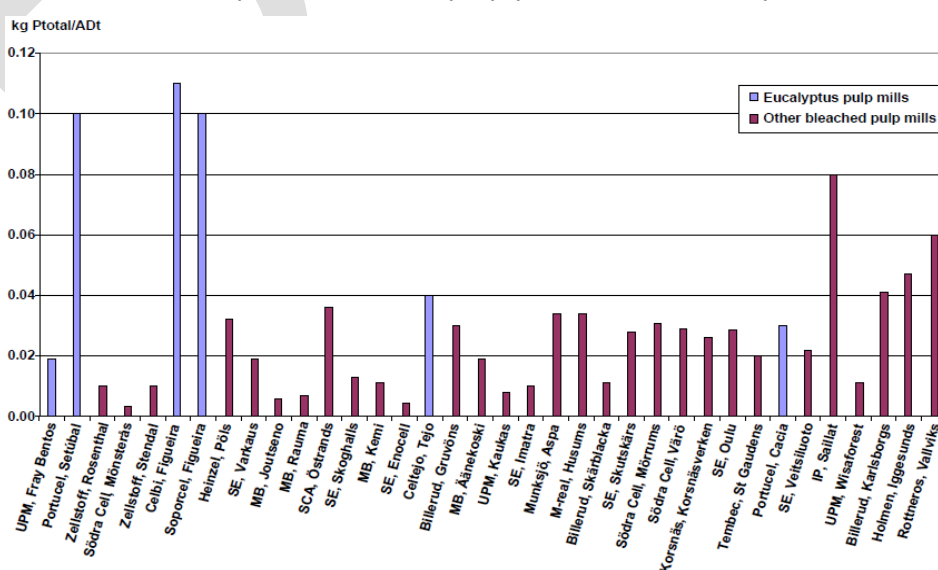


Figure 12. Specific emissions of total phosphorus from bleached kraft pulp mills

Phosphorus emissions from unbleached pulp production are generally lower than from bleached pulp mills and vary between close to zero and 0.025 kg Tot-P/ADt.

BAT-associated emission levels for the direct waste water discharge to receiving waters from a bleached kraft pulp mill is 0,01 – 0,03, and 0,02 – 0,11 kg P/ADt for Eucalyptus pulp. BAT-associated emission levels for the direct waste water discharge to receiving waters from an unbleached kraft pulp mill 0,01 – 0,02 kg/ADt.

Nordic Swan requires the total P emission not to exceed 0,03 kg/ADt for bleached kraft pulp, and 0,02 kg/ADt for unbleached.

Based on the emission data a new reference value of 0,01 – 0,03 kg P/ADt is proposed for bleached kraft pulp, and 0,01 – 0,02 kg P/ADt for unbleached. The specific emission threshold for eucalyptus pulp mills should be further discussed with industry stakeholders.

4.1.1.4.2. Sulphite pulp

For sulphite pulp the best performing mills, with 7 out of 13 mills reported phosphorus emission lower than 0,045 kg P/ADt (JRC, 2015). BAT-associated emission levels for the direct waste water discharge to receiving waters from a pulp mill manufacturing bleached sulphite and magnefite paper grade pulp is 0,01 – 0,05 kg P/ADt for bleached sulphite pulp, 0,01 – 0,07 P/ADt for magnefite pulp, and 0,01 – 0,02 P/ADt for NSSC pulp.

For this type of pulp, a value of 0,01 – 0,03 kg P/ADt seems to be more representative and is proposed for the further stakeholders consultation.

4.1.1.4.3. Mechanical pulp mills and chemithermomechanical pulp (CTMP)

BAT-associated emission levels for the direct waste water discharge to receiving waters from a CTMP or CMP pulp mill, and from the integrated production of paper and board from mechanical pulps produced on site is equal to 0,001 – 0,01 kg P/ADt, which is a suggested value for the further discussion.

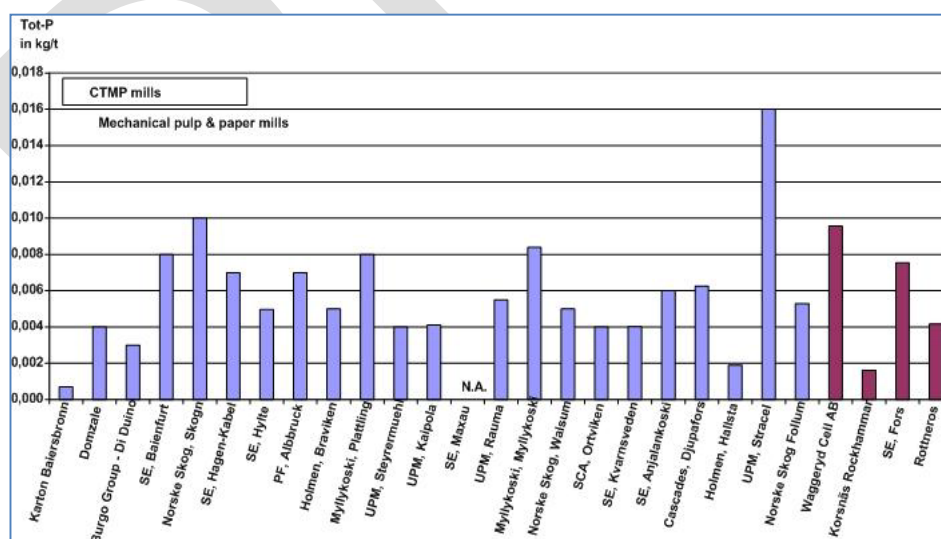


Figure 13. Yearly averages of tot-P loads from individual mechanical and chemimechanical pulp mills (BAT-REF, 2015)

4.1.1.4.4. Recovered fibres

Phosphorus emissions from RCF-based paper mills are almost completely determined by controlled dosage of phosphates to the biological waste water treatment.

BAT-associated emission levels for the direct waste water discharge to receiving waters from the integrated production of paper and board from recycled fibres pulp, produced without deinking on site are 0,001 – 0,005 kg P/AD (For mills with a waste water flow between 5 and 10 m³/t, the upper end of the range is 0,008 kg/t). BAT-associated emission levels for the direct waste water discharge to receiving waters from the integrated production of paper and board from recycled fibres pulp produced with deinking on site are 0,002 – 0,01 P/ADt; 0,002 – 0,015 kg/ADt for tissue paper. Nordic Swan sets the limit value of 0,01 kg/ADt for phosphorus emission.

In line with this a new reference emission value of 0,001 – 0,01 kg P/ADt kg P/ADt may be considered.

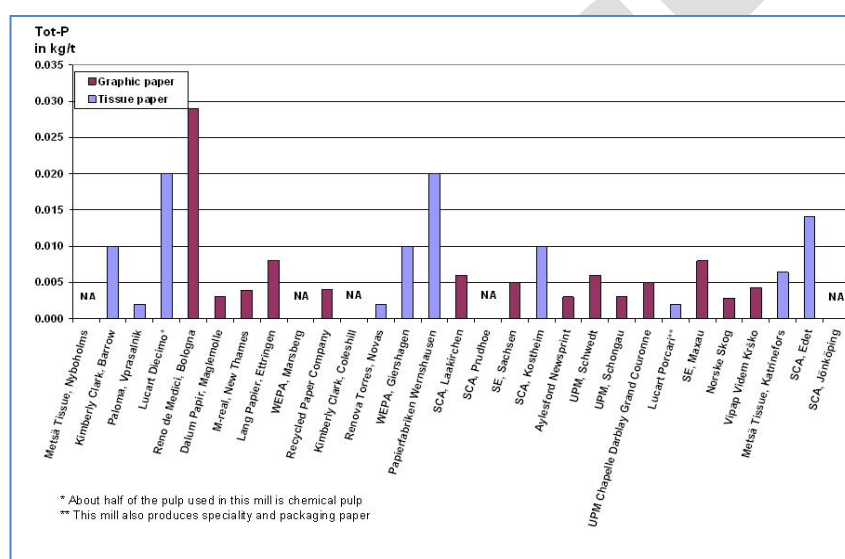


Figure 14. Specific total P load as a yearly average after waste water treatment from mills processing paper for recycling with deinking (JRC, 2015)

4.1.1.4.5. Paper mills

Typical emission loads for copying and printing paper and for tissue are comparable with loads for recovered fibres and for mechanical mills and CTMP mills (JRC, 2015). The analysed mills reached the emission level lower or close to BAT associated emission levels for the direct waste water discharge to receiving waters from a non-integrated paper and board mill are set as 0,003-0,012 kg P/ADt. A new reference emission value within the range of 0,003 - 0,01 kg P/ADt should be considered for the further discussion.

4.1.2. Criterion 1b) AOX

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>The weighted average value of AOX released from the productions of the pulps used in the eco-labelled tissue product must not exceed 0,12 kg/ADT paper. AOX emissions from each individual pulp used in the paper must not exceed 0,25 kg/ADT pulp.</p>	<p>—Until 31 March 2013 the AOX emissions from the production of each pulp used shall not exceed 0,20 kg/ADT.</p> <p>—From 1 April 2013 until the lapse of criteria validity of this Decision the AOX emissions from the production of each pulp used shall not exceed 0,17 kg/ADT.</p>	<p>—Until 31 March 2013, the AOX emissions from the production of each pulp used shall not exceed 0,20 kg/ADT.</p> <p>—From 1 April 2013 until the expiry of the period of validity of the criteria set out in this Decision, the AOX emissions from the production of each pulp used shall not exceed 0,17 kg/ADT.</p>
<p>Assessment and Verification: the applicant shall provide test reports using the following test method: AOX ISO 9562 (1989) from the pulp supplier together with detailed calculations showing compliance with this criterion, together with related supporting documentation.</p> <p>The supporting documentation shall include an indication of the measurement frequency. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.</p> <p>Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In the case of a new, or a rebuilt production plant, when emission measurements are not available for a 12-month period, the results shall be based on emission measurements taken once a day for 45 consecutive days, after the plants emissions values have stabilised.</p>	<p>Assessment and Verification the applicant shall provide test reports using the following test method: AOX ISO 9562 accompanied by detailed calculations showing compliance with this criterion, together with related supporting documentation.</p> <p>The supporting documentation shall include an indication of the measurement frequency. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.</p> <p>Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In case of a new or a re-built production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.</p>	<p>Assessment and Verification: the applicant shall provide test reports using the following test method: AOX ISO 9562 accompanied by detailed calculations showing compliance with this criterion, together with related supporting documentation.</p> <p>The supporting documentation shall include an indication of the measurement frequency. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.</p> <p>Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months. In case of a new or a re-built production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.</p>

Proposed criteria

The AOX emissions from the production of bleached pulp shall not exceed the following values for each type of pulp

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	0,17	0,17	0,25	0,10-0,15	0,10-0,15	0,10-0,15
Bleached sulphite pulp	0,17	0,17	0,25	0,17	0,17	0,17
Unbleached chemical pulp	0,17	0,17	0,25	x	x	x
CTMP	0,17	0,17	0,25	0,002 (?)	0,002(?)	0,002 (?)
-TMP	0,17	0,17	0,25	0,002 (?)	0,002 (?)	0,002 (?)
-Ground wood	0,17	0,17	0,25	0,002 (?)	0,002 (?)	0,002 (?)
-Recovered fibre pulp	0,17	0,17	0,25	0,007	0,007	0,007
Paper production						
- non-integrated mills				0,001	0,001	0,001
- other mills				0,001	0,001	0,001

Assessment and Verification: the applicant shall provide test reports using the following test method: AOX ISO 9562 accompanied by detailed calculations showing compliance with this criterion, together with related supporting documentation. **For bleached pulp, the documentation should include information on the bleaching sequence(s) applied.**

The supporting documentation shall include an indication of the measurement frequency. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.

Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months, **reported as an average from monthly measurements.** In case of a new or a re-built production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.

Rationale:

A reduction of AOX has been achieved, among others, thanks to the replacement of molecular chlorine by chlorine dioxide, and the use of chlorine free bleaching chemicals such as molecular oxygen, hydrogen peroxide, ozone or peracetic acid. Prevention of AOX formation could be achieved by application of bleaching sequences with reduced chlorine containing agents, or using TCF bleaching.

The reduction of both chlorinated and non-chlorinated organic substances in the effluents of pulp mills has been also achieved by in-process measures such as: increased delignification before the bleach plant by modified cooking and additional oxygen stages, spill collection systems, efficient washing, and stripping, and reuse of condensates. Another factor contributing to the decreased emissions of AOX and unchlorinated toxic organic compounds into receiving waters is the installation of external treatment plants.

In the common two stage activated sludge waste water treatment process 40% - 65% of AOX in waste water is normally removed.

In general, the yearly average specific AOX emissions of bleached kraft pulp mills at the point of discharge, i.e. after waste water treatment vary between undetectable and 0.3 kg AOX/ADt of bleached pulp.

The BAT associated emission values into water for AOX address ECF bleached pulps and are established as follows:

- Bleached kraft pulp mill 0,0- 0,2 yearly average kg/ADt;
- Bleached sulphite and magnefite grade paper 0,5-1,5 yearly average kg/ADt;
- RCF 0,05 for wet strength paper yearly average kg/AD;
- The paper and board making process of integrated kraft, sulphite, CTMP and CMP pulp and paper mills, Non-integrated paper and board mill (excluding speciality paper), for decor and wet strength paper yearly average kg/AD 0,05;

The recommended test method for AOX emission is EN ISO 9562: 2004 with the monitoring frequency specified as once a month for bleached kraft pulp, and once every two months for bleached sulphite and magnefite paper grade pulp, and integrated production of paper and board from recycled fibres pulp.

Nordic Swan establishes the threshold for the weighted average value of AOX at 0.17 kg/tonne paper, and for each individual pulp used in the paper AOX emissions should not exceed 0.25 kg/tonne.

Current Ecolabel reference levels and proposed new reference levels are given in Table 15

Table 15. Current and proposed new reference levels for specific emissions of AOX emissions (all figures in kg AOX/ADt)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
Pulp types						
Bleached sulphate pulp	0,17	0,17	0,25	0,10-0,15	0,10-0,15	0,10-0,15
Bleached sulphite pulp	0,17	0,17	0,25	0,17	0,17	0,17
Unbleached chemical pulp	0,17	0,17	0,25	x	x	x
CTMP	0,17	0,17	0,25	0,002 (?)	0,002(?)	0,002 (?)
TMP/ground wood pulp						
-TMP	0,17	0,17	0,25	0,002 (?)	0,002 (?)	0,002 (?)

	Current reference levels			Proposed new reference levels		
	NP	CGP	TP	NP	CGP	TP
-Ground wood	0,17	0,17	0,25	0,002 (?)	0,002 (?)	0,002 (?)
-Recovered fibre pulp	0,17	0,17	0,25	0,007	0,007	0,007
Paper production						
- non-integrated mills				0,001	0,001	0,001
- other mills				0,001	0,001	0,001

4.1.2.1. Chemical pulp

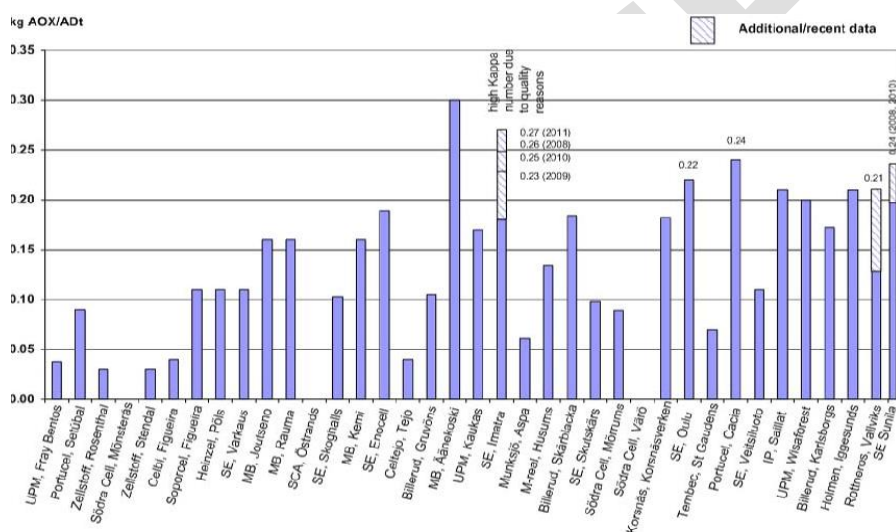


Figure 15. Specific AOX emissions from bleached kraft pulp mills

Following the data collected by EIPPCB, in 2008/2009 around 50% of European mills that took part in the questionnaire met the AOX emission level of 0,15 AOX/kg ADt, and 27% less than 0,1 AOX/ADt. The proposed revised values within the range of 0.1 - 0,15 kg AOX/ADt seems a proper starting point for the further discussion.

For the bleached sulphite pulp an overview of specific AOX loads for individual plants varied from (not detectable) 0.06 to 400 g/ADt. There is limited information found on the AOX emission level from the bleached sulphite pulp. Considering the BAT-AELs values it is proposed to maintain the current emission threshold of 0,17 kg AOX/ADt, as the starting point for the further discussion.

4.1.2.2. Mechanical pulp mills and chemithermomechanical pulp (CTMP)

Reported loads vary from 0.0002 kg/ADt to 0.010 kg/ADt for mechanical pulp and paper mills (JRC, 2015).

Since chlorine or chlorine oxide is not considered to be used for mechanical pulp bleaching, the added value of a criterion for AOX emissions is to be contrasted with stakeholders feedback.

As the starting point it is proposed to reduce the emission limit to 0.002 kg AOX/ADt.

4.1.2.3. Recovered fibres

Sources of absorbable organic halogen compounds are some chemical additives (especially wet strength agents), traces of organic halogens originating from ECF pulp in the paper for recycling and printing inks. Reported by EIPPCB loads (JRC, 2015) from waste water discharge from RCF plant vary from 0.3 to 3.0 g/t; approx. 80% of site reported emission value lower than 0,007 kg AOX/t. It is then proposed to present this value for the further discussion.

4.1.2.4. Paper mill

Reported yearly average specific AOX emission loads (JRC, 2015) for non-integrated graphic paper mills ranged from 0.0004 kg AOX/t to 0.01 kg AOX/t, while for tissue mills they ranged from 0.0005 kg AOX/t to 0.001 kg AOX/t.

In view of these actual emission levels, it is proposed to reduce the Ecolabel emission standard to 0.001 kg AOX/ADt.

Draft

4.1.3. Criterion 1c) CO₂

Table 16. CO₂ emissions criteria

Tissue Paper	Copying and Graphic Paper	Newsprint Paper																																																																								
Existing criteria																																																																										
<p>The emissions of carbon dioxide from non-renewable sources shall not exceed 1 500 kg per ADT paper produced, including emissions from the production of electricity (whether on-site or off-site).</p> <p>The fuels used for converting the tissue paper into a product and transport in distributing this product, pulps or other raw materials shall not be included in the calculations.</p>	<p>The emissions of carbon dioxide from non-renewable sources shall not exceed 1 000 kg per tonne of paper produced, including emissions from the production of electricity (whether on-site or off-site). For non-integrated mills (where all pulps used are purchased market pulps) the emissions shall not exceed 1 100 kg per tonne. The emissions shall be calculated as the sum of the emissions from the pulp and paper production.</p>	<p>The emissions of carbon dioxide from non-renewable sources shall not exceed 1 000 kg per tonne of paper produced, including emissions from the production of electricity (whether on-site or off-site). For non-integrated mills (where all pulps used are purchased market pulps) the emissions shall not exceed 1 100 kg per tonne. The emissions shall be calculated as the sum of the emissions from the pulp and paper production.</p>																																																																								
<p>Assessment and Verification: The applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation.</p> <p>The applicant shall provide data on the air emissions of carbon dioxide. This shall include all sources of non-renewable fuels during the production of pulp and paper, including the emissions from the production of electricity (whether on-site or off-site).</p> <p>The following emission factors shall be used in the calculation of the CO₂ emissions from fuels:</p> <table border="1"> <thead> <tr> <th>Fuel</th> <th>CO₂ emission</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Coal</td> <td>95</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>Crude oil</td> <td>73</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>Fuel oil 1</td> <td>74</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>Fuel oil 2-5</td> <td>77</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>LPG</td> <td>62,40</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>Natural gas</td> <td>56</td> <td>g CO₂ fossil/MJ</td> </tr> <tr> <td>Grid electricity</td> <td>400</td> <td>g CO₂ fossil/kWh</td> </tr> </tbody> </table> <p>For all grid electricity, the value quoted in the table above (the European average) shall be used, unless the applicant presents documentation establishing that electricity from renewable sources according to Directive 2001/77/EC of the European Parliament and of the Council (3) is used in which case the applicant may exclude the renewable electricity from the calculation.</p>	Fuel	CO ₂ emission	Unit	Coal	95	g CO ₂ fossil/MJ	Crude oil	73	g CO ₂ fossil/MJ	Fuel oil 1	74	g CO ₂ fossil/MJ	Fuel oil 2-5	77	g CO ₂ fossil/MJ	LPG	62,40	g CO ₂ fossil/MJ	Natural gas	56	g CO ₂ fossil/MJ	Grid electricity	400	g CO ₂ fossil/kWh	<p>Assessment and Verification: the applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation.</p> <p>The applicant shall provide data on the air emissions of carbon dioxide. 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Rationale

Pulp and paper sector is covered by Emission Trading Directive 2009/29/EC being on the list of energy-intensive industries with a risk of 'carbon leakage'. In 2006, the emissions of the sector reached 184 Mt, representing 3% of global emissions in 2006 (US EPA, 2009).

The European pulp and paper industry has a direct emission of about 37 million tonnes of CO₂ per year which accounts for 2 % of the emissions under the EU ETS (European Trading Scheme) and less than 1 % of the EU total emissions (CITL, 2008).

The CO₂ emissions are mainly caused by combustion processes: producing the electricity and heat needed for the processes. Indirect emissions are caused by purchased electricity (around 62 % of the total electricity consumption).

In accordance with Art. 9 of the IED Directive 2010/75/EU: "Where emissions of a greenhouse gas from an installation are specified in Annex I to Directive 2003/87/EC in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas, unless necessary to ensure that no significant local pollution is caused". Consequently there are no established BAT-AELs emission values of reference for the CO₂ emission from pulp and paper sector.

In Europe, there is an observable trend within the industrial sector to reduce the use of coal and oil for the benefit of renewable energy forms (biomass and waste) and to a lesser extent electricity (Figure 16). The shift in fuel composition is driven by the mandatory emission reductions that industrial activities should achieve in the context of the Integrated Pollution Prevention and Control (IPPC) and the Large Combustion Plant Directives (LCP), as well as because of national action for complying with the binding national targets of the Effort Sharing Decision (ESD) in the short-term (concerning the non-ETS industries) and the increasing ETS prices (concerning the ETS industries) mainly in the long-term (EU Energy, Transport and GHG Emissions Trends to 2050 Reference Scenario, 2013).

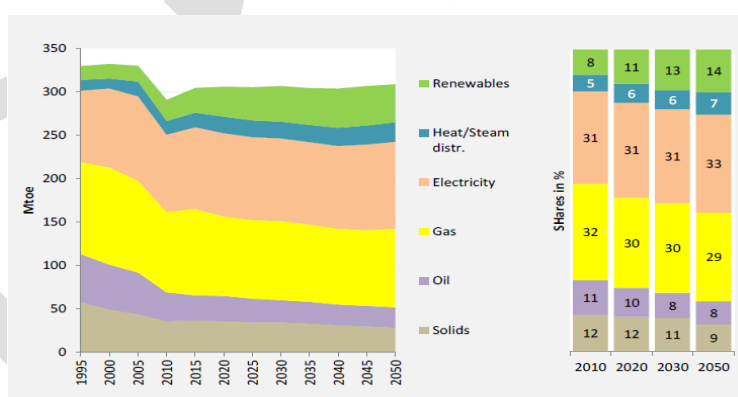


Figure 16. Predicted energy consumption of the industrial sector by energy form

Public heat and electricity production is the largest greenhouse gases emission source category in the EU-28, as well as the main source of emissions from energy industries. Fossil fuels continued to dominate the electricity mix in 2013, being responsible for close to one half (45%) of all gross electricity generation in the EU-28. The electricity produced from renewable sources increased by 171% between 1990 and 2013 at an average annual rate of 4.4%. Since 2005, the rate has been higher, at 7.5% per year. The acceleration observed since 2005 occurred in the context of national and EU renewable energy support policies and significant cost reductions achieved by certain renewable energy technologies. The total emissions of CO₂ from electricity and heat production depend on both the amount of electricity and heat produced as well as the

CO₂ intensity per unit produced (which are also fuel specific). Therefore the policies and measures to reduce emissions need to address both demand (e.g. through improvements in the energy efficiency) to stem the rapid increase in electricity and heat production, as well as CO₂ intensity per unit of electricity and heat produced (e.g. by fuel switching, generation efficiency). The large use of biomass within a pulp and paper sector contributes to the reduction of its CO₂-intensity. In 2011, about half (55 %) of the energy used by the industry came from biomass and most of the rest (36.2 %) from natural gas (EEA, 2015a, EEA 2015B, European Commission 2014c).

For the sites that rely on the energy supply from the grid, one critical area to establish CO₂ threshold and ensure a level playing field is the variation of local energy mix in the content of a possible CO₂ emission e.g. share of coal used as a fuel in the energy mix. This situation is beyond the influence of pulp and paper manufacturer. The EU average carbon intensity of the electricity grid, according to MEERP methodology- 0.384 tCO₂/MWh = 0.107 tCO₂/GJ_e (MEERP).

In this sense, Laurijssen et al. (Laurijssen et al., 2012) analysed inter-European differences pointing out the variation of European pulp and paper industry in relation to energy profile and fibre supply (Table 17). Table 18 shows the International Energy Agency (IEA) composite electricity/heat factors (IEA, 2010)

Table 17. Main characteristics of Dutch, Swedish and Polish pulp and paper industries with regard to production and energy conversion routes (Laurijssen et al., 2012).

		NL	SE	PL
Fibre share	Recycled	80%	17%	37%
	Virgin	20%	83%	63%
Integrated mills (%)		±0%	68%	Unknown
Main domestic energy source		Natural gas	Biomass	Coal and Biomass
Dominant energy conversion routes in P&P industry		CHP (gas)	Recovery heat	Boiler (coal/biomass)
		Boiler (gas)	Boiler (biomass)	Recovery heat
Grid electricity mix (%)		63% gas 23% coal	50% nuclear 50% hydro	92% coal

Table 18. EU-28 fuel-based Electricity/Heat Emission Factors for CO₂

Country	IEA composite electricity/heat factors (gCO ₂ /kWh)	Country	IEA composite electricity/heat factors (gCO ₂ /kWh)
Austria	182.756	Italy	398.464
Belgium	248.975	Latvia	162.2356
Bulgaria	488.8623	Lithuania	114.4369
Croatia	341.4155	Luxemburg	314.782
Cyprus	758.6603	Malta	848.708
Czech Republic	543.894	Netherlands	392.079
Denmark	307.755	Poland	653.44
Estonia	751.8614	Portugal	383.544
Finland	187.118	Romania	416.6456
France	82.717	Slovakia	217.154
Germany	441.181	Spain	325.878
Greece	731.218	Sweden	39.939
Hungary	330.842	UK	486.949
Ireland	486.205	EU-28	379.9

As previously mentioned, the CO₂ emission from the pulp and paper industry is intimately related to the energy intensity of the process. The CO₂ reduction is subjected to a series of obligatory emission targets that gives an industry certain time flexibility to adapt to the set targets. Statistical data for CO₂ indirect emission confirms the general trend to reduce CO₂ intensity of the sector (EU Commission, DG ENER). Following the feedback received from industry stakeholders:

The timeframe for adjustment to higher EU Ecolabel requirements for CO₂ emission is too short where the investments required are substantial in terms of scope, scale, and cost. Alternatively any adjustment of CO₂ emission requirements should be aligned with the timing of the EU's overall climate action programme which in coal-dependent countries requires manufacturer to make massive investments, which cannot be realistically realigned to the earlier timing of the EU Ecolabel scheme⁴.

Following Nordic Swan criteria: The emission of CO₂ from purchased electricity* and fossil fuel used for heating and internal electricity generation must not exceed the following limit values:

- 1,000 kg CO₂ /tonne paper for paper made from 100 % DIP/recycled pulp
- 900 kg CO₂ /tonne paper for paper made from 100 % chemical pulp
- 1,600 kg CO₂ /tonne paper for paper made from 100 % mechanical pulp
- 1100 kg CO₂/tonne tissue paper paper.

For paper comprising of a mixture of cellulose pulp, recycled fibre and mechanical pulp, a weighted limit value is calculated, based on the proportion of each pulp type.

* CO₂ emissions from purchased electricity shall be calculated on a basis of 385 g CO₂/kWh.

Table 19. The comparison between Nordic Swan and current EU Ecolabel requirements for CO₂ emission

	Ecolabel		Nordic Swan	
	NP, CGP	TP	CGP	TP
Pulp type	weighted average (kg CO₂ / ADt)			
<i>Non-integrated mills, all pulps purchased</i>	1100	1500		
a) recycled fibre			1000	1100
b) cellulose, chemical pulp			900	1100
c) mechanical pulp			1600	1100
<i>Other mills</i>	1000	1500		
a) recycled fibre			1000	1100
b) cellulose, chemical pulp			900	1100
c) mechanical pulp			1600	1100

Another option to address CO₂ emission is to refer the EU ETS benchmark values. In this case the criterion could be proposed as follows:

The on-site emissions of carbon dioxide from non-renewable sources shall not exceed the EU ETS benchmark standards per tonne of paper produced. Carbon dioxide emissions related to off-site energy supply (heat, power) shall be consistent with reference values for energy consumption (see next criterion), assuming:

- a) An emission factor of 60 kg CO₂/GJ for steam (reference: gas fired boiler);

⁴ Personal communication with industry representatives

- b) *An emission factor of 95 kg CO₂/GJ for power (reference: gas fired combined cycle power plant)*

The emissions factors proposed for heat and power supplied by off-site utilities refer to the most energy efficient gas fired boilers and power plants currently available. The provided information would be in line with or will consist of the information provided to the emission authorities under the EU ETS Framework. However, there are no actualized benchmark curves for the specific greenhouse gas emissions per unit of paper or pulp it is therefore not feasible to assess the possible impact of the criterion.

The revised reference value for CO₂ emission should be further discussed during the 1st AHWG Meeting.

Q. Considering legal requirements (EU ETS), should emission requirement for CO₂ be maintain under the EU Ecolabel criteria.

Q. Should the criterion be changed referring to the EU ETS benchmark?

Q. Should the EU Members States that rely on carbon intensive fuel (grid) be given more flexible approach?

Q. In case, the criterion is preferred to be kept in the current form, shall the reference value remain unchanged?

Q. Shall the same criterion apply to all product groups?

Draft

4.2 Criterion 2: Energy use

Table 20. Energy use criteria

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>The total consumption of electricity related to the tissue-paper product shall be calculated as the sum of the electricity used in the pulp and the tissue paper production stages and shall not exceed 2 200 kWh electricity per ADT of paper produced.</p> <p>The applicant shall calculate all inputs of electricity used during the production of pulp and tissue paper, including the electricity used in the de-inking of waste papers for the production of recycled paper.</p> <p>The electricity calculation does not include energy consumed in transporting raw materials or in converting and packaging.</p> <p>Electricity means net imported electricity coming from the grid and internally generated electricity measured as electric power. Electricity used for waste-water treatment and air cleaning need not be included.</p>	<p>(a) Electricity</p> <p>The electricity consumption related to the pulp and the paper production shall be expressed in terms of points (PE) as detailed below.</p> <p>The number of points, PE, shall be less than or equal to 1,5.</p> <p>The calculation of PE shall be made as follows.</p> <p>Calculation for pulp production: For each pulp i used, the related electricity consumption (E_{pulp, i} expressed in kWh/ADT) shall be calculated as follows:</p> <p>E_{pulp, i} = Internally produced electricity + purchased electricity – sold electricity</p> <p>Calculation for paper production: Similarly, the electricity consumption related to the paper production (E_{paper}) shall be calculated as follows:</p> <p>E_{paper} = Internally produced electricity + purchased electricity – sold electricity</p> <p>Finally, the points for pulp and paper production shall be combined to give the overall number of points (PE) as follows:</p> $PE = \frac{\sum_{i=1}^n [\text{pulp},i \times E_{\text{pulp},i}] + E_{\text{paper}}}{\sum_{i=1}^n [\text{pulp},i \times E_{\text{ref pulp},i}] + E_{\text{ref paper}}}$ <p>In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.</p> <p>(b) Fuel (heat)</p> <p>The fuel consumption related to the pulp and the paper production shall be expressed in terms of points (PF) as detailed below.</p> <p>The number of points, PF, shall be less than or equal to 1,5.</p> <p>The calculation of PF shall be made as follows.</p> <p>Calculation for pulp production: For each pulp i used, the related fuel consumption (F_{pulp, i} expressed in kWh/ADT) shall be calculated as follows:</p> <p>F_{pulp, i} = Internally produced fuel + purchased fuel – sold fuel –</p>	<p>(a) Electricity</p> <p>The electricity consumption related to the pulp and the paper production shall be expressed in terms of points (PE) as detailed below.</p> <p>The number of points, PE, shall be less than or equal to 1,5.</p> <p>The calculation of PE shall be made as follows.</p> <p>Calculation for pulp production: For each pulp i used, the related electricity consumption (E_{pulp,i} expressed in kWh/ADT) shall be calculated as follows:</p> <p>E_{pulp,i} = Internally produced electricity + purchased electricity – sold electricity</p> <p>Calculation for paper production: Similarly, the electricity consumption related to the paper production (E_{paper}) shall be calculated as follows:</p> <p>E_{paper} = Internally produced electricity + purchased electricity – sold electricity</p> <p>Finally, the points for pulp and paper production shall be combined to give the overall number of points (PE) as follows:</p> $PE = \frac{\sum_{i=1}^n [\text{pulp},i \times E_{\text{pulp},i}] + E_{\text{paper}}}{\sum_{i=1}^n [\text{pulp},i \times E_{\text{ref pulp},i}] + E_{\text{ref paper}}}$ <p>In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.</p> <p>(b) Fuel (heat)</p> <p>The fuel consumption related to the pulp and the paper production shall be expressed in terms of points (PF) as detailed below.</p> <p>The number of points, PF, shall be less than or equal to 1,5.</p> <p>The calculation of PF shall be made as follows.</p> <p>Calculation for pulp production: For each pulp i used, the related fuel consumption (F_{pulp,i} expressed in kWh/ADT) shall be calculated as follows:</p> <p>F_{pulp,i} = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity</p>

	<p>1,25 × internally produced electricity</p> <p>Note:</p> <p>F_{pulp, i} (and its contribution to PF, pulp) need not be calculated for mechanical pulp unless it is market air dried mechanical pulp containing at least 90 % dry matter.</p> <p>The amount of fuel used to produce the sold heat shall be added to the term ‘sold fuel’ in the equation above.</p> <p>Calculation for paper production: Similarly the fuel consumption related to the paper production (F_{paper}, expressed in kWh/ADT), shall be calculated as follows:</p> <p>F_{paper} = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity</p> <p>Finally, the points for pulp and paper production shall be combined to give the overall number of points (PF) as follows:</p> $P_F = \frac{\sum_{i=1}^n [\text{pulp},i \times F_{\text{pulp},i}] + F_{\text{paper}}}{\sum_{i=1}^n [\text{pulp},i \times F_{\text{ref pulp},i}] + F_{\text{ref paper}}}$ <p>Table 3. 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	Coated woodfree fine paper Coated magazine paper (LWC, MWC)	1 800	800	
	<p>Assessment and Verification (for both (a) and (b)): the applicant shall provide detailed calculations showing compliance with this criterion, together with all related supporting documentation. Reported details shall therefore include the total electricity and fuel consumption.</p> <p>The applicant shall calculate all energy inputs, divided into heat/fuels and electricity used during the production of pulp and paper, including the energy used in the de-inking of waste papers for the production of recycled paper. Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations.</p> <p>Total heat energy includes all purchased fuels. It also includes heat energy recovered by incinerating liquors and wastes from on-site processes (e.g. wood waste, sawdust, liquors, waste paper, paper broke), as well as heat recovered from the internal generation of electricity — however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.</p> <p>Electric energy means net imported electricity coming from the grid and internal generation of electricity measured as electric power. Electricity used for wastewater treatment need not be included.</p> <p>Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0,8 and added to the total fuel consumption.</p> <p>In case of integrated mills, due to the difficulties in getting separate fuel (heat) figures for pulp and paper, if only a combined figure for pulp and paper production is available, the fuel (heat) values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.</p>	<p>a) Assessment and Verification(for both (a) and (b)): the applicant shall provide detailed calculations showing compliance with this criterion, together with all related supporting documentation. Reported details shall therefore include the total electricity and fuel consumption.</p> <p>The applicant shall calculate all energy inputs, divided into heat/fuels and electricity used during the production of pulp and paper, including the energy used in the de-inking of waste papers for the production of recovered paper. Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations.</p> <p>Total heat energy includes all purchased fuels. It also includes heat energy recovered by incinerating liquors and wastes from on-site processes (e.g. wood waste, sawdust, liquors, waste paper, paper broke), as well as heat recovered from the internal generation of electricity — however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.</p> <p>Electric energy means net imported electricity coming from the grid and internal generation of electricity measured as electric power. Electricity used for wastewater treatment need not be included.</p> <p>Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0, 8 and added to the total fuel consumption.</p> <p>In case of integrated mills, due to the difficulties in getting separate fuel (heat) figures for pulp and paper, if only a combined figure for pulp and paper production is available, the fuel (heat) values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.</p>		

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Proposed criteria		
<p>(a) Electricity</p> <p>The electricity consumption related to the pulp and the paper production shall be expressed in terms of points (PE) as detailed below.</p> <p>The number of points, PE, shall be less than or equal to 1,5.</p> <p>The calculation of PE shall be made as follows.</p> <p>Calculation for pulp production: For each pulp i used, the related electricity consumption ($E_{pulp,i}$ expressed in kWh/ADT) shall be calculated as follows:</p>		

$E_{pulp,i}$ = Internally produced electricity + purchased electricity – sold electricity

Calculation for paper production: Similarly, the electricity consumption related to the paper production (E_{paper}) shall be calculated as follows:

E_{paper} = Internally produced electricity + purchased electricity – sold electricity

Finally, the points for pulp and paper production shall be combined to give the overall number of points (PE) as follows:

$$P_E = \frac{\sum_{i=1}^n [pulp,i \times E_{pulp,i}] + E_{paper}}{\sum_{i=1}^n [pulp,i \times E_{ref pulp,i}] + E_{ref paper}}$$

In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.

(b) Fuel (heat)

The fuel consumption related to the pulp and the paper production shall be expressed in terms of points (PF) as detailed below.

The number of points, PF, shall be less than or equal to 1,5.

The calculation of PF shall be made as follows.

Calculation for pulp production: For each pulp i used, the related fuel consumption ($F_{pulp,i}$ expressed in kWh/ADT) shall be calculated as follows:

$F_{pulp,i}$ = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity

Note:

$F_{pulp,i}$ (and its contribution to PF, pulp) need not be calculated for mechanical pulp unless it is market air dried mechanical pulp containing at least 90 % dry

The amount of fuel used to produce the sold heat shall be added to the term 'sold fuel' in the equation above .matter.

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Calculation for paper production: similarly, the fuel consumption related to the paper production (F_{paper} , expressed in kWh/ADT), shall be calculated as follows:

F_{paper} = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity

Finally, the points for pulp and paper production shall be combined to give the overall number of points (PF) as follows:

$$P_F = \frac{\sum_{i=1}^n [pulp,i \times F_{pulp,i}] + F_{paper}}{\sum_{i=1}^n [pulp,i \times F_{ref pulp,i}] + F_{ref paper}}$$

Table 3 Reference values for electricity and fuel

Pulp grade	Fuel kWh/ADT		Electricity kWh/ADT	
	Reference		Reference	
	Non-admp	admp	Non-admp	admp
Chemical pulp	3750	4750	750	750

Thermomechanical pulp (TMP)	0	?	?	?
Groundwood pulp (including Pressurised Groundwood)	3200	4500	550	550
Chemithermomechanical pulp (CTMP)	0	?	?	
Recovered fibre pulp	?	?	?	?
Paper grade	Fuel	kWh/t		Electricity kWh/t
Newsprint paper grade		1700		750
Copying and graphic paper grade		1700		750
Tissue paper grade		1800		1030
Admp	=	air dried market pulp.		

a) Assessment and Verification: for both (a) and (b)): the applicant shall provide detailed calculations showing compliance with this criterion, together with all related supporting documentation. Reported details shall therefore include the total electricity and fuel consumption.

The applicant shall calculate all energy inputs, divided into heat/fuels and electricity used during the production of pulp and paper, including the energy used in the de-inking of waste papers for the production of recovered paper. Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations.

Total heat energy includes all purchased fuels. It also includes heat energy recovered by incinerating liquors and wastes from on-site processes (e.g. wood waste, sawdust, liquors, waste paper, paper broke), as well as heat recovered from the internal generation of electricity — however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.

Electric energy means net imported electricity coming from the grid and internal generation of electricity measured as electric power. Electricity used for wastewater treatment need not be included.

Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0,8 and added to the total fuel consumption.

In case of integrated mills, due to the difficulties in getting separate fuel (heat) figures for pulp and paper, if only a combined figure for pulp and paper production is available, the fuel (heat) values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.

Rationale

The pulp and paper industry is characterized by its high energy demand in form of electricity and heat needed for pulp and papermaking operations. Nevertheless, the pulp and paper industry has a large potential for creating energy savings (Chen et al, 2012). The use of heat recovery systems plays an important role in the overall energy efficiency of the pulp and paper industry. In Europe, the industry produces about 51 % of the electricity it consumes, most (95,2 %) from combined heat power installations (CHP). In 2011 the industry bought 63,6 TWh of electricity, sold 10,5 TWh of electricity, and produced 55.1 TWh of electricity (CEPI, 2013). Figure 17 shows EU-28 tendency of total energy consumption within the sector between 1990 and 2014. The index indicates the energy consumption decline since 2006 whereas paper and pulp production has increased (as indicated in the preliminary report, section 3). The ration between energy consumed/production suggests industry efforts to implement energy saving measures that are proportionally related to operational costs of a site.

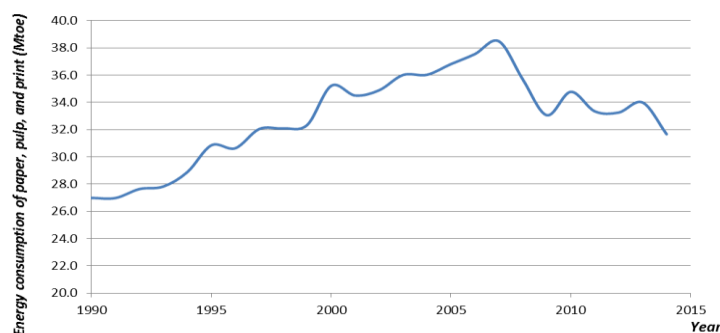


Figure 17. EU- 28 Energy Statistics- total energy consumption of paper, pulp, and print (Mtoe) (EU Commission, DG ENER)

Monitoring of energy used in the pulp and paper industry is complex and non-homogenous, mainly because of limited comparability between different installations due their specificity. Within one paper grade there are differences in raw material composition, product properties and installed process equipment, among others, that influence the overall energy consumption per product. Following Laurijssen et al. (Laurijssen et al, 2013) the energy improvement potential should be identified at the process level by the comparison of specific energy consumption (SEC) of similar processes within different paper mills. Reporting energy use by process area instead of for the entire mill allows for meaningful comparison of energy use across mills and countries with widely varying processes and product mixes. In this sense, the Reference Document of the European Commission on Best Available Techniques in the Pulp and Paper Industry (BAT/BREF) defines "Best practice energy benchmarking" as the process of comparing actual steam and energy consumption with the levels of best practice used in the mills that apply similar processes and manufacture similar products. The reference level should be formed by energy consumption figures together with the technologies used.

Table 21 shows the assessment of subsystems with regard to their relevance for energy consumption. System borders and reference values of the subsystems are to be considered when assessing the energy balance (Blum et al., 2007).

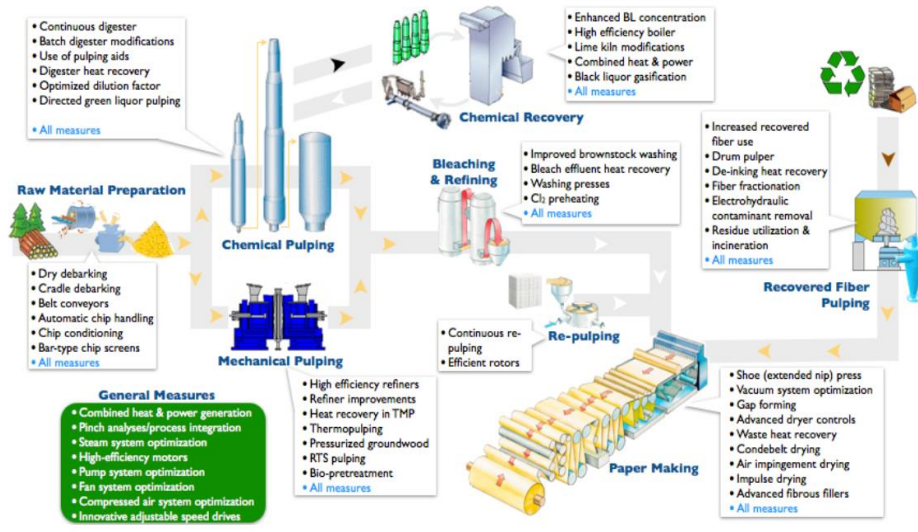


Figure 18. Energy reduction cross cutting measures for pulp and paper processing (<http://ietd.iipnetwork.org/content/pulp-and-paper>)

Table 21. Assessment of subsystems with regard to their relevance for energy consumption

Process ⁽¹⁾	Integrated uncoated mechanical	Integrated coated mechanical	Non-integrated uncoated wood-free	Non-integrated coated wood-free	RCF without deinking	RCF-based graphic (with deinking)	RCF-based board (with deinking)	Non-integrated tissue	RCF-based tissue	Speciality wood-free
Wood handling			NA	NA	NA	NA.	NA	NA	NA	NA
Refining										
Grinding			NA	NA	NA	NA	NA	NA	NA	NA
Screening										
HC cleaning										
Thickening			NA	NA				NA		NA
Deinking	NA	NA	NA	NA	NA			NA		NA
Bleaching			NA	NA	NA			NA		NA
Mixing										
Approach flow										
Forming										
Pressing										
Drying										
Coating	NA		NA		NA	NA		NA	NA	
Calendering					NA		NA	NA	NA	
Finishing										
Central service										
	Very intensive (greatest consumer in the mill)									
	Considerable (major consumer)									
	Low (has only a minor impact on the energy situation of the mill)									
	Negligible									
NA	The process is not applied in the manufacturing of this grade									
	Varying because of differences in process and production within this grade									

⁽¹⁾ Chemical pulping is not included.

Analysis of energy consumption levels

Establishing of the energy consumption reference values for pulping technique/ final product is very complex and requires building up an extensive database. The comparative analysis can be done between installations of similar technical parameters. Therefore, the data presented in the subsequent chapters for specific pulp types are not conclusive and its referencing should be performed indicatively. Because of differences in the overall energy balance when proposing the energy consumption reference values the clear separation should be done between integrated process, manufacturing of market pulp (pulp mill) and paper product (paper mill). As suggested by industry stakeholders total energy consumption values should also refer to the paper grade. Furthermore, the need for a specific energy criterion under EU Ecolabel scheme was questioned, given that air emissions of NO_x, SO₂, and CO₂ are already covered and effectively provide limits on the quantities of fossil fuels and fossil fuel-based electricity that can be used in the process.

Comparison of Ecolabel and Nordic Swan energy reference values with the benchmark values included in ETS and BATs report shows discrepancies for mechanical pulp and sulphite pulp, while figures for sulphate mills are of comparable order of magnitude. BATs energy consumption levels and Nordic Swan reference levels are more or less comparable (see Table 22).

The close relationship between energy consumption and the different stages of pulp and paper production, which will vary in relevance from site to site, makes this available information unfeasible to use as a basis for proposing any benchmark energy balances.

The differences for energy consumption for production of sulphite and mechanical pulp indicates the need to gather further information from industry stakeholders involved in the EU Ecolabel revision process. Therefore, it seems more appropriate to discuss the background of these differences and analyse what data may have to be additionally collected to gain a better understanding of the possible benchmark value to be established for the different types of pulp.

On the basis of the comparative analysis conducted, the preliminary proposal is to harmonise the energy consumption values with Nordic Swan requirements for Sulphate pulp, unbleached chemical pulp, and product grades.

It seems appropriate to discuss during the technical meeting what data may have to be additionally collected to gain a better understanding of the differences between certification schemes' reference levels and BATs, in order to come out with the new revised proposal.

In a possible discussion the relation between Ecolabel reference fuel consumption and ETS benchmarks for fuel consumption may also be addressed.

Table 22. Overview of reference energy consumption values in Ecolabel and Nordic Swan certification schemes and energy consumption benchmark values included in ETS and BAT REF report

	Ecolabel				BAT REF				Nordic Swan				ETS	Best existing mills
	Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT	Electricity kWh/ADT
	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	
Pulp types														
Bleached chemical pulp	4000	5000	800	800	3500	4400	700	550	3750	4750	750	750		
Bleached sulphite pulp	4000	5000	800	800	2250	3050	550	650	3750	4750	750	750		
Unbleached chemical pulp	4000	5000	800	800	2900	3800	620	470	3200	4500	550	550		
CTMP										1000	2000	2000		
a) newsprint	0	1000	2000	2000				1800						1.620
b) copy & print	0	1000	2000	2000				4300						2.200
c) tissue								1425						1.200
TMP										1000	2200	2200		
a) newsprint	0	900	2200	2200				2425						1.800
b) copy & print	0	900	1900	1900				3600						2.700
c) tissue								n.r.						
Groundwood										1000	2000	2000		
a) newsprint	0	900	2000	2000				1600						
b) copy & print	0	900	1900	1900				2200						
c) tissue								n.r.						
Recovered fibre pulp													190	
a) newsprint, copying and printing	300	1300	450	550					350	1350	500	600		
b) tissue	1800	2250	800	800					500	1500	500	700		
Paper production														
Non-integrated mills,														
a) newsprint paper grade	0	1800	0	700						1700		750	1480	
b) printing and copying grade														
-Uncoated		1800		600						1700		750	1570	
-Coated		1800		800						1700		800	1570	

	Ecolabel				BAT REF				Nordic Swan				ETS	Best existing mills
	Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT		Electricity kWh/ADT		Fuel kWh/ADT	Electricity kWh/ADT
	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	Non-admp (integrated)	admp (non integrated)	admp (non integrated)	
c) tissue grade										1800		1030	1650	
Other mills														
Product, weighted average														
Non-integrated mills,			2200	2200										
Other mills			2200	2200										

As previously mentioned, type of raw material used, final product grade, process-related aspects influence the specific energy consumption levels. Presented data and supporting analysis are mainly subtracted from Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board (JRC, 2015).

I.A.1 Chemical pulp:

The manufacturing of bleached kraft pulp consumes a large amounts of heat energy about 10 – 14 GJ/ADt of heat energy (excluding steam for the production of electrical power). The power consumption of an energy-efficient market pulp mill is typically between 660 kWh/ADt and 800 kWh/ADt. The consumption of electrical energy is 600 – 800 kWh/ADt, including the drying of pulp. The energy consumption for pulp drying is about 25 % of the heat energy and 15 – 20 % of the electrical energy. Over 50 % of the electrical energy consumption is used for pumping. The energy for pulp drying (only market pulp) can be of the order of 3 GJ/ADt of pulp or some 25 % of the total heat requirement for a kraft pulp mill and 15 – 20 % of the electrical energy.

The manufacturing of bleached sulphite pulp (Table 23) consumes about 7.5 – 16.5 GJ/ADt of heat energy (excluding steam for the production of electrical power). The lower levels are achieved when paper pulp is produced and the drying of pulp is not included (pumpable pulp). The consumption of electrical energy is 550 – 900 kWh/ADt. If ozone is used in bleaching, the total consumption of electrical energy may reach 990 kWh/ADt.

Table 23. Indicative energy consumption levels for gross process heat and power for different types of sulphite pulp mills

Type of sulphite pulp mill	Indicative consumption level for gross process heat in kWh/ADt	Indicative consumption level for electricity in kWh/ADt	Remarks
<i>Production of bleached sulphite or magnefite paper grade pulp (pumpable pulp)</i>	2 100 – 2 400	400 – 700	Levels refer to manufacturing of pumpable pulp; pulp drying would additionally consume approx. 780 – 840 kWh/ADt heat and 100 kWh/ADt power
<i>Production of bleached sulphite paper grade pulp (market pulp)</i>	2 900 – 3 200	500 – 800	Levels refer to air dry pulp, i.e. include pulp dryer; if steam-consuming processes for by-products are included, energy consumption may increase accordingly
<i>Production of bleached sulphite pulp for viscose</i>	3 200 – 3 500	700 – 800	Levels refer to air dry pulp (including dryers) and include an ozone bleaching stage

*Note that 1 GJ = 277,78 kWh

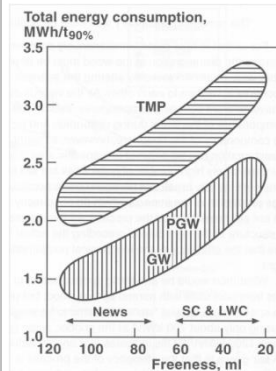
I.A.2 Mechanical and termomechanical (TMP), and chemitermomechanical pulp (CTMP)

Electricity is the main energy used in the pulping process, thus this technology may have high primary energy demand and CO₂ emissions. Power consumption for TMP (thermomechanical pulp) is normally higher than for PGW/SGW (pressurised/stone groundwood) and much higher than for RCF (recovered fibre). Groundwood pulp used for SC paper and newsprint production consumes in total about 2 200 kWh/t and 1 600 kWh/t respectively, whereas TMP consumes about 3 600 kWh/t and 2 500 kWh/t respectively. However, higher heat recovery in TMP may normally lead to lower overall energy consumption than GW pulping. These differences should be addressed under revised energy consumption values for mechanical, semi chemical pulping. Heat recovery in TMP pulping is another aspect to be considered.

Specific electricity consumption per type of pulp/process can vary with more than 100% between different grades as a function of the difference in mechanical degradation required to produce certain qualities of fibres. In general:

- production of tissue paper requires the lowest intensity in mechanical refining, copying and printing paper the highest and newsprint paper requires some 40% less electricity than production of copying and printing paper.
- TMP requires 50% - 60% more electricity than ground wood pulping for similar paper grades.

Electricity consumption levels vary between 1,5 – 2,5 GJ/ADt for GW and between 2,0 – 3,5 GJ/ADt for TMP.



Thermo-mechanical pulping, where steam is recovered enables to reduce the net heat demand of the subsequent integrated papermaking process: *'only a portion of the mechanical work put into the grinder or refiner is used to liberate the fibres in the wood. The rest of the applied energy is converted through friction into heat and some of this can be recovered as hot water or steam that can be used for the drying of the final product'*.

For TMP and CTMP recoverable energy fraction can amount to respectively 80% and 45% of power consumption and for TMP can exceed heat requirement for pulp drying or paper making.

The Ecolabel reference fuel consumption of 900 – 1.000 kWh_{fuel}/ADt of pulp for drying of market pulp do not match with the heat recovery potentials.

Another aspect that should be taken into account for mechanical pulps is that most mechanical pulp mills are integrated with the paper manufacturing:

- Groundwood pulp mills are, in practice, always integrated with a paper mill and therefore the pulp is normally not dried with a drying machine.
- TMP is nearly almost always produced in connection with a paper mill due to the possibility to reuse the heat from refiners for the production of steam and better energy efficiency. Only one mill produces market TMP and uses pulp dryers.
- CTMP is often produced in connection with a paper or board mill due to the possibility to reuse the heat from refiners for the production of steam and better energy efficiency. However, CTMP is in some cases (approximately 10 mills in Europe) manufactured as market pulp and dried with a flash dryer which achieves a 90 % DS content.

In view of the level of integration for GWP and TMP the question could be raised if there is a need to define energy consumption reference value for market pulp from non-integrated sites.

A representative reference energy consumption level is difficult to define given the rapid technological developments in the past two decades and the associated significant reduction in energy consumption (Figure 18). The decision making process is rather supported by economical and not environmental issues

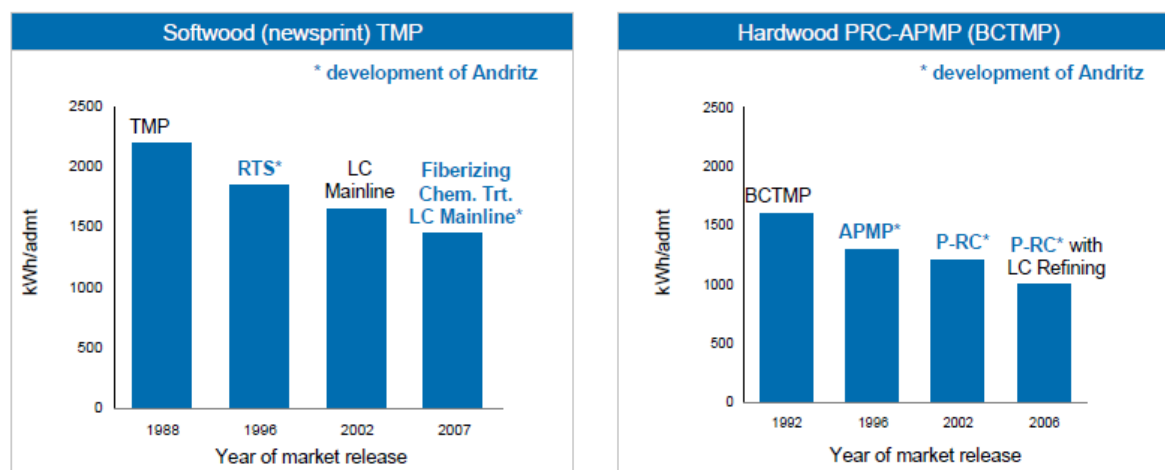


Figure 19. Development of specific energy requirement for TMP newsprint grade pulp and CTMP tissue grade pulp in past 20 years (Andritz, 2008).

I.A.3. Recycled pulp

RCF mills require substantial amounts of steam for heating of water, pulp, air and chemical additives and for drying the paper. Nevertheless, RCF pulping requires comparatively less total energy for processing than is needed for virgin pulp, especially for mechanical pulping. In fact, it has been estimated that producing recycled Kraft pulp uses 33% less energy overall, on average, than mills making virgin chemical pulp (Kinsela, 2012).

Energy consumption in recovered fibre processing depends to a large extent on the design, type and amount of process steps involved to achieve a certain product quality (Table 23). Whereas standard deinked stock for newsprint consumes about 300 – 350 kWh/t electrical energy, high-grade deinked pulp with higher ISO brightness (e.g. graphic papers) requires 400 – 500 kWh/t.

Integrated RCF-based mills are often partially integrated, i.e. part of pulp is manufactured on site and the rest is purchased pulp. In Europe, nearly all RCF-based mills are integrated. In RCF paper mills, steam is normally produced on site by each company. Electricity can also be purchased from the public grid. Paper mills usually use a mixture of different fibre types. The total energy consumption is directly proportional to the share and type of mechanical pulp in the furnish. Power consumption for RMP (refiner mechanical pulp) and GW (groundwood) is significantly higher than for RCF processing.

Table 24. Energy consumption different RCF paper grades

	Packaging paper	Newsprint	LWC/SC paper	Tissue paper and market pulp
<i>Main paper for recycling (depends on availability and price of paper for recycling and quality of the end product)</i>	Mixed paper for recycling and boards, paper for recycling and packaging from stores and supermarkets	Deinkable paper for recycling (old newsprint and old magazines)	Deinkable paper for recycling (old newsprint and old magazines)	Deinkable paper for recycling (old newsprint + magazines); wood-free office paper for recycling
Energy consumption - Electricity - Thermal energy (e.g. steam)	150 – 250 kWh/t 0 MJ/t (if dispersing is applied heating is required)	300 – 420 kWh/t 450 – 900 MJ/t (=0.2 – 0.4 t _{steam} /t)	400 – 600 kWh/t 650 – 1 200 MJ/t (=0.3 – 0.5 t _{steam} /t)	400 – 500 kWh/t 650 – 1 100 MJ/t (=0.3 – 0.5 t _{steam} /t)

I.A.4. Paper mill

The total electrical energy consumption at paper mills is summarised in Table 25. All electric power inside the paper mill building is included. i.e. all power usage inside the paper mill starting from the pulp storage towers (in integrated mills) and ending at the finishing operations is included. For non-integrated paper mills, all processes starting from the mixing chest are included, i.e. for the whole mill energy consumption, consumption data for pulpers that increase specific power consumption must be added (up to 30 – 60 kWh/t) and refiners, if applied. The values are based on 100 % efficiency at the reel to make paper machines comparable (JRC, 2015)

Table 25. Typical electrical energy consumption at modern paper mills based on the dimensioning capacity (= 100 % at reel) of the paper machine

Paper grade	Power consumption in kWh/t (based on dimensioning capacity, Paper machine without stock preparation)	Power consumption in kWh/t (data refer to the whole paper mill)
<i>Newsprint</i>	480 – 630	500 – 700
<i>LWC paper</i>	550 – 750	500 – 800
<i>SC paper</i>	600 – 700	450 – 700
<i>Fine paper (uncoated)</i>	450 – 650	450 – 650
<i>Fine paper (coated)</i>	600 – 850	600 – 750
<i>Multi-ply board</i>	~ 680	
<i>Sack paper</i>	~ 850	700 – 850
<i>Testliner</i>	~ 550	
<i>Tissue</i>	500 – 3 000 *	

*The range reflects the full range of possibilities and is not typical in this sense

The lowest values for power consumption correspond to packaging paper or corrugated base paper which consume about 400 – 600 kWh/t, whereas printing and writing paper (e.g. wood-free uncoated) consume about 450 – 650 kWh/t (electrical energy, 100 % efficiency).

The different drying systems used in tissue mills through-air drying or hybrid technologies have a significant effect on the energy consumption of the mill. Apart from the tissue-making process, there are additional processes that can significantly influence the energy consumption of a tissue mill:

- Integrated deinking will require more energy;
- CHP/cogeneration will require more natural gas consumption;
- Electrical steam boilers will require more electricity;
- Biomass boilers will require less fossil fuel.

Nordic Swan (Table 22) set the reference values for the tissue paper machine's consumption of fuel at 1800 kWh/tonne, and for electricity at 1030 kWh/tonne. The same reference values shall be used for tissue paper products that are manufactured using non-woven or TAD technology. Where the tissue is produced out of recycled fibre fuel consumption is set at 500 kWh/tonne, and for electricity at 500 kWh/tonne. In case where dried recycled fibre is used fuel consumption is set at 1500 kWh/tonne, and for electricity at 700 kWh/tonne. BREF indicates that the heat consumption for non-integrated tissue with conventional drying system is at 1800-2100 kWh/tonne, and for electricity 900-1100 kWh/tonne.

II. Methodology for reporting on energy consumption

The current criterion considers the use of energy in form of heat and power. The intention of the requirement is based on information on actual energy use in production in relation to a specified reference value expressed in the scoring system. The quotient

between these values determines the energy points rating. The quotient shall be less than or equal to 1,5. The separation between energy (fuel and heat) required for air dried pulp, integrated process, and also final product grade enable to separate production of market pulp and integrated system.

In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both respective pulp and paper production.

According to current Ecolabel criteria fuel consumption considering all contributions is to be calculated as:

Consumption = Internally produced fuel + 0,8 × bleed steam ^(a) + 0,8 × steam from electrode boilers ^(b) + purchased fuel – sold fuel – 1,25 × internally produced electricity ^(c) – sold heat ^(d)

^(a) According to the 2011 Commission Decision on Ecolabel criteria for copying and graphic paper: 'Total heat energy includes as well as heat recovered from the internal generation of electricity – however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.' This has been interpreted as referring to bleed steam from a back pressure steam turbine.

^(b) 'Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0,8 and added to the total fuel consumption'.

^(c) The factor 1,25 relating to internally produced electricity seems to indicate that a boiler efficiency of 80% is assumed.

^(d) As mentioned in the Commission Decision: 'The amount of fuel used to produce the sold heat shall be added to the term 'sold fuel' in the equation above'.

The calculation rule requires a reduced set of parameters considering key energy inputs and outputs. The formula considers onsite power generation. In this way the approach takes into account all aspects relevant for onsite optimisation of energy consumption; heat demand per process, heat integration and recovery of residual heat, conversion efficiencies (e.g. boiler efficiencies).

Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations. Electricity used for waste-water treatment and – for tissue paper – air cleaning need not be included.

The energy used for waste water treatment forms a part of the entire process. It should therefore be subject to the further discussion if the energy used for waste water treatment plant should remain excluded from the calculation.

With respect to the calculation of fuel consumption following aspects seem to require further consultation:

Assuming the factor 1,25 does refer to boiler efficiency of 80%, a modification could be suggested:

- For fuel utilized in CHP: in modern sulphate pulp mills part of the generated residual biomass fuels may be utilized for production of electricity by producing high pressure steam and convert the steam with a condensing steam turbine. According to (BAT-REF, 2015)⁵ electric efficiency for high pressure steam systems in modern pulp mills amounts to approximately 35%. Taking into account a boiler efficiency of 75% fuel requirement per unit of produced electricity would amount to $1/(35\% \times 75\%) = 3,8 \text{ GJ}_{\text{fuel}}/\text{GJ}_e$.

⁵ See table 3.5: 8,2 GJ of steam generates 2,9 GJ of electricity

- For fuel utilized in condensing steam cycles or gas turbines/gas engines without heat recovery, the modified factor should be related to the actual net electric efficiency.

For heat supplied to external consumers, no recalculation factor for calculating associated fuel consumption seems to be included, even though supplied heat may refer to low or medium pressure steam.

As the mandatory allocation rule for calculating fuel consumption has no relation with actual CHP unit efficiencies, fuel consumption related to 'internal generation of electricity' may be grossly underestimated.

Given the above issues, it is to be discussed with stakeholders if the electricity consumption calculation should be kept at the simplified level, or should be considered thorough more detailed energy balance calculation.

As illustrated by the formula for fuel consumption calculation, in the Ecolabel criteria for paper products electricity from CHP units has a $1,25/0,8 = 1,56$ -fold higher allocation factor than heat.

Generally accepted allocation methodologies applied in LCA's and in NO_x and CO₂ emission trading schemes are based on actual efficiencies of boilers, furnaces and co-generation units⁶. Examples of allocation rules included in EU legislation are:

- Renewable Energy Directive: allocation on the basis of energy content of power and heat⁷
- EU ETS: heat benchmark allowances/TJ (i.e. 90% efficient NG boiler)
- for fossil fuel fired cogeneration units

Actual net electric and thermal efficiencies of the cogeneration unit are basis of allocation. For biomass fired CHP units (e.g. black liquor recovery boiler, bark boiler, biosludge combustion) the actual boiler efficiency (approximately 75%) may be applied for calculating fuel consumption.

Q: The question may be put forward whether waste water treatment (and air/flue gases) should not be included in the calculation of electricity consumption.

Q: Shall energy calculation methodology be re-design including modified factor, which should be based on the actual thermal and electric efficiencies of heat producing equipment.

⁶ Other allocation methods may also be applied, e.g. using exergy as basis for allocation – see e.g. http://www.ghgprotocol.org/files/ghgp/tools/CHP_guidance_v1.0.pdf for a complete overview.

⁷ See Zip file with calculation tool and background reports on: http://www.biograce.net/app/webroot/biograce2/content/ghgcalculationtool_electricityheatingcooling/overview

4.3 Criterion 3: Fibres – conserving resources, sustainable forest management

Table 26. Sustainable fibre criteria

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p>The fibre raw material in the paper may be recycled or virgin fibre.</p> <p>Virgin fibres shall be covered by valid sustainable forest management and chain of custody certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.</p> <p>However, where certification schemes allow mixing of certified material and uncertified material in a product or product line, the proportion of uncertified material shall not exceed 50%. Such uncertified material shall be covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material.</p> <p>The certification bodies issuing forest and/or chain of custody certificates shall be accredited/ recognised by that certification scheme.</p>	<p>At least the 70% (w/w) on the total amount of fibres used for newsprint paper shall be recovered fibres.</p> <p>All fibres used that are not recovered shall be virgin fibres covered by valid sustainable forest management and chain of custody certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.</p> <p>However, where certification schemes allow mixing certified material and uncertified material in a product or product line, the proportion of uncertified material shall not exceed 50 % of the overall amount of virgin fibres used. Such uncertified material shall be covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material.</p> <p>The certification bodies issuing forest and/or chain of custody certificates shall be accredited/recognised by that certification scheme.</p> <p>Excluded from the calculation of recovered fibres content is the reutilisation of materials generated in a process and capable of being reclaimed within the same process that generated it (mill broke — own produced or purchased).</p>	<p>a) The pulp and paper producer/s shall have a policy for sustainable wood and fibre procurement and a system to trace and verify the origin of wood and tracking it from forest to the first reception point.</p> <p>The origin of all virgin fibres shall be documented. The pulp and paper producer must ensure that all wood and fibre originate from legal sources. The wood and fibre shall not come from protected areas or areas in the official process of designation for protection, old growth forests and high conservation value forests defined in national stakeholder processes unless the purchases are clearly in line with the national conservation regulations.</p> <p>b) The fibre raw material in the paper may be recycled or virgin fibre. 50 % of any virgin fibre must, however, originate from sustainably managed forests which have been certified by independent third party schemes fulfilling the criteria listed in paragraph 15 of the Council Resolution of 15 December 1998 on a Forestry Strategy for the EU and further development thereof.</p> <p>The applicant shall provide appropriate documentation from the paper supplier indicating the types, quantities and precise origins of fibres used in the pulp and the paper production. Where virgin fibres from forests are used, the applicant shall provide appropriate certificate(s) from the paper/pulp supplier showing that the certification scheme correctly fulfils the requirements as laid down in paragraph 15 of the Council Resolution of 15 December 1998 on a Forestry Strategy for the EU.</p>

<p>Assessment and Verification: The applicant shall provide appropriate documentation indicating the types, quantities and origins of fibres used in the pulp and the paper production.</p> <p>Where virgin fibres are used, the product shall be covered by valid forest management and chain of custody certificates issued by an independent third party certification scheme, such as PEFC, FSC or equivalent. If the product or product line includes uncertified material, proof should be provided that the uncertified material is less than 50 % and is covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material.</p> <p>Where recycled fibres are used, the applicant shall provide a declaration stating the average amount of grades of recovered paper used for the product in accordance with the standard EN 643 or an equivalent standard. The applicant shall provide a declaration that no mill broke (own or purchased) was used.</p>	<p>Assessment and Verification: The applicant shall provide appropriate documentation indicating the types, quantities and origins of fibres used in the pulp and the paper production.</p> <p>Where virgin fibres are used, the product shall be covered by valid forest management and chain of custody certificates issued by an independent third party certification scheme, such as PEFC, FSC or equivalent. If the product or product line includes uncertified material, proof should be provided that the uncertified material is less than 50 per cent and is covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material.</p> <p>The percentage of recovered fibres shall be calculated as ratio between the inputs of recovered fibres compared to the final paper production. Where recovered fibres are used, the applicant shall provide a declaration stating the average amount of grades of recovered paper used for the product in accordance with the standard EN 643 or an equivalent standard. The applicant shall also provide a declaration that no mill broke (own or purchased) was used for the calculation of the recovered percentage.</p>	<p>a) Assessment and Verification: The following documents will be required:</p> <p>For each pulp used, separately: A copy of the pulp producer's policy for sustainable procurement including a description of what the pulp producer does, in practice, to ensure that the wood and fibres do not come from protected areas or areas in the official process of designation for protection, old growth forests and high conservation value forests defined in national stakeholder processes unless the purchases are clearly in line with the national conservation regulations.</p> <p>For each pulp used, separately: An independently third party certified CoC certificate that can be used for the verification of the system to trace and verify the origin of the wood.</p> <p>b) Assessment and Verification: The following documents will be required:</p> <p>For each pulp used, separately: a list of all fibre suppliers, and the amount of wood and species of wood that is annually delivered to the pulp mill from each, along with declarations (from the fibre suppliers) of the amount of certified fibres delivered to the pulp mill and the copies of the certificates for the certified fibres.</p> <p>In case the certified fibres are allocated to only a part of the pulp production a description of the system for tracing that part must be provided.</p>
Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Proposed criteria		
<i>No concrete wording at this stage although the intended ambition level would be harmonised across all three product groups and refer to a minimum sustainable fibre content of 70% - with sustainable fibres being considered as virgin fibres sourced from sustainably managed forests or fibres from recovered paper.</i>		

Rationale

Why relevant

A minimum requirement (50%) for any virgin fibres being sourced from sustainably managed forests is already present in the existing criteria for Copying and Graphic Paper and for Tissue Paper. The existing criteria for Newsprint Paper have a minimum requirement (70%) for recovered fibre content.

Sustainable forestry and the adverse environmental impacts of deforestation originally came to the fore around 1990. Since then, a political commitment at the ministerial level in Europe to the definition, monitoring, understanding and promotion of sustainable forestry has become well established under the voluntary Forest Europe initiative, to which 46 European countries have now signed up.

The environmental impact of wood harvesting from forests or plantations can vary significantly depending on how the whole process is carried out and how the forest or plantation is managed in the long term. In terms of LCA impact categories, the harvesting of wood has a strong influence on global warming potential and land use as well as impacts on biodiversity.

Positive impacts on climate change due to the sequestration of carbon in the wood biomass and in forest/plantation soil are obvious although these short term positive impacts are meaningless in the long term if the harvesting operation results in net deforestation or forest degradation.

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC, 2014) quotes forestry and land use as the second most important source of anthropogenic carbon dioxide (fossil fuel combustion being the first). These conclusions are supported by other independent scientific studies, e.g., the work carried out by van der Werf et al., (2009). The subject is sufficiently important to have been addressed specifically in an IPCC special report (IPCC, 2000) and the development of the "United Nations Reducing Emissions from Deforestation and forest Degradation" [UN-REDD](#) initiative.

Land use impacts are generally negative due to the need for building access roads and clear-cutting operations but the latter impact can be minimised over the longer term when the harvested area is replanted and the forest or plantation is managed in a manner that maintains or enhances the levels of growing stock in the forest/plantation. Land use change relating to forestry operations can in some limited cases be positive (due to land reclamation or the conversion of intensive agricultural land to plantations) but can also be negative (due to the conversion of naturally regenerated or primary forests to plantations).

Threats to biodiversity caused by forestry activities are evident if care is not taken to maintain minimum levels of deadwood and a minimum spread of different tree species and ages in the forest unit.

What other related Ecolabel criteria and green initiatives say

There are a number of relevant Ecolabel criteria / green initiatives which make reference to minimum requirements for either sustainable certified virgin fibres, recovered fibres or both.

- The FSC standards sets out a list of criteria by which a forest can be demonstrated to be managed in a sustainable manner and makes provision for regular auditing of the forest in order to ensure that management practices are implemented and maintained. The FSC initiative also sets out a standard for Chain of Custody (CoC) requirements for actors throughout the supply chain in order to ensure that sustainable certified material can legitimately be traced and subsequently claimed on the end product. There are three FSC labels that can potentially be applied to paper products: **FSC 100%** (where 100% of all fibres used are from forests covered by FSC SFM certificates or recycled material); **FSC Mix** (where at least 70% of fibres are from forests covered by FSC SFM certificates and/or

recycled material and that the remaining fibres are from acceptable "controlled sources"); **FSC Recycled** (only if the recycled fibre content is 100%).

- The PEFC standards are similar to the FSC in the sense that it provides a set of criteria by which SFM can be defined, demonstrated and audited and that a CoC standard is provided so that material can be traced from the forest to the final product in a legitimate manner. There are two types of PEFC label that can be applied to paper products: **PEFC certified** (where at least 70% of fibre content is from forests covered by PEFC SFM certificates and/or recycled material and that any remaining fibre content is from acceptable "controlled sources"); and **PEFC Recycled** (where the recycled fibre content is at least 70% and that any remaining fibres are from acceptable "controlled sources").
- The Blue Angel criteria for sanitary paper products (RAL UZ 5, January 2013 version) has a requirement that 100% of the fibres used must be sourced from recovered paper and then detail specific requirements about which categories of recovered paper grades can be used.
- The Nordic Ecolabel Basic Module for paper products (June 2011) requires that all pulp and paper producers are covered by independently verified Chain of Custody certificates that ensures traceability of wood and fibre raw materials to the point and species of origin. Fibre raw material must not come from GMO species. No direct mention is made of FSC or PEFC when defining what is considered as SFM standards, which is detailed in Appendix 1C. A flexible approach is provided for the minimum sustainable fibre content in paper products where either (i) at least 30% of fibres must be virgin fibres from sustainably managed forests or, (ii) at least 75% of fibres must be from recovered paper, wood shavings or sawdust or, (iii) a combination of (i) and (ii) so long as a certain minimum content is respected according to a basic equivalency calculation.
- The Green Seal standard for Sanitary Paper Products (GS-1 Edition 6.1, July 2013) requires that paper must be made from 100% "recovered material" or combinations of recovered material with agricultural residues or post-consumer material.
- The Green Seal standard for Printing and Writing Paper (GS-7 Edition 6.1, July 2013) requires that at least 30% of fibres shall be from post-consumer materials or that, where recovered material is used, that no elemental chlorine, chlorine dioxide, hypochlorite or any of the solvents restricted on a list maintained by the US EPA are used during processing.
- The Green Seal standard for Newsprint Paper (GS-15 Edition 1.1, July 2013) makes a distinction between "Newsprint" and "Newspaper" where minimum requirements for recovered fibre material is 40% and 35% respectively.

Points raised by stakeholders and related discussion

Responses to the initial scoping questionnaire revealed the following points:

- Strong support for EU Ecolabel criteria that specifically state certain sustainable forest management principles to be complied with.
- Very strong support that any requirements set out by EU Ecolabel criteria should be able to be fulfilled by demonstrating compliance with well-established certification schemes like FSC or PEFC.
- Strong support that no distinction should be made between virgin fibres from sustainably managed forests, fibres recovered from pre-consumer waste and fibres recovered from post-consumer waste.
- Strong opposition to a minimum recycled content for all three product groups.
- A mixed reaction to the tentative proposal of a minimum 70% content for "sustainable fibres" which could be met by virgin fibres from sustainable forests and/or recycled fibres.

The negative reaction to the proposal to set a minimum recycled fibre content for the three product groups is doubtless due to the same reasons for opposition expressed when a minimum recycled fibre content of 70% was set for Newsprint Paper in 2012, which is linked to differences in the availability of recovered paper across Europe.

The Nordic countries in the EU are major producers of wood material in the EU due to vast forest reserves. Despite high recycling rates in these countries, the fact that these countries are not highly populated and that much of the paper production is exported, means that these countries would be unable to meet the existing EU Ecolabel requirements for Newsprint Paper without importing recovered paper.

It was pointed out several times that overall paper recycling rates are already quite high in Europe and that this has led to an increase in the number of cycles that a "representative fibre" undergoes during its lifetime.

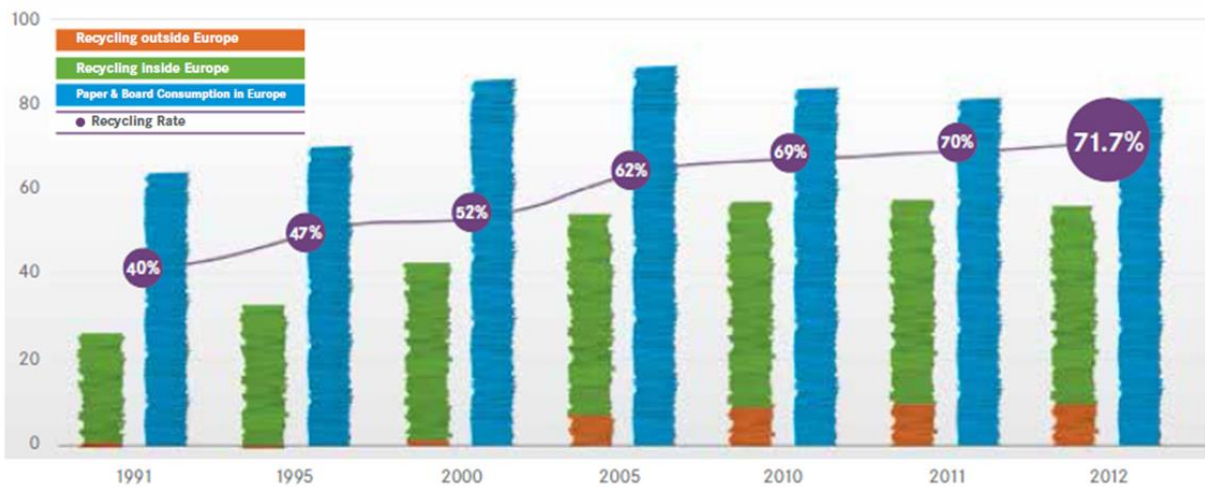


Figure 20. Trends in paper recycling in Europe (1991-2012). Source: European Recovered Paper Council.

Unlike metals, and to some extent plastics, paper fibres cannot be recycled dozens of time over and over. After being recycled on average 5-6 times, a reduction in the strength characteristics of the recycled paper pulp occurs due to a lower swelling capacity of fibres amongst other factors. As such, from a techno-economic perspective, there is an optimum level of recycled fibre in the product as a whole (PIRA International, 2005). According to the European Recovered Paper Council, the average number of times a paper fibre is collected and recycled was 3.5 in Europe in 2012 (compared to 2.4 for the global average). So there is a continual need for fresh virgin fibres to enter into the paper cycle. Some industry stakeholders have confirmed a perceived reduction in recovered fibre quality which makes the production of good quality, high recycled fibre content paper products more challenging in Europe.

Another challenge to mandatory minimum recycled contents is the fact that the consumption rates of Copying and Graphic Paper and Newsprint Paper (which are the most suitable sources of recovered fibre in the revised product groups, are declining across Europe at a significant rate. Both carton board and tissue producers use large amounts of old newspapers as inputs material. China is currently the biggest destination for European recycled paper, which in general can be considered to later return to Europe as packaging of products imported from China.

Despite the fact that Copying and Graphic Paper or Newsprint Paper can be recycled into packaging grade papers and paperboards, the opposite process is not straightforward, especially for the production of good quality Copying and Graphic Paper or Tissue Paper. This is reflected in market trends (see. Preliminary report, section 3) which show that paper and board ending up in packaging products much more than in Copying and Graphic Paper or Tissue Paper. Even considering that some manufacturers have products with 100% recycled fibre content, the market availability might not always be sufficient across Europe to require mandatory minimum recycled content under EU Ecolabel.

Industry stakeholder feedback indicated that overall, using fibres from higher quality recovered paper grades does not generally result in any cost burden or cost benefit when compared to virgin fibres but the prices for higher grades of recovered paper can be more volatile. Experience has shown that minimum recycled contents in certain products are a direct result of marketing decisions taken by certain end clients.

Ambition level

It can be argued that there is an increase in ambition level for Copying and Graphic Paper and Tissue paper because the minimum content of certified fibres (recovered and/or sustainable virgin fibres) has increased from 50% to 70%. Two major reasons for the increase in ambition level are:

- the increasing areas of forests and plantations covered by SFM certificates (globally FSC and PEFC certified areas grew from around 384 million ha to 462 million ha between 2012 and 2016) and
- that the proposed criteria align with current FSC and PEFC labelling criteria such that if the product carries an FSC or PEFC label as well, it can be considered automatically to comply with the EU Ecolabel criteria.

On the other hand, it could be argued that the criteria for Newsprint Paper has been relaxed, because now the criteria can be complied with using either sustainable virgin fibre or recovered fibres instead of only recovered fibres. The main reasons for this change link back to previous stakeholder discussions about the geographical disparities regarding the relative availabilities of recovered fibres and sustainable virgin fibres across Europe.

In the context of other ecolabels, the requirements can be considered as more ambitious than equivalent Nordic ecolabel criteria and less restrictive than Blue Angel and Green Seal standards. Ultimately, a large part of how ambitious the proposed criteria are will come down to the reader's opinion about the relative environmental merits of recovered fibres versus sustainable virgin fibres.

Going straight to underlying SFM principles in EU Ecolabel criteria

The upcoming revised set of EU Ecolabel criteria for Copying & Graphic Paper, Newsprint Paper and Tissue Paper should include a requirement on "Sustainable Forest Management", taking into consideration the importance of preventing the use of unsustainably sourced fibres in EU Ecolabel paper products, as the implementation of the principles of SFM are the only way we could prevent possible negative impacts of wood sourcing, such as deforestation and forest degradation.

The most recently voted criteria (Furniture and Footwear, January 2016) in this area are reproduced below criteria presented follow the equivalent sustainable wood criteria that were agreed for the most recently voted EU Ecolabel product groups (furniture and footwear). Naturally there are some specificities for the paper product groups that would result from a deviation in the text from other product groups.

"All wood, cork, bamboo and rattan shall be covered by chain of custody certificates issued by an independent third party certification scheme such as the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC) or equivalent.

All virgin wood, cork, bamboo and rattan shall not originate from GMO species and shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent.

Where a certification scheme allows the mixing of uncertified material with certified and/or recycled materials in a product or production line, a minimum of 70% of the wood, cork, bamboo or rattan material, as appropriate, shall be sustainable certified virgin material and/or recycled material.

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

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

Assessment and verification: *The applicant or material supplier, as appropriate, shall provide a declaration of compliance supported by valid, independently certified chain of custody certificate(s) for all wood, cork, bamboo or rattan material used in the product or production line and demonstrate that at least 70% of the material originates from forests or areas managed according to Sustainable Forestry Management principles and/or from recycled sources that meet the requirements set out by the relevant independent chain of custody scheme. FSC, PEFC or equivalent schemes shall be accepted as independent third party certification. In case the scheme does not specifically require that all virgin material is sourced from non-GMO species, additional evidence shall be provided to demonstrate this.*

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

While the FSC and PEFC schemes are clearly established market leaders in the area of sustainable forest management, to avoid creating any current or potential future market distortions, it is necessary to refer to "*FSC, PEFC or equivalent*" in EU Ecolabel criteria.

However, exactly what is meant by "or equivalent" is unclear and it has been requested that the feasibility of introducing an alternative wording for sustainable wood criteria be investigated. Any alternative wording would need to accurately capture the most important elements of SFM which are common to the principles set out by Forest Europe, FSC and PEFC and which can be practically assessed and verified.

Other concerns raised about the current wording for paper products (and for Furniture and Footwear) are that although today FSC and PEFC schemes can be considered as equivalent in many respects, this is no guarantee that it will remain the case in the future. Furthermore, the actual criteria that FSC and PEFC are periodically reviewed by their members and stakeholder groups, a process which is essentially independent of EU Ecolabel criteria.

The preferred solution to this situation would be to directly state certain SFM principles in the EU Ecolabel criteria which are common to FSC and PEFC, which are tangible and can be clearly verified by any qualified third party independent auditor. As a neutral basis for consideration, the Forest Europe definition of SFM is given in Table 27. Any principles and criteria that are common to FSC and PEFC standards should also be considered.

Q. What are the most important SFM criteria, how credible are they and how easily can they be verified?

Q. What are the pros and cons of using existing SFM certification schemes as proof of compliance with SFM criteria established under the EU Ecolabel?

Q. Besides SFM certificates, what other forms of assessment and verification could be considered as proof of compliance that fibres are sustainably sourced?

Table 27. Forest Europe criteria and indicators to evaluate SFM.

Criteria	No.	Indicator	Full text
Criterion 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles	C.1	Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles	
	1.1	Forest area	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area
	1.2	Growing stock	Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply
	1.3	Age structure and/or diameter distribution	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply
	1.4	Forest carbon	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products
Criterion 2: Maintenance of Forest Ecosystem Health and Vitality	C.2	Policies, institutions and instruments to maintain forest ecosystem health and vitality	
	2.1	Deposition and concentration of air pollutants	Deposition and concentration of air pollutants on forest and other wooded land
	2.2	Soil condition	Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types
	2.3	Defoliation	Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes
	2.4	Forest damage	Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced)
	2.5	Forest land degradation	Trends in forest land degradation
Criterion 3: Maintenance and Encouragement of Productive Functions of Forests (Wood and Non-Wood)	C.3	Policies, institutions and instruments to maintain and encourage the productive functions of forests	
	3.1	Increment and fellings	Balance between net annual increment and annual fellings of wood on forest available for wood supply
	3.2	Roundwood	Quantity and market value of roundwood
	3.3	Non-wood goods	Quantity and market value of non-wood goods from forest and other wooded land
	3.4	Services	Value of marketed services on forest and other wooded land
Criterion 4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems	C.4	Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystem	
	4.1	Diversity of tree species	Area of forest and other wooded land, classified by number of tree species occurring
	4.2	Regeneration	Total forest area by stand origin and area of annual forest regeneration and expansion
	4.3	Naturalness	Area of forest and other wooded land by class of naturalness
	4.4	Introduced tree species	Area of forest and other wooded land dominated by introduced tree species
	4.5	Deadwood	Volume of standing deadwood and of lying deadwood on forest and other wooded land
	4.6	Genetic resources	Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ genetic conservation) and area managed for seed production
	4.7	Forest fragmentation	Area of continuous forest and of patches of forest separated by non-forest lands
	4.8	Threatened forest species	Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species
	4.9	Protected forests	Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE categories

	4.10	Common forest bird species	Occurrence of common breeding bird species related to forest ecosystems
Criterion 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management (notably soil and water)	C.5	Policies, institutions and instruments to maintain and appropriately enhance of the protective functions in forest management	
	5.1	Protective forests – soil, water and other ecosystem functions – infrastructure and managed natural resources	Area of forest and other wooded land designated to prevent soil erosion, preserve water resources, maintain other protective functions, protect infrastructure and managed natural resources against natural hazards
Criterion 6: Maintenance of other socioeconomic functions and conditions	C.6	Policies, institutions and instruments to maintain other socioeconomic functions and conditions	
	6.1	Forest holdings	Number of forest holdings, classified by ownership categories and size classes
	6.2	Contribution of forest sector to GDP	Contribution of forestry and manufacturing of wood and paper products to gross domestic product
	6.3	Net revenue	Net revenue of forest enterprises
	6.4	Investments in forests and forestry	Total public and private investments in forests and forestry
	6.5	Forest sector workforce	Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics
	6.6	Occupational health and safety	Frequency of occupational accidents and occupational diseases in forestry
	6.7	Wood consumption	Consumption per head of wood and products derived from wood
	6.8	Trade in wood	Imports and exports of wood and products derived from wood
	6.9	Wood energy	Share of wood energy in total primary energy supply, classified by origin of wood
6.10	Recreation in forests	The use of forests and other wooded land for recreation in terms of right of access, provision of facilities and intensity of use	

4.4 Criterion 4: Excluded or limited substances and mixtures

- Currently referred to as "*Hazardous chemical substances*" (in existing criteria for Tissue Paper) or "*Excluded or limited substances and mixtures*" (in existing criteria for Copying and Graphic Paper and Newsprint Paper).

The existing chemical substance and mixture criteria for all three product groups are complex. While there are many common aspects between Copying and Graphic Paper and Newsprint Paper criteria, it is not the case with Tissue Paper criteria. This is partly due to the differences in Tissue Paper production and conversion operations but also due to the fact that Tissue Paper criteria were published a few years earlier (2009) and especially because this was prior to the adoption of the current EU Ecolabel Regulation (EC) No 66/2010, which has specific provisions for dealing with hazardous substances in Article 6(6) and 6(7) of the Regulation.

The EU Ecolabel Regulation specifically restricts hazardous substances that remain in the final product. However, the production of pulp and paper involves the use of a number of hazardous substances and mixtures which, although they may not remain in the final paper product, could cause adverse environmental impacts if they are discharged to the environment via aqueous and gaseous emissions.

Table 28. Existing criteria structure for hazardous substances and mixtures

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria structure		
4 – Excluded or limited substances and mixtures Preamble a) Hazardous substances and mixtures b) Article 59(1) substances c) Chlorine d) APEOs e) Residual monomers f) Surfactants in deinking g) Biocides h) Azo dyes i) Metal complex dye stuffs or pigments j) Ionic impurities in dye stuffs	4 – Excluded or limited substances and mixtures Preamble a) Hazardous substances and mixtures b) Article 59(1) substances c) Chlorine d) APEOs e) Residual monomers f) Surfactants in deinking g) Biocides h) Azo dyes i) Metal complex dyes j) Ionic impurities in dye stuffs	4 – Hazardous Chemical substances a) Chlorine b) APEOs c) Surfactants in deinking d) Biocides e) Wet Strength Agents f) Softeners, lotions, fragrances and additives of natural origin

Where possible, a common wording for all three product groups will be proposed for the sake of having a harmonised approach between different paper products. Stakeholders should be aware that a wider harmonisation approach between *all upcoming EU Ecolabel product groups* is being led by a horizontal task force involving the Commission and a small group of cross-sectorial experts. The task force will focus on those aspects of the criteria text that are common to all EU Ecolabel product groups as a direct result of Articles 6(6) and 6(7) and aim to clarify issues which have led to most confusion for both applicants and Competent Bodies. Evidently, the outcomes of the horizontal task force may impact directly on future proposed wordings for these criteria.

To improve readability in this report, each of the sub-criteria (preamble plus parts a-j) are compared and contrasted and the rationale for any proposed changes are provided immediately below on a sub-criterion per sub-criterion basis. Any brand new proposals to be raised for discussion at the 1st AHWG meeting are included at the end of this chapter.

Preamble text for overall criteria

Table 29. Preamble text for general hazardous substance criteria

Tissue Paper	Newsprint Paper	Copying and Graphic Paper
Existing criteria		
No equivalent text	<p>Criterion 4 — Excluded or limited substances and mixtures</p> <p><i>Assessment and verification:</i> the applicant shall supply a list of the chemical products used in the pulp and paper production, together with appropriate documentation (such as SDSs). This list shall include the quantity, function and suppliers of all the substances used in the production process.</p>	<p>Criterion 4 — Excluded or limited substances and mixtures</p> <p><i>Assessment and verification:</i> the applicant shall supply a list of the chemical products used in the pulp and paper production, together with appropriate documentation (such as Safety Data Sheets). This list shall include the quantity, function and suppliers of all the substances used in the production process.</p>
Proposed criteria		
<p>Criterion 4 – Restricted hazardous substances and mixtures</p> <p>The applicant shall supply a list of all the chemical products used in the pulp and paper production process, together with appropriate documentation, such as Safety Data Sheets (SDSs). This list shall include the quantities used, their function, the stages in the process where they are used and supplier details.</p>		

Rationale

Only minor changes are proposed for the preamble text. The single biggest change is the removal of the text "*suppliers of all the substances used in the production process*" because it is already mentioned at the beginning of the preamble for "chemical products" and so is redundant.

Furthermore, it is possible that the "*suppliers of all the substances*" text in the existing preamble could potentially be misinterpreted as asking for suppliers of all substances that appear in mixtures (very complicated and not the intention) and not just the suppliers of those mixtures alone (less complicated and the intention).

Increase in the use of non-fibrous raw materials (minerals, chemical substances) stems mainly from targeting more efficient use of feedstock and improvement of the paper products' functionality. Chemical additives used in papermaking generally might be classified into three groups—general (commodity) and two classes of specialty chemicals—process and functional, which can be described as follows:

1. Process chemicals are used as a core chemicals or aids during pulping and bleaching process to optimize the production process, or used in chemical formulations for pulping/bleaching process
2. Functional chemicals directly affect paper quality and paper properties like colour, water repellence, strength, printability, etc. Typical examples of such functional chemicals are dyes, coating binders, and strength and sizing additives.

Since functional chemical additives are designed to give paper a particular characteristic, for reasons of cost and efficiency they generally have a high level of retention to the cellulose fibres. Most of the chemicals are therefore retained in the paper. Chemical auxiliaries, on the other hand, often have a low level of retention and a large proportion is discharged with the wastewater. A product with a chemical additive often contains chemical auxiliaries designed to facilitate the use of the product, e.g. emulsifiers that ensure better accessibility for substances in the water system, which are difficult to dissolve in water. These chemical auxiliaries also have little affinity to cellulose (IPPC, 2001).

Criterion 4a) Restriction of CLP classified substances and mixtures

- No previous equivalent criteria for Tissue Paper while it is currently referred to as "*Hazardous substances and mixtures*" in existing criteria for Copying and Graphic Paper and Newsprint Paper.

Table 30. Restriction of CLP classified substances and mixtures

Existing criteria	
Tissue Paper	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">Copying and Graphic Paper</div> <div style="width: 45%;">Newsprint Paper</div> </div>
No general requirement	<p>In accordance with Article 6(6) of Regulation (EC) No 66/2010, the product shall not contain substances referred to in Article 57 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (2) nor substances or mixtures meeting the criteria for classification with the hazard statements or risk phrases in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council (3) or Council Directive 67/548/EEC (4) specified below:</p> <p>H300(R28), H301(R25), H304(R65), H310(R27), H311(R24), H330(R23/26), H331(R23), H340(R46), H341(R68), H350(R45), H350i(R49), H351(R40), H360F(R60), H360D(R61), H360FD(R60/61/60-61), H60Fd(R60/63), H360Df(R61/62), H361f,(R62) H361d(R63), H361fd(R62-63), H361(R64), H370(R39/23/24/25/26/27/28), H371(R68/20/21/22), H372(R48/25/24/23), H373(R48/20/21/22), H400(R50), H410(R50-53), H411(R51-53), H412(R52-53), H413(R53), EUH059(R59), EUH029(R29), EUH031(R31), EUH032(R32), EUH070(R39-41) H317(R43)*.</p> <p><i>*No commercial dye formulation, colorants, surface-finishing agents, auxiliaries and coating materials shall be used on either pulp or paper that has been assigned or may be assigned at the time of application the hazard statement H317: May cause allergic skin reaction</i></p> <p>Substances or mixtures which change their properties upon processing (e.g., become no longer bioavailable, undergo chemical modification) so that the identified hazard no longer applies are exempted from the above requirement.</p> <p>Concentration limits for substances or mixtures which may be or have been assigned the hazard statements or risk phrase listed above, or which meet the criteria for classification in the hazard classes or categories listed in the table above, and concentration limits for substances meeting the criteria set out in Article 57(a), (b) or (c) of Regulation (EC) No 1907/2006, shall not exceed the generic or specific concentration limits determined in accordance with the Article 10 of Regulation (EC) No 1272/2008. Where specific concentration limits are determined, they shall prevail over the generic ones.</p> <p>Concentration limits for substances meeting the criteria set out in Article 57(d), (e) or (f) of Regulation (EC) No 1907/2006 shall not exceed 0,1 % weight by weight.</p> <p>Assessment and verification: the applicant shall prove compliance with these criteria by providing data on the amount (kg/ADT paper produced) of substances used in the process and by demonstrating that the substances referred to in these criteria are not retained in the final product above the concentration limits specified. The concentration for substances and mixtures shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.</p>
Proposed criteria	
	<p>The product shall not contain substances or mixtures meeting the criteria for classification with the hazard statements in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council specified below in concentrations higher than 0.10% (weight by weight) or other specific concentration limits as per Article 10 of Regulation (EC) No 1272/2008:</p> <p>Group 1 hazards: Category 1A or 1B Carcinogenic, Mutagenic and/or Toxic for Reproduction (CMR): H340, H350, H350i, H360, H360F, H360D, H360FD, H360Fd, H360Df</p> <p>Group 2 hazards: Category 2 CMR: H341, H351, H361f, H361d, H361fd, H362; Category 1 aquatic toxicity: H400, H410; Category 1 and 2 acute toxicity: H300, H310, H330; Category 1 aspiration toxicity: H304; Category 1 Specific Target Organ Toxicity (STOT): H370, H372, Category 1 Skin Sensitiser: H317.</p> <p>Group 3 hazards: Category 2, 3 and 4 aquatic toxicity: H411, H412, H413; Category 3 acute toxicity: H301, H311, H331, EUH070; Category 2 STOT: H371, H373. Other EU hazard classes: EUH029, EUH031, EUH032, EUH059, EUH070.</p> <p>Assessment and verification: the applicant shall prove compliance with these criteria by providing data on the amount (kg/ADT paper produced) of substances or mixtures used in the process and by demonstrating that the substances or mixtures referred to in this critierion are not retained in the final product above the concentration limits specified. The concentrations s of substances and mixtures shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.</p>

Rationale

Alignment with more recent Decisions for other EU Ecolabel product groups

The title of part a) of criterion 4 has been changed to align with equivalent EU Ecolabel criteria used in more recently voted product groups (e.g. Computers, Footwear and Furniture). This is the same reason for splitting the different restricted CLP hazards into 3 different groups of different severity.

The grouping hierarchy for hazards is also in line with recent developments in other product groups and is intended as an aid when setting derogation conditions. For example, it would be much more difficult to justify a derogation request for a substance with a Group 1 classification that remains in the final product than for a substance with a Group 3 hazard. If, in a hypothetical case, there are three examples of substances used for a particular function, each of which remain in the final product to a similar degree, and one is classified with a Group 1 hazard, one with a Group 2 hazard and one with a Group 3 hazard, then the Group 3 chemical would be considered as the prime candidate for derogation.

Comparison with other Ecolabel schemes and green initiatives

The scope of the general hazardous substance requirements with the EU Ecolabel proposal is similar that of the Nordic and Blue Angel equivalents in that CMR substances are specifically excluded. Both the Nordic and EU Ecolabel criteria have additional hazard statement restrictions although it must be pointed out that the Nordic approach is implemented at the level of chemicals used, whereas the EU Ecolabel requirements are implemented at the level of the paper product. In this sense, the Nordic approach is more ambitious but in reality also requires a series of exemptions and associated conditions being necessary (for example for biocides, peracetic acid, cationic polymers and dyes).

Furthermore, the Nordic criteria are open to possible unintended consequences if all the chemicals used in the pulp and paper production process, and their respective classifications, are not extremely well understood and that any possible changes to classifications, either due to changes in classification rules or to new toxicological evidence are foreseen.

The EU Ecolabel approach is very much in line with the specific wording of Articles 6(6) and 6(7) of Regulation (EC) No 66/2010 which specifically refer to the product. While this could be considered as less ambitious, it still requires a good understanding of which hazardous substances and mixtures are likely to remain in the final product and approximately at what concentrations. The wording in the EU Ecolabel Regulation does not specify a specific concentration limit for any residual hazardous substances but the outcomes of the 1st horizontal task force on chemicals agreed on a 0.10% (w/w) limit.

Updates to legislation

No reference is made to risk phrases (i.e. R40, R45 etc.) and the Council Directive 67/548/EEC because these are now obsolete after having been repealed since 1 June 2015 under Regulation (EC) No 1272/2008.

Other changes

The text exempting substances and mixtures which "*...change their properties upon processing...so that the identified hazard no longer applies.*" has been removed due to possible ambiguity in interpretation that could lead to an inconsistent approach being taken by different Competent Bodies.

Other changes to the wording have been made with a view to shortening the text as far as possible without losing the meaning because feedback from this criterion in other EU Ecolabel product groups often complains about the complexity of the text and how difficult it is to read. However, certain parts of the text, such as long-winded references

to legislation, cannot be shortened due to the formatting requirements for legal text published by the Commission.

Discussion points:

Future changes to this proposal will depend to some extent on the agreements and guidance that will be delivered by the 2nd horizontal task force for hazardous chemicals. Regardless, the following discussion points are considered particularly relevant for the time-being:

Q. In what group (1, 2 or 3) should the following hazard statements be placed: EUH029, EUH031, EUH032, EUH059 and EUH070?

Q. Can a clear definition of what can be considered as the point at which a hazardous chemical has undergone changes so as to no longer be rendered hazardous be agreed upon for the paper production process? If such a clause is to be reintroduced into the criteria proposal, clarification will be necessary to ensure a transparent and consistent approach between different Competent Bodies.

Draft

Criterion 4b) Restriction of substances of very high concern

- No previous equivalent criteria for Tissue Paper. Currently referred to as "*Substances listed in accordance with Article 59(1) of Regulation (EC) No 1907/2006*" in existing criteria for Copying and Graphic Paper and Newsprint Paper.

Table 31. Restriction of Substances of Very High Concern (SVHCs).

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
No general requirement	<p>No derogation from the prohibition set out in Article 6(6) of Regulation (EC) No 66/2010 shall be granted concerning substances identified as substances of very high concern and included in the list provided in Article 59 of Regulation (EC) No 1907/2006, <u>present in mixtures, in an article or in any homogenous part of a complex article</u> in concentrations higher than 0,1 %. Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No 1272/2008 shall apply where the concentration is lower than 0,1 %.</p> <p>Assessment and verification: the list of substances identified as substances of very high concern and included in the candidate list in accordance with Article 59 of Regulation (EC) No 1907/2006 can be found here: http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp</p> <p>Reference to the list shall be made on the date of application.</p> <p>The applicant shall prove compliance with this criterion by providing data on the amount (kg/ADT paper produced) of substances used in the process and by demonstrating that the substances referred to in this criterion are not retained in the final product above the concentration limits specified. The concentration shall be specified in the safety data sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.</p>	
Proposed criteria		
<p>The product shall not contain substances that have been identified according to the procedure described in Article 59(1) of Regulation (EC) No 1907/2006 and included in the Candidate List for SVHCs in concentrations higher than 0.10% (weight by weight).</p> <p>No derogation from this requirement shall be given to Candidate List SVHCs present in the product at concentrations higher than 0.10% (weight by weight).</p> <p>Assessment and verification: the list of substances identified as substances of very high concern and included in the candidate list in accordance with Article 59 of Regulation (EC) No 1907/2006 can be found here: http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp</p> <p>Reference to the list shall be made on the date of application.</p> <p>The applicant shall prove compliance with this criterion by providing data on the amount (kg/ADT paper produced) of substances used in the process and by demonstrating that the substances referred to in this criterion are not retained in the final product above the concentration limits specified. The concentration shall be specified in the safety data sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.</p>		

Rationale

The major change in the proposed criterion is to harmonise Tissue Paper with both Copying and Graphic Paper and Newsprint Paper. The proposed wording is slightly shorter than the existing criterion, again due to complaints about the readability of the general hazardous substance criteria in other product groups.

No changes to the verification text are proposed, because it appears very well tailored to the paper product groups. In the existing criterion text, it appears that the restriction does apply at the level of mixtures and the final product but then in the verification text it seems that the restriction only applies to the paper product.

The minimum requirements of the EU Ecolabel Regulation (EC) No 66/2010 only refer to the final product but if existing licence holders are already set up to screen out SVHCs at the level of mixtures used during processing, then of course this more ambitious approach should be clarified in the criterion and adopted.

Discussion points:

Q. Should the restriction of SVHCs be extended to mixtures used during processing or only to those mixtures where SVHCs are likely to remain in the final product?

Q. How exactly can it be "demonstrated" that a substance is not retained in the final product? Are there any examples of this with existing applications?

Criterion 4c) Chlorine

- No change from the current name in existing equivalent criteria for Tissue Paper, Copying and Graphic Paper and Newsprint Paper.

Table 32. Restrictions on chlorine

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>Chlorine gas shall not be used as a bleaching agent. This requirement does not apply to chlorine gas related to the production and use of chlorine dioxide.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration from the pulp producer(s) that chlorine gas has not been used as a bleaching agent. <i>Note:</i> while this requirement also applies to the bleaching of recycled fibres, it is accepted that the fibres in their previous life cycle may have been bleached with chlorine gas.</p>	<p>Chlorine gas shall not be used as a bleaching agent. This requirement does not apply to chlorine gas related to the production and use of chlorine dioxide.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration from the pulp producer(s) that chlorine gas has not been used as a bleaching agent. <i>Note:</i> while this requirement also applies to the bleaching of recycled fibres, it is accepted that the fibres in their previous life-cycle may have been bleached with chlorine gas.</p>	<p>Chlorine gas <u>or other chlorinated compounds</u> shall not be used as a bleaching agent. This requirement does not apply to chlorine gas related to the production and use of chlorine dioxide.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration from the pulp producer(s) that chlorine gas or other chlorinated compounds have not been used as a bleaching agent. <i>Note:</i> while this requirement also applies to the bleaching of recovered fibres, it is accepted that the fibres in their previous life-cycle may have been bleached with chlorine gas or other chlorinated compounds.</p>
Proposed criteria		
<p>Chlorine gas shall not be used as a bleaching agent. This requirement does not apply to chlorine gas related to the production and use of chlorine dioxide.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration from the pulp producer(s) that chlorine gas has not been used as a bleaching agent. <i>Note:</i> while this requirement also applies to the bleaching of recycled fibres, it is accepted that the fibres in their previous life-cycle may have been bleached with chlorine gas.</p>		

Rationale

Relevance

In the preliminary report, a number of environmental issues were presented that relate to the use of chlorine and chlorinated compounds during pulp production which justify the exclusion of elemental chlorine as a bleaching agent.

It is proposed to follow the existing criterion for Copying and Graphic Paper and apply this to all three product groups. There was a contradiction in the Newsprint Paper (which seems to ban ClO₂ and then allow it again). It was confirmed that the intention of the EU Ecolabel Newsprint Paper criteria was to align with that for Copying and Graphic Paper. However, this was not exactly the end result and so a common approach is now proposed for all three product groups.

What other ecolabels and green initiatives say

The Nordic Ecolabel has a similar level of ambition to the proposed criteria by banning the use of elemental chlorine bleaching but allowing the use of chlorine dioxide (ClO₂) as a bleaching agent. On the other hand, both the Blue Angel (for example) and Green Seal standards prohibit the use of not only elemental chlorine but also any other chlorine compounds, including ClO₂.

Ambition level

The strictest level would be for paper to be made only from virgin pulp using a total chlorine free process (TCF) and/or recycled fibres that are process chlorine free (PCF).

However, as mentioned in the preliminary report (section 5.1.2) there are some potential trade-offs between the ECF and TCF processes and less than 10% of current pulp production is via TCF technology.

It can perhaps be argued that progressively more stringent requirements on AOX emissions will bring about better process control and improved efficiencies in ECF bleaching, ensuring that pulp produced by what is known as "ECF-light" processes are favoured in EU Ecolabel paper products.

Discussion points:

Significant discussion is anticipated with this criterion and the following points should be addressed as a minimum and in as much detail as possible:

Q. Should ECF bleaching only be permitted in line with the use of certain technologies and/or chlorate monitoring? Or can this be considered to be already controlled to a satisfactory extent by AOX criteria?

Q. Based on energy and chemical requirements, are there any LCA-based arguments that can be used to justify/dismiss the exclusion of ECF in favour of TCF?

Q. Are there any technical arguments (in terms of pulp or paper quality) that could be used to justify the continued use of ECF?

Q. Would it be feasible to require TCF for Newsprint Paper based on current market trends and industry practice?

Criterion 4d) APEOs

- *No change from the current name in existing equivalent criteria for Tissue Paper, Copying and Graphic Paper and Newsprint Paper.*

Table 33. 4(d). APEOs

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>Alkylphenol ethoxylates or other alkylphenol derivatives shall not be added to cleaning chemicals, de-inking chemicals, foam inhibitors, dispersants or coatings. Alkylphenol derivatives are defined as substances that upon degradation produce alkyl phenols.</p> <p>Assessment and verification: The applicant or the chemical supplier/s shall provide relevant declaration(s) that alkylphenol ethoxylates or other alkylphenol derivatives have not been added to these products.</p>	<p>Alkylphenol ethoxylates or other alkylphenol derivatives shall not be added to cleaning chemicals, de-inking chemicals, foam inhibitors, dispersants or coatings. Alkylphenol derivatives are defined as substances that upon degradation produce alkyl phenols.</p> <p>Assessment and verification: The applicant shall provide a declaration(s) from their chemical supplier(s) that alkylphenol ethoxylates or other alkylphenol derivatives have not been added to these products.</p>	
Proposed criteria		
<p>Alkylphenol ethoxylates or other alkylphenol derivatives shall not be added to cleaning chemicals, de-inking chemicals, foam inhibitors, dispersants or coatings. Alkylphenol derivatives are defined as substances that upon degradation produce alkyl phenols.</p> <p>Assessment and verification: The applicant shall provide a declaration(s) from their chemical supplier(s) that alkylphenol ethoxylates or other alkylphenol derivatives have not been added to these products.</p>		

Rationale

No major change in the existing criteria is proposed. Only a very minor alignment of the wording in the assessment and verification text is proposed.

What other ecolabels and green initiatives say

Version 2.3 of the Nordic Paper Products chemical module explicitly ban the use of APEOs and their derivatives in R3, R4, R6 and R8 (cleaning agents and dispersants, de-inking chemicals, coating agents, retention agents, flocculants, foam inhibitors, defoamers and wet strength agents).

Criterion 4e) Acrylamide

- Currently referred to as "*Residual monomers*" in existing equivalent criteria for Copying and Graphic Paper and Newsprint Paper. No such criteria in existing criteria for Tissue Paper.

Table 34. Acrylamide / residual monomers restriction

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
No equivalent criteria.	<p>The total quantity of residual monomers (excluding acrylamide) that may be or have been assigned any of the following risk phrases (or combinations thereof) and are present in coatings, retention aids, strengtheners, water repellents or chemicals used in internal and external water treatment shall not exceed 100 ppm (calculated on the basis of their solid content):</p> <p>H340 (R46); H350 (R45); H350i (R49); H351 (R40); H360F (R60); H360D (R61); H360FD (R60/61/60-61); H360Fd (R60/63); H360Df (R61/62); H400 (R50/50-53); H410 (R50-53), H411 (R51-53); H412 (R52-53); H413 (R53).</p> <p>Acrylamide shall not be present in coatings, retention aids, strengtheners, water repellents or chemicals used in internal and external water treatment in concentrations higher than 700 ppm (calculated on the basis of their solid content).</p> <p>The competent body may exempt the applicant from these requirements in relation to chemicals used in external water treatment.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion, together with appropriate documentation (such as Safety Data Sheets).</p>	
Proposed criteria		
<p>Acrylamide shall not be present in coatings, retention aids, strengtheners, water repellents or chemicals used in internal and external water treatment in concentrations higher than 700 ppm (calculated on the basis of their solid content).</p> <p>The competent body may exempt the applicant from these requirements in relation to chemicals used in external water treatment.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion, together with appropriate documentation (such as Safety Data Sheets).</p>		

Rationale

The entire general reference to residual monomers is proposed to be removed and only the specific requirement for acrylamide is proposed to be maintained.

The main reasons for proposing to remove the general requirements for all residual monomers in coatings, retention aids, strengtheners, water repellents or chemicals used in water treatment are as follows:

- Concentration limits for residual classified monomers in the existing criteria are very low (100ppm) and unlikely to have any influence on the CLP classification of the mixture.
- They are below the general threshold set in the criterion on presence of hazardous substances in the final products (0.10% weight by weight).
- The extent to which the residual monomers will remain in the final product is considered to be extremely small.
- By going significantly beyond the minimum requirements of CLP and REACH legislation, additional verification efforts will be needed.
- The criterion appears to be especially stringent on residual monomers with the less severe hazard classifications such as H412 and H413.

However, the proposal for acrylamide is to maintain the existing limit of 700ppm as before and as is currently stated in equivalent Nordic Ecolabel criteria as it is understood to represent the best polyelectrolyte products on the market used in the paper industry.

Discussion points:

Q. How is "calculated on the basis their solid content" interpreted in applications?

Q. What residual monomers are targeted by this original 100ppm limit?

Criterion 4f) Surfactants

- Proposed change from the current name in existing equivalent criteria for Copying and Graphic Paper and Newsprint Paper which is "*Surfactants in de-inking*". The equivalent criterion in Tissue Paper is titled "*Surfactants in de-inking formulations for recycled fibres*".

Table 35. Restrictions on surfactants

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>Where surfactants are used in quantities of at least 100 g/ADT (summed over all the surfactants used in the all the different formulations used in de-inking return fibres), each surfactant shall be readily biodegradable. Where such surfactants are used in quantities of less than 100 g/ADT, each surfactant shall be either readily biodegradable or ultimately biodegradable (see test methods and pass levels below).</p> <p>Assessment and verification:</p> <p>The applicant or the chemical supplier/s shall provide a declaration of compliance with this criterion together with the relevant safety data sheets or test reports for each surfactant which shall indicate the test method, threshold and conclusion stated, using one of the following test methods and pass levels: for ready biodegradability OECD 301 A-F (or equivalent ISO standards), with a percentage degradation within 28 days of at least 70 % for 301 A and E, and of a least 60 % for 301 B, C, D and F; for ultimate biodegradability OECD 302 A-C (or equivalent ISO standards (1)), with a percentage degradation (including adsorption) within 28 days of at least 70 % for 302 A and B, and of at least 60 % for 302 C.</p>	<p>All surfactants used in de-inking shall be ultimately biodegradable (see test methods and pass levels below).</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion together with the relevant safety data sheets or test reports for each surfactant which shall indicate the test method, threshold and conclusion stated, using one of the following test method and pass levels: OECD 302 A-C (or equivalent ISO standards), with a percentage degradation (including adsorption) within 28 days of at least 70 % for 302 A and B, and of at least 60 % for 302 C.</p>	
Proposed criteria		
<p>All surfactants used shall demonstrate ready or inherent ultimate biodegradability (see test methods and pass levels below).</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion together with the relevant safety data sheets or test reports for each surfactant which shall indicate the test method, threshold and conclusion stated, using one of the following test method and pass levels:</p> <ul style="list-style-type: none"> For ready biodegradability: OECD No 301 A-F (or equivalent ISO standards) with a percentage degradation (including absorption) within 28 days of at least 70% for 301 A and E, and of at least 60% for 301 B, C, D and F. For inherent ultimate biodegradability: OECD 302 A-C (or equivalent ISO standards), with a percentage degradation (including adsorption) within 28 days of at least 70 % for 302 A and B, and of at least 60 % for 302 C. 		

Rationale

The major changes in the revised criterion are:

- to align Tissue Paper with the criteria for Copying and Graphic Paper and Newsprint Paper,
- to extend the requirement to ***all surfactants*** used in the paper production process, not just de-inking.
- To specifically mention ready biodegradability as a means of compliance in addition to inherent ultimate biodegradability.

The more concise wording in the criteria and assessment and verification text in Copying and Graphic Paper and Newsprint Paper has been used as a basis for the proposed text.

The existing criteria for Copying and Graphic Paper and Newsprint Paper use the term "*ultimately biodegradable*" although a more precise definition would be "*inherent ultimate biodegradability*". Tissue Paper accepts a demonstration of either "*inherent ultimate biodegradability*" or "*ready biodegradability*", which is can be considered to be of less risk at ending up in final effluents. So the terms and relevant tests specified for Tissue Paper are proposed to be aligned for all three product groups and the wording altered slightly.

According to the BREF, surfactants are also used in the cleaning of felts, wires and machinery, cleaning of the water circuit system and for the dispersion of chemicals. Consequently, it is considered useful to extend the scope of this criterion beyond that of de-inking operations only.

What other ecolabels and green initiative say

In version 2.3 of the Paper Products Chemical Module (R4), Nordic restrictions for surfactants are like the existing EU Ecolabel Tissue Paper criteria, only apply to de-inking operations and being linked to the total quantities used on a per tonne of pulp produced basis. If it is greater than 100g / tonne of pulp then each individual surfactant used must be readily biodegradable. However, if less than 100g / tonne of pulp is used then each individual surfactant only has to be ultimately biodegradable. An exemption is stated for silicone derivatives.

Discussion points:

Q. Can this requirement be extended to all surfactants used in the paper production process without major problems for implementation?

Q. From practical experience, are there any issues with biodegradability testing, especially with OECD 301?

Q. Is there any experience with the reporting of results from equivalent ISO standards?

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Criterion 4g) Biocidal product restrictions

- No change from the current name in existing equivalent criteria for Tissue Paper, Copying and Graphic Paper and Newsprint Paper.

Table 36. Biocidal product restrictions

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>The active components in biocides or biostatic agents used to counter slime-forming organisms in circulation water systems containing fibres shall not be potentially bio-accumulative.</p> <p>Assessment and verification:</p> <p>The applicant or the chemical supplier/s shall provide a declaration of compliance with this criterion together with the relevant safety data sheet or test report which shall indicate the test method, threshold and conclusion stated, using the following test methods: OECD 107, 117 or 305 A-E.</p>	<p>The active components in biocides or biostatic agents used to counter slime-forming organisms in circulation water systems containing fibres shall not be potentially bio-accumulative. Biocides' bioaccumulation potentials are characterised by log Pow (log octanol/water partition coefficient) < 3,0 or an experimentally determined bioconcentration factor (BCF) ≤ 100.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion together with the relevant material safety data sheet or test report which shall indicate the test method, threshold and conclusion stated, using the following test methods: OECD 107, 117 or 305 A-E.</p>	
Proposed criteria		
<p>The active substances in biocidal products used to counter slime-forming organisms in circulation water systems containing fibres shall not be potentially bio-accumulative.</p> <p>For the purposes of this criterion, the potential to bio-accumulate shall be characterised by log Kow (log octanol/water partition coefficient) > 3,0 or an experimentally determined bioconcentration factor (BCF) > 100.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion together with the relevant material safety data sheet or test report which shall indicate the test method, threshold and conclusion reached, using the following test methods: OECD 107, 117 or 305 A-E.</p>		

Rationale

Only minor changes are proposed to this criterion. The most significant is to directly align the wording for Tissue Paper with that for Copying and Graphic Paper and Newsprint Paper.

The use of the term "biocidal products" is proposed based on recent experience with other EU Ecolabel product groups and following the terminology of the Biocidal Products Regulation (EC) No 528/2012.

For the avoidance of any possible misinterpretation during applications, a definition of what is considered as a potential to bioaccumulate is put in the context of "For the purposes of this criterion..." because the current CLP definitions use different values (log Kow > 4.0 and BCF > 500).

Discussion points:

Q. Is there any added value in specifically requesting that active substances and biocidal products used must be approved or currently under evaluation in accordance with the Biocidal Products Regulation (EC) No 528/2012?

Q. With tissue paper, would be of added value to add specify the following additional text or similar: "No biocidal products shall be applied to the Tissue Paper product with the intention of providing a disinfective effect on the final product".

Q. Are biocidal products commonly used during the shipment and storage of mother reels and market pulp?

Criterion 4h) Dyes, dyestuffs and pigments

- This criterion is a proposed merging of three separate criteria titled "Azo dyes", "Metal complex dyestuffs or pigments" and "Ionic impurities in dyestuffs" that appear in the Decisions for Copying and Graphic Paper and for Newsprint Paper. Some equivalent criteria appear in the existing Decision for Tissue Paper but under the criterion "Product Safety".

Table 37. Dyes, dyestuffs and pigments

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
No equivalent criteria	<p>(h) Azo dyes</p> <p>Azo dyes that may cleave to any of the following aromatic amines shall not be used, in accordance with Annex XVII to Regulation (EC) No 1907/2006:</p> <p>4-aminobiphenyl (92-67-1); Benzidine (92-87-5); 4-chloro-o-toluidine (95-69-2); 2-naphthylamine (91-59-8); o-aminoazotoluene (97-56-3); 2-amino-4-nitrotoluene (99-55-8); p-chloroaniline (106-47-8); 2,4-diaminoanisole (615-05-4); 4,4'-diaminodiphenylmethane (101-77-9); 3,3'-dichlorobenzidine (91-94-1); 3,3'-dimethoxybenzidine (119-90-4); 3,3'-dimethylbenzidine (119-93-7); 3,3'-dimethyl-4,4'-diaminodiphenylmethane (838-88-0); p-cresidine (120-71-8); 4,4'-methylene-bis-(2-chloroaniline) (101-14-4); 4,4'-oxydianiline (101-80-4); 4,4'-thiodianiline (139-65-1); o-toluidine (95-53-4); 2,4-diaminotoluene (95-80-7); 2,4,5-trimethylaniline (137-17-7); 4-aminoazobenzene (60-09-3); o-anisidine (90-04-0)</p> <p>Assessment and verification: The applicant shall provide a declaration of compliance with this criterion.</p>	
No equivalent criteria	<p>(i) Metal complex dye stuffs or pigments</p> <p>Dyes or pigments based on lead, copper, chromium, nickel or aluminium shall not be used. Copper phthalocyanine dyes or pigments may, however, be used.</p> <p>Assessment and verification: The applicant shall provide a declaration of compliance.</p>	
No equivalent criteria	<p>(j) Ionic impurities in dye stuffs</p> <p>The levels of ionic impurities in the dye stuffs used shall not exceed the following: Ag 100 ppm; As 50 ppm; Ba 100 ppm; Cd 20 ppm; Co 500 ppm; Cr 100 ppm; Cu 250 ppm; Fe 2 500 ppm; Hg 4 ppm; Mn 1 000 ppm; Ni 200 ppm; Pb 100 ppm; Se 20 ppm; Sb 50 ppm; Sn 250 ppm; Zn 1 500 ppm.</p> <p>Assessment and verification: The applicant shall provide a declaration of compliance.</p>	
Proposed criteria		
<p>h) Dyes, dyestuffs and pigments</p> <p>The following requirements shall be met for dyes, dyestuffs and pigments:</p> <ol style="list-style-type: none"> None of the aromatic amines listed in Directive 2002/61/EC shall be used during the paper production process and the use of other dyes that may cleave to form these aromatic amines during processing shall be avoided. (See Appendix I for a full list of banned aromatic amines and an indicative list of dyes that may cleave during processing to form these restricted aromatic amines). With the exception of copper phthalocyanine, dyes or pigments based on: aluminium, silver, arsenic, barium, cadmium, cobalt, chromium, copper, mercury, manganese, nickel, lead, selenium, antimony, tin or zinc shall not be used. The levels of ionic impurities in the dyestuffs used shall not exceed the following: Silver 100 ppm; Arsenic 50 ppm; Barium 100 ppm; Cadmium 20 ppm; Cobalt 500 ppm; Chromium 100 ppm; Copper 250 ppm; Fe 2,500 ppm; Mercury 4 ppm; Manganese 1,000 ppm; Nickel 200 ppm; Lead 100 ppm; Selenium 20 ppm; Antimony 50 ppm; Tin 250 ppm; Zinc 1,500 ppm. <p>Assessment and verification: The applicant shall provide a declaration of compliance with the requirements of this criterion, supported by safety data sheets or other relevant documentation from chemical suppliers.</p>		

Rationale

The two main changes to the criteria are:

- the merging of the three separate criteria into a single, three-part criterion and
- harmonise requirements for Tissue Paper, which had no previous requirements for dyes and pigments, with those for Copying and Graphic Paper and Newsprint Paper.

Product performance and technical factors

Depending on the fibrous material to be dyed and the intended purpose of the paper, different types of pigment dispersions and dyes are used as basic dyes and direct dyes. These are all obvious examples of substances that can remain in the final product and therefore should be addressed with specific criteria as far as is practical. Thus the criteria here are set at the level of chemicals used during processing because this is a simpler and cheaper approach than final product testing.

Basic dyes provide bright and effective shading of paper and are rapidly and permanently fixed to wood containing fibres. Dosage rates at the wet end of the paper machine are low (typically 40-80g/t paper) and the dye is not considered to leave in effluents as it is rapidly fixed. However, some of these dyes are typically classified as very toxic in the aquatic environment (violets and blues).

Direct dyes, typically having "harmful" CLP classifications, are generally used for wood free paper shading and result in good paper lightfastness although some fixative may be required in deep shade products like coloured tissue. However, there is a negative effect on paper brightness which for a certain performance level, would increase the need for Optical Brightening Agents (OBAs). To achieve a particular shading strength, the dosage rate is typically 5 times higher for direct dyes compared to basic dyes.

Pigment dispersions offer performance levels somewhere in between those of basic dyes and direct dyes for shading purposes. They may be made from basic dyes (i.e. pigment violet 3) and when dosed at the wet end of a paper machine, dosage rates are typically 5 times higher than would be the case for basic dyes. However, in coating applications, pigment dispersions are generally considered as the optimum solution in coating applications and are used for coating paste shade control.

Dyes which might interfere re-pulping, either as broke or as wastepaper should be avoided

REACH requirements

The restriction of aromatic amines in the existing criteria state that all azo dyes that may cleave to form the restricted aromatic amines are excluded. However, while reasonable estimates can be made, it can never be 100% certain that all such azo dyes are recognised.

The same issues apply to dyes used in EU Ecolabel Textiles (Decision 2014/350/EU), Footwear (voted January 2016) and Furniture (voted January 2016). In these product groups the direct use of the restricted aromatic amines is excluded and the use of any other possible compounds that may cleave during processing to form the restricted aromatic amines is covered by testing requirements for textiles and leather according to EN standards (EN 14362 and EN 17234 respectively).

Entry 43 of Annex XVII specifically refers to textiles and leather, so for paper it is deemed more suitable to refer to Directive 2002/61/EC. It is uncertain if standard test methods exist for these aromatic amines in coloured papers or if it is more adequate to also specifically prohibit the use of other compounds known to cleave to form the restricted aromatic amines.

As a guide to applicants, the criteria for Textiles, Footwear and Furniture provide an indicative list of azo dyes that are known to potentially cleave during processing to form the restricted aromatic amines.

Two options are therefore proposed at this stage:

1. To specifically ban the direct use of Directive 2002/61/EC aromatic amines and ban the use of all dyes currently known to potentially cleave to form these banned aromatic amines (and provide an indicative list of these in an appendix).
2. To require periodic testing of the paper product to ensure the absence of the restricted aromatic amines.

With paper products, in light of the uncertainty about testing methods as a final assurance, the first option is proposed although.

The list of metals which dyes and pigments should not be based upon has been expanded in order to reflect the same ionic impurities that are restricted in dyestuffs in order to have a more consistent approach.

Discussion points:

Q. Any experience with testing paper products for the restricted aromatic amines?

Q. Is it reasonable to expand the list of restricted metals in dyes and pigments to align with the metals banned as ionic impurities in dyestuffs?

Q. With the limits for ionic impurities, limits are expressed as ppm. Should this be interpreted as mg/kg, mg/l or $\mu\text{L/L}$ (i.e. w/w, w/v or v/v)?

Q. Are phthalates a concern in dyes, dye stuffs and pigment dispersions? Are any classified phthalates used in these applications?

Criterion 4i) Wet strength agents (Tissue Paper only)

- No change from the current name in existing equivalent criteria for Tissue Paper. Not considered relevant to existing or proposed Copying and Graphic Paper and Newsprint Paper criteria.

Table 38. Wet strength agent restrictions

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>Wet strength aids must not contain more than 0,7 % of the chloro-organic substances epichlorohydrin (ECH), 1,3- dichloro-2-propanol (DCP) and 3-monochloro-1,2-propanediol (MCPD), calculated as the sum of the three components and related to the dry content of the wet strength agent.</p> <p>Wet strength agents that contain glyoxal must not be used in the production of the eco-labelled tissue paper.</p> <p>Assessment and verification:</p> <p>The applicant or the chemical supplier/s shall provide a declaration(s) that the content of the epichlorohydrin (ECH), 1,3-dichloro-2-propanol (DCP) and 3-monochloro-1,2-propanediol (MCPD), calculated as the sum of the three components and related to the dry content of the wet strength agent is not higher than 0,7 %.</p>	No equivalent criteria	
Proposed criteria		
<p>Wet strength agents must not contain a cumulative total in excess of 0,7 % (on a dry content basis) of the following organo-chlorine substances:</p> <ul style="list-style-type: none"> epichlorohydrin (ECH) CAS No 106-89-8, 1,3-dichloro-2-propanol (DCP) CAS No 96-23-1 and 3-monochloro-1,2-propanediol (MCPD) CAS No 96-24-2, <p>Wet strength agents that contain glyoxal must not be used in the production of the eco-labelled tissue paper.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a declaration, supported by documentation from chemical supplier(s), that the content of the epichlorohydrin (ECH), 1,3-dichloro-2-propanol (DCP) and 3-monochloro-1,2-propanediol (MCPD), calculated as the sum of the three components and related to the dry content of the wet strength agent is not higher than 0,7 %.</p>		

Rationale

Wet strength agents are functional chemicals added at the wet end of the paper machine to improve the strength properties of the finished paper in wet conditions. They are used in tissue products such as towels, kitchen rolls, napkins, but also sack papers, labels, currency, maps, etc. The substances mainly used are: starch or modified cationic starches, cellulose derivatives (e.g. carboxymethylcellulose (CMC)) and polyacrylamides.

No major changes are currently proposed to the criterion beyond basic rewording and restructuring of the text.

What other ecolabels and green initiatives say

The Blue Angel RAL UZ 5 (July 2014) criteria do not explicitly ban ECH, DCP and MCPD but simply state in part 3.8 that Tissue Paper must comply with certain limits for chlorophenols in water extraction tests.

The Nordic criteria for Tissue Paper (Version 5.2, Oct. 2011) have the same 0.7% requirement for ECH, DCP and CPD but also a lower 0.05% requirement for any other chemicals used on the Yankee cylinder.

Ambition level

The ambition level should be considered in light of the available chemicals on the market. One example of lower concentration products are the 3rd generation Maresin wet strength high performance resins (e.g. Maresin M1.0) with very low levels (less than 5ppm; 0.0005%) of MCPD and DCP (MARE, 2016). More commonly 3rd generation wet strength resins contain less than 50ppm of MCPD and DCP (i.e. 0.005%). Dry solids in these products is typically around 25%, hence the actual dry concentration of MCPD and DCP is actually between 0.002% and 0.02% per substance.

Discussion points:

Q. Would a stricter limit on these chemicals be a better reflection of current best practice in Tissue Paper production?

Q. Are wet strength agent criteria applicable to Copying and Graphic Paper or Newsprint Paper? The Nordic Chemical Module has a general requirement of 0.01% for ECH, DCP and CPD, which is more stringent than what they have for Tissue Paper (0.05%).

Q. Since 2009, have any other substances of concern in wet strength agents been identified which should also be restricted?

Draft

Criterion 4j) Softeners, lotions, fragrances and additives of natural origin (Tissue Paper only)

- *No change from the current name in existing equivalent criteria for Tissue Paper. Not considered relevant to existing or proposed Copying and Graphic Paper and Newsprint Paper criteria.*

Table 39. Softener, lotion and fragrance restrictions

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>None of the constituent substances or preparations/mixtures in the softeners, lotions, fragrances and additives of natural origin must meet the classification as hazardous to the environment, sensitising, carcinogenic or mutagenic with risk phrases R42, R43, R45, R46, R50, R51, R52 or R53 (or and combination thereof) in accordance with Council Directive 67/548/EEC (1) or Directive 1999/45/EC of the European Parliament and of the Council (2) and its amendments. Any substances/fragrances that in accordance with Directive 2003/15/EC of the European Parliament and of the Council (3) (7th amendment to Directive 76/768/EEC, Annex III, part I), requires the fragrance to be labelled on a product/packaging, shall not be used in the eco-labelled product (concentration limit 0,01 %).</p> <p>Any ingredient added to the product as a fragrance must have been manufactured, handled and applied in accordance with the code of practice of the International Fragrance Association.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a list of softeners, lotions and additives of natural origin that have been added to the tissue product together with a declaration for each added preparation that the criterion is met.</p> <p>A declaration of compliance with each part of this criterion shall be provided to the Competent Body by the fragrance manufacturer.</p>	No equivalent criteria	
Proposed criteria		
<p>None of the constituent substances or mixtures in the softeners, lotions, fragrances and additives of natural origin shall be classified as hazardous to the environment, sensitising, carcinogenic or mutagenic with hazard statements H317, H334, H340, H350, H400, H410, H411, H412 or H413 (or any combination thereof) in accordance with Regulation (EC) No 1272/2008.</p> <p>Any ingredient added to the product as a fragrance must have been manufactured, handled and applied in accordance with the code of practice of the International Fragrance Association. Fragrances shall not contain any substances that are listed in Annex III to Regulation (EC) No 1223/2009 of the European Parliament and of the Council in sufficiently high concentrations as to require them to be labelled on a product/packaging, as per the conditions set out in the same Regulation (EC) No 1223/2009.</p> <p>Assessment and verification:</p> <p>The applicant shall provide a list of softeners, lotions and additives of natural origin that have been added to the tissue product together with a declaration for each added preparation that the criterion is met.</p> <p>A declaration of compliance with each part of this criterion shall be provided to the Competent Body by the fragrance manufacturer.</p>		

Rationale

The main changes proposed are due to changes in the relevant legislation. First of all, reference to "*preparations*" and "*risk phrases*" has been replaced by "*mixtures*" and "*hazard statements*" after Directives 67/548/EEC and 1999/45/EC were repealed on 1 June 2015.

Regarding fragrances, it appears that the reference to Directive 2003/15/EC became obsolete in 2013 and that this is now addressed in Regulation (EC) No 1223/2009.

The other significant change has been the removal of the text "*concentration limit 0.01%*" (for Annex III substances) because it is not clear whether this limit actually refers to the tissue product or the fragrance itself because both are mentioned in the same sentence.

Until such clarification is received, it is considered a simpler approach to simply prohibit the use of any Annex III substances in the fragrance and in accordance with the labelling requirements of Regulation (EC) No 1223/2009 so that Competent Bodies and applicants can simply assess compliance by reading the packaging of supplied fragranced products used in the process.

However, this proposal may be substantially less ambitious than the current criteria if the intention of the current wording was to ban all Annex III substances above concentrations of 0.01% in the fragrance products. If this was the original intention, then the proposed text "*...sufficiently high concentrations as to require them to be labelled on a packaging...*" should be replaced by something like "*...concentrations higher than 0.01%...*".

What other ecolabels and green initiatives say

Part R9 of the Nordic criteria for Tissue Paper (Version 5.2, Oct. 2011) does not permit the use of perfumes and other fragrances in the Tissue Paper product. In the same document, under part R7, a specific exemption is made for the use of softeners based on quaternary imidazoline.

Part 3.16 of the Blue Angel criteria for Sanitary Paper (RAL UZ 5, July 2014) simply bans the use of "*lotions, fragrances and bacterial suspensions*".

The Green Seal standard for Sanitary Paper (Version 6.1, July 2013) permits the use of lotions in part 3.6 so long as they do not contain any fragrances or colourants.

Discussion points:

Q. What is the range of softeners, lotions and fragrances typically used in Tissue Paper products and at what stages of production are they added?

Q. Should fragrances continue to be permitted in EU Ecolabel Tissue Paper?

Q. If yes to Q_, what is the most up to date and relevant legal framework for fragrances and should a specific 0.01% concentration limit should or could be applied to all Annex III substances.

Q. Any relevant experiences to share with challenges implementing this criterion in existing Tissue Paper licences?

Criterion 4k) Residual substances (Tissue Paper only)

- No current requirements for this in Copying and Graphic Paper or Newsprint Paper and none are proposed for these product groups. It does appear in the existing criteria for Tissue Paper under "*Product Safety*".

Table 40. Residual substance restrictions

Tissue Paper	Copying and Graphic Paper	Newsprint Paper
Existing criteria		
<p>5. Product Safety</p> <p>Products made from recycled fibres or mixtures of recycled and virgin fibres shall fulfil requirements on hygiene as follows:</p> <p>The tissue paper shall not contain more than:</p> <p>Formaldehyde: 1 mg/dm² according to test method EN 1541</p> <p>Glyoxal: 1,5 mg/dm² according to test DIN 54603</p> <p>PCP: 2 mg/kg according to test method EN ISO 15320.</p> <p>All tissue products shall fulfil the following requirements:</p> <p>Slimicides and antimicrobial substances: No growth retardance of micro-organisms according to test method EN 1104</p> <p>Dyes and optical brighteners: No bleeding according to test method EN 646/648 (level 4 is required)</p> <p>Dyes and inks:</p> <p>— Dyes and inks used in the production of tissue paper shall not contain azo-substances that may cleave to any of the amines listed in the table 3 [reference to a list of 24 aromatic amines from Directive 2002/61/EC],</p> <p>— Dyes and inks used in the production of tissue paper shall not be based on Cd or Mn.</p> <p>Assessment and verification:</p> <p>The applicant or the chemical supplier/s shall provide a declaration of compliance with this criterion.</p>	No equivalent criteria	
Proposed criteria		
<p>4.j) Residual hazardous substances</p> <p>Where tissue paper is manufactured entirely or partially from de-inked pulp, the final tissue paper shall not contain more than:</p> <ul style="list-style-type: none"> 1 mg/dm² formaldehyde according to EN 1541 (cold water extract test). 1.5 mg/dm² glyoxal according to DIN 54603 2 mg/kg pentaclorophenol (PCP) according to EN ISO 15320 (cold water extract test) <p>Assessment and verification:</p> <p>The applicant shall provide a declaration of compliance with this criterion, supported by relevant laboratory test reports..</p>	No equivalent criteria proposed	

Rationale

Restructuring of existing EU Ecolabel criteria:

The current criterion titled "*Product Safety*" that appears for Tissue Paper is proposed to be deleted with the current content relocated as follows:

- Current restrictions for dyes are already proposed to be moved to criterion 4h).
- Restrictions for formaldehyde, glyoxal and PCP in paper made with recovered fibres are proposed here in criterion 4j).
- Requirements for compliance with micro-organism growth and bleeding are to be moved to the proposed criterion for "*Fitness for use*".

Relevance

Wet strength agents are widely used in some tissue paper making, in particular facial tissue and kitchen tissue rather than toilet tissue (this needs to break up easily in wastewater treatment plants). The BREF 2015 notes that wet strength agents include urea and melamine formaldehyde (UF/MF) resins and epichlorohydrin condensates which are usually toxic to bacteria. Most modern wet strength agents are the latter and often referred to as PAAE types.

The BREF notes that the use of organic halogenated resins for wet strength improvement leads to higher levels of AOX in waste water. Given the reduction in AOX levels from chlorinated bleaching, wet strength agents are now a more significant contributor.

Glyoxal is Crosslinking agent used widely in wet strength and dry strength additives for paper. While Glyoxal is readily biodegradable according to OECD criteria (BASF, 2008) it has a wide range of hazard factors including acting as an irritant to eyes, skin and respiratory tract and more seriously: **H341** (suspected of causing genetic defects) and **H373** (May cause damage to organs through prolonged or repeated exposure).

While substances such as glyoxal are already banned for use in wet strength agents under criterion 4i), there is no way to ensure the complete absence of glyoxal in the process if recovered fibres that were previously treated with glyoxal were used. Both the existing and proposed criteria are quite open ended in the sense that they say the testing should be carried out regardless of whether the recovered fibre content is 1% or 100%.

What other ecolabels and green initiatives say

The use of Glyoxal appears to be indirectly banned in the Nordic criteria (Version 2.3 of Paper Products Chemical Module) under their R2 criterion due its H341 classification. However, as with the EU Ecolabel approach, where recovered fibres are used, testing is required for the same substances (plus PCB). Section 3.6 of RAL UZ5 for sanitary paper (July 2014) explicitly bans the use of wet or dry strength agents containing glyoxal.

Ambition level

No minimum test frequency is specified in the criterion (either existing or proposed) but clearly guidance on this would be helpful.

For the part that is relocated here, no major modification is proposed. However, upon inspection of the EN 1541 and EN ISO 15320 standards, it is clear that two different tests can be conducted (extraction with cold water or with hot water). Due to the fact that these conditions will no doubt affect results, clarification is needed for applicants to know what extraction should be specified. Due to the fact that Tissue Paper is not expected to be used in contact with hot water, the cold water extraction has provisionally been specified – although perhaps the hot water test is more ambitious.

Discussion points:

Q. Which extraction method should be specified for formaldehyde and PCP (hot water or cold water)?

Q. Are there any international equivalents to DIN 54603 that could be used for glyoxal analysis?

Q. Should there be a minimum recovered fibre content that acts as a prerequisite before testing should be made mandatory?

Q. Can the avoidance of certain recovered paper grades reduce the possibility of finding these compounds to such an extent that proof of their use could be assumed as a justification to avoid testing?

Q. When deemed that testing should be carried out, what would be an appropriate sample frequency (either per unit time or per production volume/batch)?

4.5 Criterion 5: Waste Management

Table 41. Waste management criteria

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p>Criterion 5: Waste Management (Criterion 6 for Tissue paper)</p> <p>All pulp and paper production sites shall have a system for handling waste (as defined by the relevant regulatory authorities of the pulp and paper production sites in question) and residual products arising from the production of the ecolabeled product. The system shall be documented or explained in the application and include information on at least the following points:</p> <ul style="list-style-type: none"> — procedures for separating and using recyclable materials from the waste stream, — procedures for recovering materials for other uses, such as incineration for raising process steam or heating, or agricultural use, — procedures for handling hazardous waste (as defined by the relevant regulatory authorities of the pulp and paper production sites in question). <p>Assessment and verification: the applicant shall provide a detailed description of the procedures adopted for the waste management of each of the sites concerned and a declaration of compliance with the criterion.</p>		
Proposed criteria		
<p>Criterion 5: Waste Management</p> <p>(a) Waste Handling and Minimisation</p> <p>All pulp and paper production sites shall demonstrate to have a system for handling of waste arising from the production of the licensed product.</p> <p>The application should provide a comprehensive waste minimisation and management plan that details the system and includes information on the following points:</p> <ul style="list-style-type: none"> • Procedures for waste prevention; • Procedures for waste separation, reuse and recycling; • Procedures for the safe handling of hazardous waste; • Continuous improvement objectives and targets. <p>Assessment and verification: the applicant shall provide a waste minimisation and management plan for each of the sites concerned and a declaration of compliance with the criterion. The declaration should inform about the amount of waste generated per each class/category.</p>		

Rationale

Waste Framework Directive (2008/98/EC) provides guidance in planning implementation of a comprehensive waste management scheme. The majority of residues generated during pulp and paper process could be reused, recycled or recovered.

There is limited data availability to assess the total amount of waste generated at pulp and paper mills. Some of the rejects might not be considered as residue being directly redirected to the production process (regarded as by-product or fully valuable substrate in conditions with Art. 5 of Waste Framework Directive) or treated on-site. Most pulp and paper mills already implemented internal waste handling procedures. For example, paper trimmings are directly recirculated into the process being considered as fully valuable substrate; on-site incinerated bark residues and sludge remains in form of ashes, etc. Often the flow of internally treated material is not registered quantitatively, and this is one of the reasons of limited data availability to assess the total amount of waste generated at pulp and paper mills (including process rejects, and on – site treatment).

A waste management system is a valuable tool that ensures control over the material flow, and drives to waste prevention, reuse, recovery, recycling, and safe disposal.

Key prevention activities are highlighted as;

- minimising the amount of fibre rejects having to be removed from the process;
- suitable handling and recovery to avoid having to discard coating chemicals;
- using good quality make-up chemicals to reduce the amount of material having to be bled out from a kraft or sulphite recovery system; and
- preventing fibre losses and fibre rejects from entering the effluent.

Some of the recycling options for paper mill residues are as follows;

- **Industrial** - bricks, cement, roads, mining, iron and steel;
- **Agricultural** – land spreading; and
- **Composting.**

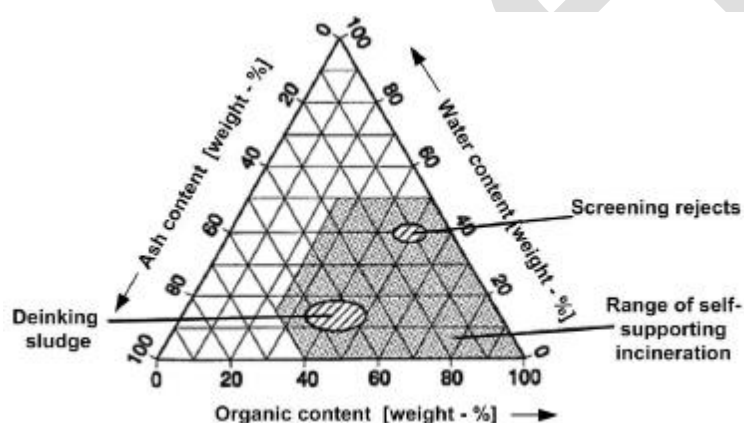


Figure 21. Fuel triangle for waste and residues from the paper industry (BREF 2015)

As demonstrated in Figure 21 incineration can be self-supporting (with no additional energy input) for high calorific value rejects and deinking sludge with a high ash content. Effluent sludge can also be incinerated, but unless it has been dried to >40% dry solids, the net energy production may be negative.

Table 42 shows the typical ranges of solid waste disposal that are identified in the BREF for pulp, paper and board (JRC, 2015). Generally, the kraft process produces more solid waste than sulphite and mechanical processes.

Table 42. Typical ranges of solid residues (wet weight) sent to disposal from different types of pulp and paper production

Production type	Waste to disposal (kg/tonne)
Non-integrated kraft mill	0 – 50
Kraftliner	0.5 – 5
Integrated kraft paper	0 – 20
Integrated sulphite paper	0.5 – 5
Integrated board	0 – 15
Wood-containing printing paper	0 – 5
Non-integrated paper mill	0 – 10

The specific amount of residue is calculated per tonne of total production, i.e. in the case of integrated manufacturing, on the total amount of pulp and paper produced on the site.

Data presented in Table 43 should be treated indicatively. For example, integrated Kraft liner is found in a range of 0 – 20kg, and although non-integrated ranges from 0 – 50kg the BREF for pulp and paper (JRC, 2015) states that non-integrated production normally results in very low solid residues. The production of 50kg of waste may therefore be from a single low performing plant.

Example data on generation of waste from a few of the larger European pulp and paper mills, namely UPM, SCA, Norske Skog, Stora Enso, are presented in Table 43. These figures show the vast differences, often up to ten times, even between mills that use the same pulp process.

Table 43. Example Solid Waste from European Paper Mills

Plant	Ortviken, Sweden (SCA, 2016)	Skogn, Norway (Norske Skog, 2015)	Golbey, France (Norske Skog, 2015)	Saugbrugs, Norway (Norske Skog, 2015)	Hylte, Sweden (Stora Enso, 2015b)	Nymolla, Sweden (Stora Enso, 2013)	Chapelle Darblay, France (UPM, 2014b)
Pulp Process	Integrated thermos-mechanical	Mechanical pulp, DNP	Mechanical pulp, recovered fibre	Mechanical pulp	De-inked pulp	Integrated sulphite	De-inked pulp
Paper Type	Newsprint, LWC	Newsprint	Newsprint	Super Calendared	Newspaper	Copy Paper	Newspaper
Production (ktons)	843	450	537	429	480	429	380
Solid Waste to landfill (kg/t)	0.7	16.85	2.4	19.56	82.9	0.31	20

The BAT 12 specifies (Commission Implementing Decision 2014/687/EU) ways in which solid waste could be minimised by using additional processes and/or making them available to other industries (Table 44).

Table 44: Waste Management BAT (JRC, 2015)

Technique	Description
Pre-treatment of process residues before reuse or recycling	<p><i>Pre-treatment comprises techniques such as:</i></p> <ul style="list-style-type: none"> dewatering e.g. of sludge, bark or rejects and in some cases drying to enhance reusability before utilisation (e.g. increase calorific value before incineration); or dewatering to reduce weight and volume for transport. For dewatering belt presses, screw presses, decanter centrifuges or chamber filter presses are used; crushing/shredding of rejects e.g. from RCF processes and removal of metallic parts, to enhance combustion characteristics before incineration; biological stabilisation before dewatering, in case agricultural utilisation is foreseen
Material recovery and recycling of process residues on site	<p><i>Processes for material recovery comprise techniques such as:</i></p> <ul style="list-style-type: none"> separation of fibres from water streams and recirculation into feed stock; recovery of chemical additives, coating pigments, etc.; recovery of cooking chemicals by means of recovery boilers, causticising, etc.
Energy recovery on- or off-site from wastes with high organic content	Residues from debarking, chipping, screening etc. like bark, fibre sludge or other mainly organic residues are burnt due to their calorific value in incinerators or biomass power plants for energy recovery
External material utilisation	<p><i>Material utilisation of suitable waste from pulp and paper production can be done in other industrial sectors, e.g. by:</i></p> <ul style="list-style-type: none"> firing in the kilns or mixing with feedstock in cement, ceramics or bricks production (includes also energy recovery); composting paper sludge or land spreading suitable waste fractions in agriculture; use of inorganic waste fractions (sand, stones, grits, ashes, lime) for construction, such as paving, roads, covering layers etc.

Technique	Description
	The suitability of waste fractions for off-site utilisation is determined by the composition of the waste (e.g. inorganic/mineral content) and the evidence that the foreseen recycling operation does not cause harm to the environment or health
Pre-treatment of waste fraction before disposal	Pre-treatment of waste before disposal comprises measures(dewatering, drying etc.) reducing the weight and volume for transport or disposal

One of the limiting factors to implement a comprehensive waste management strategy within pulp and paper mill is the availability of possible routes for waste treatment either internally or externally. Although it is possible to achieve a zero waste to landfill target, this requires access to end markets which should be developed over time and will vary depending on local infrastructure and demand. Therefore no specific waste treatment routes are required under revised criterion proposal. The wording of the criterion was adapted to reflect the main objective which is to ensure the implementation of a long-term waste management strategy.

The feasibility of quantitative requirements for the waste dispose should be further discussed with stakeholders.

Discussion points:

Q: Is it feasible to set maximum waste disposal limits?

Q: Is there justification for having a higher limit for RCF pulp production?

Q: Is it feasible to provide waste limits on an end product basis as well as a pulp type basis?

4.6 Criterion 6: Fitness for use

Table 45. Fitness for use criteria

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p>Criterion 6: Fitness for use The product shall be suitable for its purpose. Assessment and verification: the applicant shall provide appropriate documentation demonstrating compliance with the scope of the criteria.</p>		<p>Criterion 6: Fitness for use The product shall be fit for use.</p>
<p>The test methods shall comply with one of the following standards: — copying papers: EN 12281 — ‘Printing and business paper — Requirements for copy paper for dry toner imaging processes’, — continuous papers: EN 12858 — ‘Paper — Printing and business paper — Requirements for continuous stationery’.</p>		
<p>The product shall fulfil requirements for permanence in accordance to applicable standards. The user manual will provide the list of norms and standards which shall be used for the permanence assessment. As alternative to the use of the above methods, the producers shall guarantee the fitness for use of their products providing appropriate documentation demonstrating the paper quality, in accordance with the standard EN ISO/ IEC 17050-1:2004, which provides general criteria for suppliers’ declaration of conformity with normative documents.</p>		
Proposed Criteria		
		<p><i>(Already included in existing criteria but under a different criterion: Product Safety)</i></p> <p>All tissue products shall fulfil the following requirements: Slimicides and antimicrobial substances: No growth retardance of micro-organisms according to test method EN 1104 Dyes and optical brighteners: No bleeding according to test method EN 646/648 (level 4 is required). Assessment and verification: The applicant shall provide a declaration of compliance with these requirements, supported by relevant test reports in accordance with standards EN 1104 and EN 646/648.</p>

Rationale

Paper products are subject to a series of technical requirements that vary as a function of their intended purpose and quality level. A few of the main technical/quality features are described below:

- Paper surface: A quality parameter which affects subsequent performance characteristics. Each paper is double-sided, i.e. the side which during production was in contact with the

wire is called the wire side (bottom side). This side also bears the wire mark and is slightly more uneven. In the case of coloured papers, this side tends to be darker as pigments are deposited on the bottom. The upper side is called the felt side or the right side, as it is the first to come into contact with the felt. It is smoother and generally brighter as fibres can be freely arranged on this side. It also contains more fillers.

- Surface smoothness (roughness) - both obtained in the machine and during glazing – a parameter that is relevant is for printing quality. The roughness of paper or board is assessed by measuring the flow of air which passes between the edge of a measuring head and the surface of the material under specified conditions
- Clarity, opacity, and transparency: Clarity indicates if the paper is coarsely ground or finely ground. Opacity is related to paper thickness and for a given thickness, a high filler content has a direct effect on this characteristic. Transparency is an undesirable characteristic for many paper qualities, with the notable exception of tracing paper or paper for detailed drawings.
- Sizing is especially important for writing and drawing papers, but also for other paper grades. The role of paper sizing is to bind fibres and filling agents. It must be uniform and dosed so that when ink or drawing ink is applied, the lines are clean and there is no bleed. Insufficient, poor sizing can be recognized by visible jagged lines often bleeding through to other side of paper or by picking (loose fibres on the paper surface).
- Strength: Mechanical properties of paper are defined by a series of parameters such as: breaking length, tensile strength, elongation, tearing index, folding resistance and stiffness.
- Grammage and thickness: Grammage is defined as the weight per square meter and expressed in gsm (g/m^2). Paper thickness, measured in microns, defines if the paper is a compact paper with a lot of fillers or a high volume paper.
- Ageing of paper (yellowing): Resistance to ageing of different paper grades depends primarily on the quality of raw materials. In the case of products with a short life cycle, such as newsprint, packaging etc., this property is not very important.
- Brightness: Measures the visual parameters of a paper sheet: the amount of reflectance of a specific wavelength of blue light. Paper brightness affects the images printed on the paper, especially the vibrancy of the colours.

Paper products are essentially single use in nature. Paper quality requirements are directly related to the final product fitness for use requirements. It is therefore very complex to fix any common set of technical requirements in EU Ecolabel criteria that in the market reality are dynamic, reflecting the multiple different uses for paper products and related consumer expectations that is currently the case.

Considering the existing markets for Copying and Graphic Paper and for Newsprint Paper and the standard practice that is already prevalent in them, it is considered of little added value to specify fitness for use requirements in EU Ecolabel criteria.

Tissue Paper is a different case because there is a hygiene issue which can result in some products being treated with biocidal products to impart a final disinfective effect to the product. In order to avoid this occurring in EU Ecolabel Tissue Paper, there is a requirement for testing of the Tissue Product in accordance with EN 1104.

Again with Tissue Paper, there is a risk exposure issue for dyes and optical brighteners (where these are used) when paper is used in applications where it will come into contact with food. For this reason, compliance with EN 646/648 is required.

It should be noted that these requirements for Tissue Paper were already set out in the existing criteria but have simply been moved to a different criterion.

Discussion points:

Q: Do you consider that EN 12281 and 12858 fitness for use requirements for Copying and Graphic Paper or for Newsprint Paper are of direct relevance to EU Ecolabel criteria?

Q: Do you consider EN 646, 648 and 1104 as more appropriate to consider as Fitness for use criteria or should they continue to be grouped under a "Product Safety" criterion?

Q: Are there any other standards that you believe should be considered for the fitness for use aspects of these product groups? And if so, should they be specified in EU Ecolabel criteria?

Draft

4.7 Criterion 7: Information on the packaging (Copying and graphic paper/Newsprint Paper only)

Table 46. Information on packaging

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p>The following information shall appear on the product packaging: ‘Please collect used paper for recycling’.</p> <p>In addition, if recycled fibres are used, the manufacturer shall provide a statement indicating the minimum percentage of recycled fibres next to the EU Ecolabel logo.</p> <p>Assessment and verification: the applicant shall provide a sample of the product packaging bearing the information required.</p>		No equivalent criterion
Proposed Criteria		
<p>The following information shall appear on the product packaging: ‘Please minimise use of this paper where possible (e.g. through avoidance and double sided printing), reusing used paper where possible (e.g. as note paper), and finally presenting it for recycling. Remember that minimising contamination (e.g. adhesives, labels, tape, laminates etc.) helps to maximise the environmental benefits of recycling’.</p> <p>Assessment and verification: the applicant shall provide a sample of the product packaging bearing the information required.</p>		No equivalent criterion

Rationale

The rationale is that consumers should be encouraged to follow the waste hierarchy and to maximise the benefits of paper recycling.

Discussion points:

Q1: Do the revisions/additions seem reasonable?

4.8 Criterion 8: Information appearing on the EU Ecolabel (Copying and graphic paper/Newsprint Paper) or Criterion 8: Consumer information (Tissue Paper)

Table 47. Consumer information criterion

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p>Criterion 8: Information appearing on the EU Ecolabel</p> <p>The optional label with text box shall contain the following text:</p> <ul style="list-style-type: none"> – low air and water pollution, – use of certified fibres AND/OR use of recycled fibres (case-by-case), – hazardous substances restricted’. <p>The guidelines for the use of the optional label with the text box can be found in the Guidelines for use of the Ecolabel logo on the website:</p> <p>http://ec.europa.eu/environment/ecolabel/promo/pdf/logo%20guidelines.pdf</p> <p>Assessment and verification: the applicant shall provide a sample of the product packaging showing the label, together with a declaration of compliance with this criterion.</p>		<p>Criterion 7: Consumer information</p> <p>Box 2 of the Ecolabel shall include the following text:</p> <ul style="list-style-type: none"> – uses sustainable fibre, – low water and air pollution, – low greenhouse gas emissions and electricity use. <p>In addition, next to the Ecolabel, the manufacturer shall either provide a statement indicating the minimum percentage of recycled fibres, and/or a statement indicating the percentage of certified fibres.</p>
Proposed Criteria		
<p>Criterion 9: Information appearing on the EU Ecolabel</p> <p>The optional label with text box shall contain the following text:</p> <ul style="list-style-type: none"> - Uses sustainable fibres; - low water and air pollution; - low greenhouse gas emissions and energy use; - low water use and waste generation in production; and - reduced use of hazardous substances. <p>In addition, next to the Ecolabel, the manufacturer shall provide a statement indicating the minimum percentage of recycled fibres and certified fibres.</p> <p>The guidelines for the use of the optional label with the text box can be found in the Guidelines for use of the Ecolabel logo on the website:</p> <p>http://ec.europa.eu/environment/ecolabel/promo/pdf/logo%20guidelines.pdf</p> <p>Assessment and verification: the applicant shall provide a sample of the product packaging showing the label, together with a declaration of compliance with this criterion.</p>		<p>Criterion 8: Consumer information</p> <p>Box 2 of the Ecolabel shall include the following text:</p> <ul style="list-style-type: none"> - Uses sustainable fibre; - low water and air pollution; - low greenhouse gas emissions and electricity use; - low water use and waste generation in production; and - reduced use of hazardous substances. <p>In addition, next to the Ecolabel, the manufacturer shall provide a statement indicating the minimum percentage of recycled fibres and the percentage of certified fibres.</p>

Rationale

The rationale is that this provides a more accurate reflection of the key issues addressed in line with the extended range of technical criteria proposed.

Discussion points:

Q. Only three points can be used in any given label, are the proposed points suitable or do you have any other preferences?

5. Proposed criteria areas

5.1. Water consumption control

Table 48. Criteria for water consumption

Copying and Graphic Paper	Newsprint Paper	Tissue Paper
Existing criteria		
<p><i>No existing criterion, this is a newly proposed criterion.</i></p>		
Proposed criteria		
<p><u>(a) Onsite water consumption control</u></p> <p>This requirement shall apply to all relevant pulp and paper mills that are under the management of the applicant.</p> <p>A report explaining how water consumption is monitored in the mill shall be provided which should also address the following points:</p> <ul style="list-style-type: none"> Highlighting existing design features that minimise water consumption; Potential future improvements that could be made to reduce water consumption; The practical limitations of further closure of water circuits at the mill site(s); and Continuous improvement objectives and targets. <p>Assessment and verification: the applicant shall provide a detailed water minimisation and management plan for of each of the sites concerned and a declaration of compliance with the criterion. Where appropriate, EMS (e.g. ISO14001 or EMAS) procedures or permit information (e.g. under Directive 2015/75/EU on industrial emissions – formerly Integrated Pollution Prevention and Control) can be used as part of the evidence.</p> <p><u>(b) Reporting of specific water consumption</u></p> <p>The specific water consumption associated with the paper product shall be reported in m3/ADT. Data shall be obtained from metering of inflows of process water (i.e. from mains water or abstraction from rivers, lakes or boreholes) and the production output of pulp of paper from the mill. Annual average data should be reported based on measurements taken at least once per month.</p> <p>For each pulp 'i' used, the related measured water consumption ($WC_{pulp,i}$ expressed as m3/ADT), shall be weighted according to the proportion of each pulp used per ADT of paper produced. The weighted WC for the pulps is then added to the measured WC from the paper production to give a total WC, WC_{total}.</p> $P_{WC} = \sum_{i=1}^n [pulp, i^{*i} (WC_{pulp,i})] + WC_{papermachine}$ <p>Assessment and verification: the applicant shall provide a report declaring the specific water consumption associated with the production of the paper product, expressed as m3/ADT paper, together with the underlying calculation. For non-integrated paper production, declarations of specific water consumption shall be provided by the pulp supplier for use in the calculation.</p>		

Rationale

Relevance:

When assessing normalised and equally weighted life cycle impacts from a representative paper product, the PEF CR Screening study found that water depletion was by far the single largest impact (see section X of the PR). However, this impact category is considered to be of low quality in the LCA community and the limitations of simple volumetric based indicators are clearly described and discussed by Berger and Finkbeiner

(Berger & Finkbeiner, 2013). The significance of water depletion impacts is highly dependent on the regional context, being much more important in areas of water scarcity. A wide range of specific water consumption rates (m³/ ADt) exist throughout the paper industry.

The pulp and paper industry is the third largest emitter of wastewater after the primary metals and chemicals industries (Savant, Abdul-Rahman, & Ranade, 2006). This is despite major reductions in the volumes of wastewater effluent produced. For example, a reduction from 46 to 9 l/kg was reported for Germany between the 1970s and 2014 (Jung and Kappen, 2014).

How well a particular plant can reduce water consumption depends on the degree to which the water circuits can be closed. This in turn depends on factors such as: bleaching requirements, cooling water requirements, and the upper limits of non-process elements (NPEs such as chlorine, calcium, barium, manganese, iron, copper, silicon and aluminium) that can be tolerated. Plants producing packaging grade paper tend to have a good potential to reach very low or even zero water discharge by complete closure of the water circuit (Bajpai, 2005; Bajpai, 2015). On the other hand, plants producing speciality papers, due to very high quality requirements, lower production rates and frequent grade changes will find it much more difficult to reduce specific water consumption rates.

The BREF report from 2014 for pulp, paper and board production addresses water consumption and gives various examples of BAT techniques that can be used to minimise water use as shown in Table 49.

Table 49: Techniques to reduce water use at source

Technique		Applicability
a	Dry debarking	Restricted applicability when high purity and brightness is required with TCF bleaching
b	Handling of wood logs in such a way as to avoid the contamination of bark and wood with sand and stones	Generally applicable
c	Paving of the wood yard area and particularly the surfaces used for the storage of chips	Applicability may be restricted due to the size of the wood yard and storage area
d	Controlling the flow of sprinkling water and minimising surface run-off water from the wood yard	Generally applicable
e	Collecting of contaminated run-off water from the wood yard and separating out suspended solids effluent before biological treatment	Applicability may be restricted by the degree of contamination of run-off water (low concentration) and/or the size of the waste water treatment plant (large volumes)

Technical issues and trade-offs

Purely from an engineering perspective, it is possible to completely close the water circuits in most pulp and paper production processes. Such an approach has some obvious benefits such as cost savings in water abstraction and improved potential for fibre recovery. Any capital and operating costs related to new auxiliary systems for the (fully or partially) closed water circuit can be offset against projected savings in final effluent treatment and discharge. However, complete water circuit closure has not been widely implemented due to a number of different technical issues and other trade-offs which can occur, some of which are briefly summarised below.

Table 50. Common technical issues associated with water circuit closure

Technical issue	Specific details
Increased corrosion rates	Applies especially to digestors, evaporators and recovery boilers. The main problem is due to chloride in liquors reaching the digestors, evaporators and especially the recovery boiler.
Scaling, deposits and fouling	Precipitation of barium sulfate is a concern throughout water circuits irrespective of pH while precipitation of calcium oxalate is a particular issue in waters of pH < 8 and calcium carbonate in waters of pH > 8. Other scaling and fouling issues include aluminosilicates, aluminium phosphates, aluminium hydroxide (at pH >5), calcium sulfate and burkeit. Scaling and deposits ends up increasing head-loss throughout the pipe network, plugging of mechanical parts and greatly reducing heat transfer efficiency in heat exchangers.
Increased chemical consumption	Increased dosing of pH control chemicals (i.e. H ₂ SO ₄ and NaOH) due the higher buffering capacity of waters caused by increased dissolved organic carbon content from recycled waters. Chemical dosing required in auxiliary processes to treated recycled water to prevent scaling and fouling issues.
Reduced bleaching efficiency	Increased concentrations of Fe ³⁺ and Cu ²⁺ ions would require an increased dosing of chealants (i.e. EDTA) prior to peroxide or ozone bleaching to maintain process efficiency.
Effluent quality	As less water is discharged from process systems, the tendency will be for concentrations of contaminants such as COD to increase and move out of the optimal performance window of existing WWTP processes. Therefore reference must be made to the specific terms and conditions in the permit conditions before considering partial closure of the water circuit.

It is unclear how the trade-offs from reduced water consumption would translate into LCA impact categories but from a technical point of view, the most prudent approach is to take a step-wise approach to reducing water consumption and only to the degree that is technically feasible with existing technologies.

What other ecolabels and green initiatives say

Water consumption is not addressed in equivalent product groups covered under the Nordic, Blue Swan or Green Seal ecolabels.

The BREF recommendations simply state that water circuits should be closed to the degree that is technically feasible in line with the pulp and paper grade manufactured and recommends certain measures including:

- Monitoring and optimising water usage.
- Evaluation of water recirculation options.
- Balancing the degree of closure of water circuits and potential drawbacks; adding additional equipment if necessary.
- Separation of less contaminated sealing water from pumps for vacuum generation and reuse.
- Separation of clean cooling water from contaminated process water and reuse.
- In-line treatment of (parts of) process water to improve water quality to allow for recirculation or reuse.
- Reusing process water to substitute for fresh water (water recirculation and closing of water loops). Applicable to new plants and major refurbishments. Applicability may be limited due to water quality and/or product quality requirements or due to technical constraints (such as precipitation/incrustation in water system) or increase odour nuisance.

The concept of a "*water footprint*" can be applied to any product in principle and a standard approach for such methodology has been published (Hoekstra, 2009). As part of the methodology a distinction is made between different types of water:

Blue water (which includes evaporated water, water incorporated into the product, water which does not return to the same defined catchment area and water that does not return during a defined time period).

Green water (which refers to rainwater that is removed from soil by evapotranspiration or incorporated into crops used in the production process).

Grey water (which is directly related to contaminants in aqueous emissions relative to the background contamination level in natural waters).

Although significant background research has been conducted relating to the specific water footprint of paper products (van Oel and Hoekstra, 2012), there are a large number of assumptions needed when accounting for the water footprint of the forestry stage. Accurately following these water flows would be a particular challenge for pulp and paper, which are global commodity products.

Ambition level

Considering the current status of other ecolabel schemes, it appears that any minimum requirement relating to water consumption would be ambitious while a full water footprint calculation including the forestry stage would present many challenges.

A reasonable intermediate level of ambition is to refer to the BREF approach, which simply focuses on process water requirements and wastewater flow rates and provides a range of BAT-AELs for annual average wastewater production for different pulp production processes.

Table 51: BAT waste water flows at the point of discharge after waste water treatment as yearly averages

Sector	BAT-associated waste water flow
Bleached kraft pulp	25 – 50 m ³ /ADt
Unbleached kraft pulp	15 – 40 m ³ /ADt
Bleached sulphite paper grade pulp	25 – 50 m ³ /ADt
Magnefite pulp	45 – 70 m ³ /ADt
Dissolving pulp	40 – 60 m ³ /ADt
NSSC pulp	11 – 20 m ³ /ADt
Mechanical	9 – 16 m ³ /ADt
CTMP and CMP	9 – 16 m ³ /ADt
RCF paper mills without deinking	1.5 – 10 m ³ /t (the higher end of the range is associated with mainly folding boxboard production)
RCF paper mills with deinking	8 – 15 m ³ /t
RCF-based tissue paper mills with deinking	10 – 25 m ³ /t
Non-integrated paper mills	3.5 – 20 m ³ /t

To look more closely at the data used to define these ranges, an example of the data received from BREF questionnaire responses that was used to arrive at the BAT-AEL range for one of the entries in **Table 51** (bleached kraft pulp) is shown in Figure 22 below.

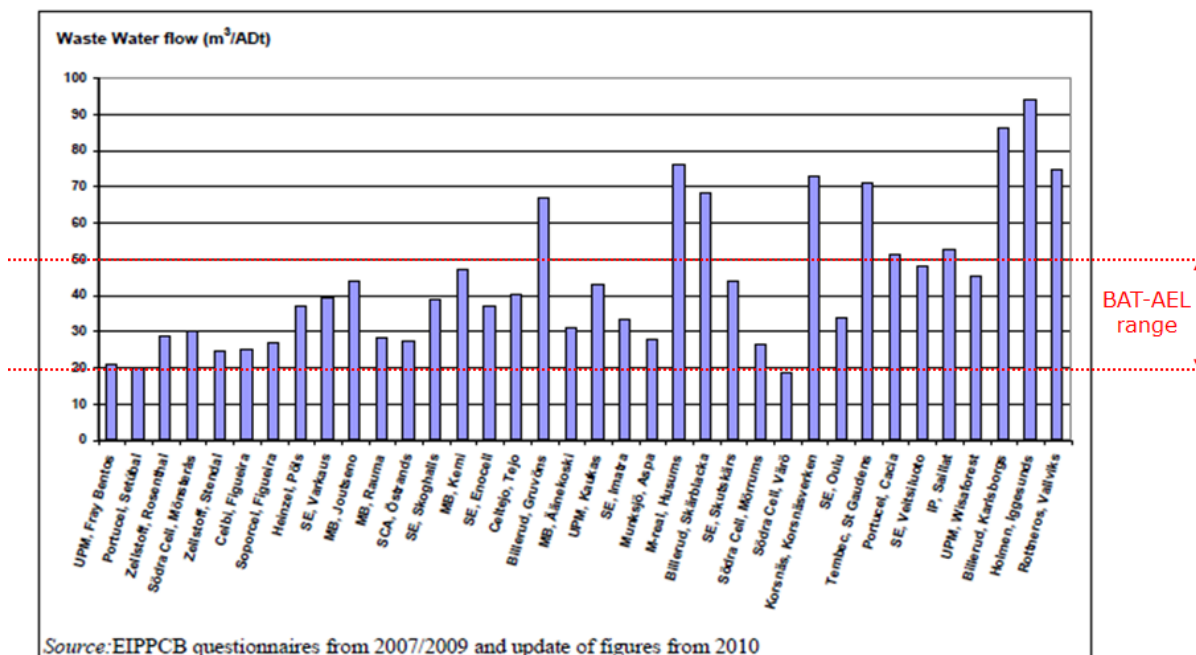


Figure 22: Specific waste water flow of bleached kraft pulp mills (JRC, 2015)

It is considered more straightforward to target water consumption rather than wastewater emission because it tends to be directly metered, captures water used for cooling and is not subject to significant influence by variable factors such as storm events increasing flows from site impermeable areas into the WWTP and variable water contents of sludge removed from the WWTP.

In this initial proposal, no actual minimum benchmark is set for water consumption, although this could be set in future EU Ecolabel criteria revisions, based on data that has been collected from applicants by Competent Bodies during the next 4-5 years. There are a series of discussion points which should be covered at the 1st AHWG meeting relating to this criterion area, which are listed below.

Discussion points:

Q. Is it more appropriate to target the minimisation of water consumption or the minimisation of wastewater discharge volume? Please explain why either way?

Q. Do you think a benchmark could or should be set for water consumption (or wastewater effluent discharge)?

Q. Would market pulp suppliers be willing or able to provide specific water consumption data from their pulp?

Q. Should a tiered approach be taken, which would introduce more stringent measures for mills located in geographical regions of higher water scarcity/water stress? If so, what system should be used to define levels of water scarcity/water stress?

5.2. EDTA and DTPA

During the literature review process, a possible further restriction that could potentially be applied to EDTA and DTPA as process chemicals used to make EU Ecolabel paper products was identified. The background information compiled is given below.

In chemical or mechanical pulp mills, complexing/chelating agents are used to protect oxygen-based bleaching chemicals against catalytic degradation prior to or during the bleaching stages (i.e. in TCF). The complexing agents are used in neutral, slightly acidic or slightly alkaline (depending on the formulation and the process requirements) washing and bleaching steps to eliminate transition metals (mainly Mn and Fe, and Cu). The most widely used chelating agents are EDTA (ethylenediaminetetraacetic acid) and DTPA (polyamino carboxylic acid), in different product formulations.

The BREF notes that DTPA and EDTA are powerful chelants, but are poorly biodegradable (Hinck, Ferguson, & Puhaakka, 1997) and are emitted to receiving water bodies at the end of the process. These can then mobilise heavy metals from the ground in lakes and rivers. The BREF describes various techniques for minimising their emissions in effluent. So, while useful in the TCF bleaching processes, their use needs to be minimised or they need to be treated in the effluent. One study notes (Rodríguez et al., 1999) that a combination of O₃ and UV (pH 7.0 by 15 min) combined with biological treatment, can be very efficient in the removal of the EDTA and DTPA chelants (98 %) and COD (95 %), however this has cost and energy implications for the effluent treatment plant.

Some references show that there are far more biodegradable and relatively harmless alternatives (Kołodziejńska, 2011), Jones & Williams, 2002) including Iminodisuccinic acid (N-1,2-dicarboxyethyl)-D,L-aspartate acid (IDS), Polyaspartic acid (DS), Ethylenediamine-N,N'-disuccinic acid (EDDS), Methylglycinediacetic acid (MGDA) and tetrasodium of N,N-bis(carboxymethyl) glutamic acid (GLDA) and aspartic acid diethoxysuccinate (AES).

For example, MGDA is readily biodegradable (>68%) and does not require adapted bacteria for decomposition. GLDA is also readily biodegradable and is based on monosodium glutamate, a flavour enhancer produced by the fermentation of corn sugars. Acid washing can also be considered as possible alternative to complexing agents.

The BREF notes that BAT is to “*reduce the release of not readily biodegradable organic chelating agents such as EDTA or DTPA from peroxide bleaching*” (where used) using a combination of techniques, including monitoring, process optimisation, and the preferential use of biodegradable or eliminable chelating agents, gradually phasing out non-degradable products. The revision of the Blue Angel criteria for Tissue, Newsprint and graphic paper (carried out in 2014) bans the use of EDTA and DTPA entirely.

What other ecolabels and green initiatives say

Part 3.14 of the RAL UZ 5 Blue Angel criteria for Sanitary Paper (July 2014) prohibits the use of any complexing agents that are not readily biodegradable, specifically mentioning EDTA and DTPA for the avoidance of doubt.

In the Basic Module for Nordic Paper Products (Version 2.2, June 2011), EDTA and DTPA are not restricted per se. Instead, pulp manufacturers are required to report the quantities of complexing agents used per tonne of 90% dry pulp produced. If the quantities of EDTA or DTPA used exceed 1.0 kg per tonne of pulp then a reduction plan must be submitted.

Level of Ambition

Clearly the use of EDTA and DTPA is an issue. The Blue Angel approach is the most stringent, but perhaps this is possible because the Blue Angel is effectively limited to using deinked pulp.

The Nordic approach is more progressive and, depending on how well licence holders have adapted to those requirements, either a similar approach could be adopted for the EU Ecolabel or a more ambitious one adopted.

Discussion points:

Some key questions need to be addressed before deciding how to proceed on this matter, which are listed below:

Q: Should chelating/complexing agents be restricted like surfactants on the basis of their biodegradability?

Q: What chemicals are used by Nordic Swan and Blue Angel licence holders as alternatives to EDTA/DTPA?

Q: If so, are there any issues with these alternatives such as poorer performance, higher quantities needed, cost, and market availability?

Q: Is there any existing information concerning the overall environmental profile of these alternative chemicals?

Q: If EDTA / DTPA were to be permitted, what conditions should be applied? For example, certain wastewater treatment processes, effluent testing (using which method)?

Draft

5.3. Optical Brightening Agents

Optical brightening agents (OBAs) are used in graphic papers and tissue to achieve higher levels of brightness than achievable in the wood-derived or deinked pulp and as an alternative to whitening fillers. To a degree there is a trade-off between the level of bleaching in the pulping process and the use of OBAs after bleaching, the latter sometimes being more cost-effective (Moreira Barbosa, Gomes, Colodette, Carvalho, & Manfredi, 2013).

Numerous OBAs are used in wet end paper making and coating and have various properties. Many modern OBAs are stilbene and tetrasulfonic types. While there is widely reported concern over the use of OBAs in laundry detergents there is very little information in terms of concern over their use in paper making.

A UNEP SIDS study (OECD, 2005) regarding disodium 4,4'-bis[(4-anilino-6-morpholino-1,3,5-triazin-2-yl)- amino]stilbene-2,2'-disulphonate (Fluorescent Brightener FWA-1) found no human toxicity concerns but a hazard for the environment (chronic toxicity to daphnia in water). Examination of other Material Safety Data Sheets indicate that most OBAs are irritants to eyes, skin and respiratory tract and eco-toxic in water. Some also have risk phrases H302 (Acute toxicity category 4, harmful if swallowed) and H314 (Skin corrosion Category 1B, causes burns).

Blue Angel bans the use of OBAs entirely in some papers (essentially where brightness is not deemed essential) but allows the use of low hazard OBAs in 'white' papers:

"The use of optical brighteners shall not be permitted. Notwithstanding this, SC, LWC, MWC and HWC papers (according to Appendix 1 to these Basic Award Criteria) may be produced using the optical brighteners C.I.220, benzenesulfonic acid, 2,2'-(1,2-ethendiyl) bis [5[4-[bis(2-hydroxyethyl) amino]-6-[(4-sulfophenyl)amino]- 1,3,5, triazin-2yl]amino]-, tetra sodium salt and C.I. 113 or C.I.28 disodium salt 4,4'-bis[6-anilino-4-[bis(2-hydroxyethyl)amino]-1,3,5-triazin-2-yl]amino]stilbene-2,2'-disulphonate."

The Green Seal standard restricts OBAs in the following manner:

"Optical brighteners may be used as a functional papermaking additive at a dosage not to exceed 200 parts per million (0.02%) by weight in the finished product. This level does not include any optical brighteners that may be present in the furnish through the use of recovered materials."

Discussion points:

There seems to be a lack of evidence to support any serious concerns with the use of optical brighteners in paper making given the concentrations likely to be present in the paper, although there may be more significant concerns regarding emissions to water and the eco-toxicity and bioaccumulation of some OBAs.

Q. Should some OBAs be restricted under the EU Ecolabel where they carry certain risk phrases (e.g. around PBT and vPvB)?

Q. If so, should restrictions be conditional depending on the grade of paper product?

6. Conclusion

The scope and definitions of the three product groups are likely to be the subject of much debate, with:

1. an initial proposal to merge that of Copying and Graphic Paper with Newsprint Paper and
2. to expand the scope for Tissue Paper to include many more products.

The existing EU Ecolabel criteria for Copying and Graphic Paper, Newsprint Paper and Tissue Paper product groups have been initially evaluated in light of any progress in technological developments, new products and processes, changes in legal requirements, market advances (including developments in other Type I ecolabel schemes) and any issues raised in the Commission statements, following previous revision rounds.

The proposed criteria are presented in this first Technical Report in order to shape discussion ahead of the 1st AHWG meeting in June 2016. Supporting arguments for the proposals are provided in rationale in this report and also from background arguments from the draft preliminary report.

The same core criteria as before are presented and maintained:

1. Emissions to air and water (i.e. COD, P, S, NO_x, AOX and CO₂)
2. Energy
3. Fibre sourcing
4. Excluded or restricted substances

The strong influence of the new BREF report for pulp, paper and board production on the first two criteria cannot be overemphasised. However, often BAT values are expressed as ranges and in some cases, BAT values were only based on limited feedback. Thus it will be of great importance for stakeholder input and real data from licence holders in order to decide on the appropriate ambition level to set.

Fibre sourcing criteria are currently the subject of discussion at the Commission level and although the need for such a criterion is clearly understood, the precise wording and approach has yet to be conclusively agreed. Nonetheless, in terms of scope and ambition level, it is proposed to remove any minimum requirement for recycled content and simply have a minimum 70% requirement for sustainably sourced fibres which can be from virgin material from sustainably managed forests and/or from recovered fibres.

The criteria for excluded or restricted substances have been updated and some potential new restrictions relating to EDTA/DTPA and Optical Brightening Agents are proposed.

The other significant proposal is to introduce some minimum requirements on the control of water consumption during pulp and paper manufacture and a relatively simple entry level for monitoring and reporting of water consumption is proposed with a possible view to future limits on water consumption in future revisions of these criteria in 6-7 years' time.

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List of abbreviations and definitions

AHWG	Ad Hoc Working Group
AOX	Adsorbable organic halogenated compounds
APEO	Alkylphenoethoxylate
BAT	Best Available Technique
BREF	Best Available Technique Reference Document
BTU	British thermal unit
CO ₂ e	Carbon dioxide equivalent
CEPI	Confederation of European Paper Industries
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DG JRC	Directorate General Joint Research Centre
DIP	De-inked pulp
DTPA	Pentetic acid or diethylenetriaminepentaacetic acid
ECF	Elementary Chlorine Free
EDTA	Ethylenediaminetetraacetic acid
EMAS	Eco-Management and Audit Scheme
EPA	United States Environmental Protection Agency
EU	European Union
FAO	Food and Agriculture Organisation
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GNP	Gross National Product.
GPP	Green Public Procurement
IEA	International Energy Agency
IPP	Integrated Product Policy
IPTS	Institute for Prospective Technological Studies
ISO	International Standardisation Organisation
kWh	Kilowatt hour
LCA	Life Cycle Assessment
LCC	Life Cycle Costing
MEAT	Most Economically Advantageous Tender
MS	Member State
NAP	National Action Plan
OBA	Optical Brightening Agent
PAM	Polyacrylamide

PBT	Persistent, Bioaccumulative and Toxic Substances
PCF	Totally Chlorine Free process of making paper and pulp
PEFC	Programme for the Endorsement of Forest Certification
RCF	Recycled Fibre / Secondary Fibre
REACH	Registration, Evaluation, Authorisation & restriction of CHemicals
RWE	Round Wood Equivalent
SFI	Sustainable Forestry Initiative
TCF	Totally Chlorine Free
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
vPvB	Very Persistent and Very Bioaccumulative Substances
VPA	Voluntary Partnership Agreement
WWT	Wastewater treatment

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