JRC Scientific and Technical Reports

Revision of the EU Ecolabel Criteria for Bed Mattresses

DRAFT BACKGROUND REPORT and PROPOSAL FOR CRITERIA REVISION

Working Document

for

1st AHWG-MEETING FOR THE REVISION OF THE EU ECOLABEL CRITERIA FOR BED MATTRESSES

Mauro Cordella, Oliver Wolf

February, 2012

JRC EUROPEAN COMMISSION

ipts Institute for Prospective Technological Studies

OAKDENE HOLLINS RESEARCH & CONSULTING

Revision of the EU Ecolabel Criteria for Bed Mattresses

Draft Background Report and Draft Proposal for Criteria Revision

Working Document for the 1st AHWG Meeting

DATE: 23rd February 2012

PLACE: Sevilla

Authors:

Mauro Cordella, Oliver Wolf (JRC-IPTS)

Adrian Chapman, Katherine Bojczuk (Oakdene Hollins)

DG JRC (IPTS) 2012

Contents

Glossary

AHWG	Ad-Hoc Working Group
ATO	Antimony Trioxide
BAT	Best Available Technique
BBP	benzyl butyl phthalate
CAGR	compound annual growth rate
CFC	chlorofluorocarbon
CMR	carcinogenic, mutagenic, toxic to reproduction
CN	Combined Nomenclature
DBP	dibutyl phthalate
DEHP	bis(2-ethylhexyl)phthalate
DINP	di-isononyl phthalate
EBIA	European Bedding Industries Association
ECHA	European Chemicals Agency
EINECS	European Inventory of Existing Commercial chemical Substances
EPD	Environmental Product Declaration
ESBR	emulsion styrene butadiene rubber
EUEB	European Union Ecolabelling Board
EUR	Euro (€)
FIRA	Furniture Industry Research Association (UK)
FSC	Forest Stewardship Council
GBP	Pound sterling (£)
GDP	gross domestic product
GHG	greenhouse gas
GHS	Globally Harmonised System
GPP	Green Public Procurement
GWP	global warming potential
HCFC	hydro chlorofluorocarbon
LCA	Life Cycle Assessment
NBF	National Bed Federation (UK)
PCB	polychlorinated biphenyl
PCR	Product Category Rules
PEFC	Programme for the Endorsement of Forest Certification
ppm	parts per million
PUR	polyurethane
PVC	polyvinyl chloride
REACH	Registration, Evaluation, Authorisation and restriction of Chemicals
SBR	styrene butadiene rubber
SFA	single family accommodation
SLA	single living accommodation
SME	small / medium-sized enterprise
SVHC	substance of very high concern

Units Conventional SI units and prefixes used throughout: {kg, kilogramme, unit mass}; {t, metric tonne, 10^3 kg};{k, kilo, 10^3}; {M, mega, 10^6}; {G, giga, 10^9}

Introduction

This report presents the preliminary results of a study which prepares the ground for the revision of the current EU Ecolabel criteria for "Bed Mattresses" and the potential development of Green Public Procurement (GPP) criteria.

The study, being carried out by the Joint Research Centre's Institute for Prospective Technological Studies (JRC-IPTS) and Oakdene Hollins Research & Consulting (UK), includes the following activities:

- Collection of preliminary recommendations from stakeholders;
- Collection of information on the main pieces of legislation and labelling schemes of relevance for bed mattresses;
- Collection of market information on bed mattresses;
- Collection of information on technical and environmental issues related to the life cycle of bed mattresses;
- Identification of the most relevant areas for setting criteria and evaluation of the improvement potential;
- Draft criteria proposal.

The tasks undertaken up to this time are outlined through the document in four thematic sections:

1. Background information
2. Definition and Categorisation
3. Market Analysis
4. Technical Analysis

This first section provides a brief introduction to the EU Ecolabel and GPP, a picture of the existing environmental labelling schemes related to bed mattress and a description of the main changes in legislation affecting the product group since the last EU Ecolabel revision in 2009.

The later sections provide further information and evidence for the EU Ecolabel criteria revision and GPP criteria development. Within this process, a preliminary stakeholder consultation was undertaken, which allowed feedback and comments to be submitted from interested parties. The outputs from this task are discussed within the relevant sections rather than individually, so that they are integrated within this process.

The information and recommendations contained within this document will be used as the basis for discussions at the 1st Ad-Hoc Working Group (AHWG) Meeting for Bed Mattresses, which will take place in Seville (Spain) on February 23rd 2012. Further work will be conducted, also based on the feedback received from the 1st AHWG meeting, and presented in time for discussion in the 2nd AHWG meeting, planned in June 2012:

- Enhanced LCA information within the technical analysis and further investigation on specific issues of discussion
- Draft criteria proposal
- Evaluation of the benefits of adopting the criteria.

Revision of the EU Ecolabel criteria for textiles is also happening simultaneously. Due to the use of textiles in bed mattresses, it should be borne in mind that the outputs and findings of this other study are likely to influence the revision of the criteria for bed mattresses.

1 Background information

1.1 EU Ecolabel & GPP

The EU Ecolabel and Green Public Procurement (GPP) are mechanisms which have been introduced within the EU to encourage the production and consumption of more environmentally friendly products and services. These schemes help purchasers and consumers to make more informed decisions through the identification of products or services with higher environmental credentials.

The EU Ecolabel is a voluntary scheme, regulated by the European Commission[a], which is used to distinguish environmentally beneficial products and services. The EU Ecolabel is awarded through an application process which demonstrates that the criteria specified for a particular product group have been met. Successful applicants are then allowed to use the EU Ecolabel logo (the 'Flower') and advertise their product as having been awarded the EU Ecolabel. The criteria for a particular product group are designed to apply, theoretically, to the best 10-20% of products in terms of environmental performance. As technology, markets and legislation change over time, the criteria need to be updated to ensure they remain relevant, as well as strict enough to capture the top 10-20% of products. This approach should also assure that the overall environmental impact of a whole product group is improved.

GPP is a voluntary instrument which European public authorities can utilise in the procurement of products and services.[b] Because of the extensive purchasing power of public authorities, GPP can make important contributions to sustainable consumption and production by motivating manufacturers to adopt more sustainable environmentally friendly practices and by promoting best environmental practices to the public. This in turn will help stimulate a critical mass of demand for these goods and services which otherwise may be difficult to get on the market. Strong but realistic criteria are required to ensure that this has maximum impact over the relevant product categories, whilst allowing producers to meet the performance guidelines.

Several GPP and EU Ecolabel product group criteria are in the process of being revised and updated: JRC-IPTS and Oakdene Hollins are undertaking the revision of the criteria for bed mattresses. The existing set of EU Ecolabel criteria for bed mattresses was adopted in July 2009.[c] To date, the EU Ecolabel appears to have been very limited interest and uptake within the bed mattress industry. Evidence indicates that this may be because the criteria are too difficult to achieve. By contrast there are at present no GPP criteria for bed mattresses. Therefore, the process of EU Ecolabel criteria revision and GPP criteria development, based on a common evidence base, is both relevant and timely. In particular, the revision process will focus on refining the existing criteria also taking into account for the reasons behind the currently low uptake of the EU Ecolabel within this product groups. This should also encourage greater uptake and support the creation of a market for these products whilst maintaining an adequate level of environmental excellence.

1.2 Bed Mattresses and the EU Ecolabel

Several aspects of mattress composition, product manufacture and fitness for use are assessed within the EU Ecolabel criteria. A summary guide of all the criteria can be found in Appendix I. These include, for instance, restrictions on residual heavy metals, pigments and dyes, flame retardants and biocides.

a Regulation (EC) No 66/2010
b Public procurement for a better environment, Communication (2008) 400/2
c Commission Decision 2009/598/EC

Several environmental labelling schemes have developed criteria for mattresses (see Table 1). These schemes either specifically target mattresses or include mattresses as a part of a wider product group. Other labelling schemes, such as the Japanese Eco-leaf or US Green Seal, were found not to include mattresses within their certified products.

Table 1: Summary of ecolabels applicable to mattresses

Ecolabel name	Region	Product group	Date of adoption of the latest version	Known licences/ companies awarded*
EU Ecolabel	EU	Mattresses	July 2009[a]	2
Blue Angel	Germany	Mattresses	April 2010[b]	4
Austrian Ecolabel	Austria	Mattresses	Jan 2011[c]	4
Nordic Swan	Denmark, Finland, Iceland, Norway, Sweden	Furniture	March 2011 (version 4)[d]	5
Green Mark	Taiwan	Mattresses	September 2011 (version 1.0.1)[e]	14 (products)

**Specifically for mattresses, this may include several products*

The last version of the EU Ecolabel criteria for mattresses were adopted in 2009, and this represents the oldest set of environmental criteria for mattresses. Nevertheless, many similarities exist between the European labelling schemes specifically focusing on mattresses, i.e. EU Ecolabel, Blue Angel and Austrian Ecolabel. A comparison between the three labels is provided in Appendix II. Generally, schemes appear very closely related each other and to address similar points. Perhaps, the largest differences occur in the way the three schemes deal with flame retardants, biocides and halogentated organic compounds. For these criteria, Blue Angel and Austrian are indeed stricter, in general requiring the absolute absence of these substances.

Compared to other product groups, uptake of the EU EColabel for bed mattresses appears being relatively low. At present, the authors of this document are aware of only two companies that hold active EU Ecolabel licences:

- Carpenter ApS – certified by Ecolabelling Denmark
- Elite SA – certified by VKI Austria.

This is despite the fact that several potential applicants are reported to have made enquiries to different EU Ecolabel Competent Bodies. From preliminary stakeholders consultation, it appears that the industry is well informed of the existence of the EU Ecolabel for this product group. Various reasons were indicated for the limited uptake of the EU Ecolabel:

- lack of clarity in existing criteria
- difficulties in meeting existing criteria
- cost and uncertainty in applying
- lack of purchaser awareness/demand.

However, there was wide acknowledgment on the potential benefits of using the EU Ecolabel as a way to differentiate more environmentally friendly and sustainable product.

[a] Commission Decision 2009/598/EC
b http://www.blauer-engel.de/de/produkte_marken/produktsuche/produkttyp.php?id=309, accessed 09/01/2012
c http://www.umweltzeichen.at/cms/upload/20%20docs/richtlinien-lf/uz55_r2a-matratzen_2010.pdf, accessed 09/01/2012
d http://www.nordic-ecolabel.org/Templates/Pages/CriteriaPages/CriteriaGetFile.aspx?fileID=128603001, accessed 09/01/2012
e http://greenliving.epa.gov.tw/GreenLife/eng/E_Criteria.aspx, accessed 09/01/2012

In addition, since the last criteria were agreed, other factors have changed, for example the adoption of the EU Ecolabel Regulation 2010/66/EC, which are further drivers for this revision process.

1.3 Legislative background

The main legislative changes which occurred since the last revision took place and which are relevant to this product group are outlined below. Further pieces of legislation were added along the document where relevant for the discussion of issues related to the EU Ecolabel criteria and GPP. Stakeholders are invited to provide for comments and additional legislative references wherever they consider it appropriate

1.3.1 CLP, REACH and Biocide Regulations

CLP (Classification, labelling and packaging of substances and mixtures)

The Regulation EC No 1272/2008 entered into force in January 2009, replacing two previous pieces of legislation, the Dangerous Substances Directive (Directive 67/548/EEC) and the Dangerous Preparations Directive (Directive 1999/45/EC), and implementing the UN Globally Harmonised System (GHS) of Classification and Labelling of Chemicals at EU level. In particular, this implies that risk phrases, safety phrases and symbols are replaced with the mostly equivalent UN GHS hazard statements, precautionary statements and pictograms. The new system is to be implemented by 1 December 2010 for substances and by 1 January 2015 for mixtures. However, substances and mixtures will still have to be classified and labelled according to the predecessor Directive 67/548/EEC and Directive 1999/45/EC for preparations until 1 June 2015.

The implications of this legislation are incorporated in the criteria discussion both in terms of definitions and in restricting hazardous substances based on both hazard statements and risk phrases.

REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals)

The REACH Regulation (Regulation (EC) No 1907/2006) is a piece of legislation which regulates the production and use of substances in EU with the aim of improving the protection of human health and the environment from the risks that can be posed by chemicals.[a,b,c]
To comply with the regulation, manufacturers and importers are required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database managed by the European Chemicals Agency (ECHA).

The legislation, which entered into force in June 2007, distinguishes between “phase-in” substances (i.e. those substances listed in the EINECS, or those that have been manufactured in the Community, but not placed on the Community market, in the last 15 years, or the so-called “no longer polymers” of Directive 67/548) and “non-phase-in” substances. Deadlines for the registration of phase-in substances are set as follows:

- 30 November 2010 for substances manufactured or imported at 1000 tonnes or more per year, for carcinogenic, mutagenic or toxic to reproduction substances above 1 tonne per year, and for substances dangerous to aquatic organisms or the environment above 100 tonnes per year.
- 31 May 2013 for substances manufactured or imported at 100-1000 tonnes per year.
- 31 May 2018 for substances manufactured or imported at 1-100 tonnes per year.

a Regulation (EC) No 1907/2006
b http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm
c http://echa.europa.eu/

Non-phase-in substances have to be registered before being placed on the market. All substances notified under Directive 67/548/EEC are considered as registered under REACH.

Substances with properties of very high concern (SVHC) are subject to authorization. In this case, applicants have to demonstrate that risks associated with uses of these substances are adequately controlled or that the socio-economic benefits of their use outweigh the risks associated. Applicants must also analyze whether there are safer suitable alternative substances or technologies. If there are, they must prepare substitution plans, if not, they should provide information on research and development activities. A Member State, or ECHA at the request of the European Commission, can propose a substance to be identified as a Substance of Very High Concern (SVHC). If identified, the substance is added to the Candidate List, which includes candidate substances for possible inclusion in the Authorisation List. Substances of Very High Concern (SVHCs) are identified among:

- Substances meeting the criteria for classification as carcinogenic, mutagenic or toxic for reproduction category 1A or 1B in accordance with Commission Regulation (EC) No 1272/2008 (CMR substances);
- Substances which are persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) according to REACH (Annex XIII)
- Substances for which there is scientific evidence of probable serious effects that cause an equivalent level of concern as with CMR or PBT/vPvB substances (e.g. endocrine disruptors)

If the chemical risks cannot be adequately controlled, authorities can restrict the use of substances. Restrictions may limit or ban the manufacture, market and use of a substance.

With respect to substances contained in articles, producers and importers must submit a registration for any substance fulfils both the conditions below:

(a) the overall quantity of the substance in the articles is above 1 tonne per year

(b) the substance is intended to be released under normal or reasonably foreseeable conditions of use.

In case the overall quantity of the substance in the articles is above 1 tonne per year and the substance is present in the articles above a concentration of 0.1 % weight by weight (w/w), it must also be notified if the substance may be classified as SVHC. The notification does not apply where exposure to humans and environment can be excluded during normal conditions of use including disposal.

The implications of this legislation are incorporated in the criteria discussion both in terms of definitions and in restricting hazardous substances of very high concern.

Biocides

The Biocidal Products Directive (Directive 98/8/EC) regulates the placing of biocidal products on the market and aims at the establishment at Community level of a positive list of active substances which may be used in biocidal products. These are list in Annex IA – “Active substances with requirements agreed at community level for inclusion in low-risk biocidal products”. Active substances cannot be added to the list if, according to the Directive 67/548/EEC, they can be classified as: carcinogenic, mutagenic, toxic for reproduction, sensitising, or bioaccumulative and not readily degrade. Each Member State must authorise products containing the biocide before they can be placed on the market in that Member State. Once authorised by a Member State, the product can be placed on the market in any other Member State.

The Directive also planned a 10-year programme of work for the systematic examination of all active substances already on the market. All provisions necessary for the establishment and implementation of the programme were provided in 2003 through the Regulation (EC) 2032/2003. The mandate for the regulation of biocidal products will be regularly transferred to the REACH system.

If biocides are allowed, a standardised text should be included in the EU Ecolabel criteria to ensure that only authorised and assessed biocidal substances are used. This is incorporated in the criteria discussion.

1.3.2 EU Ecolabel Regulation

The revised EU Ecolabel Regulation was adopted on 25 November2009 and entered into force on 19 February 2010. The key points of the new regulation are:

- To take into account the environmental performance of products, taking into account the strategic objectives of the Commission (Article 6.1)
- To determine criteria on a scientific basis (Article 6.3)
- To focus on the most significant environmental impacts over the product lifecycle (Article 6.3.a)
- To substitute hazardous substances by safer substances whenever technically feasible (Article 6.3.b)
- To improve the durability and reusability of products (Article 6.3.c)
- To take into account the net balance between environmental benefits and burdens at each life cycle stage of the product (Article 6.3.d)
- To take into account for social and ethical aspects if appropriate (article 6.3.e)
- To align with other Ecolabels to enhance synergies (Article 6.3.f)
- To restrict the use of substances or preparation/mixtures which can be classified as toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction (CMR) according to CLP Regulation or as SVHC according to Article 57 of REACH Regulation (Article 6.6)
- Derogations may be given in respect of the above point, if substitution or use of alternative materials is not technically feasible. However no derogations are possible in respect of substances of very high concern (SVHC) identified in accordance with the procedure set out in Article 59 of REACH Regulation and that are present in mixtures, in an article or in any homogeneous part of a complex article in concentrations higher than 0,1 % (weight by weight) (Article 6.7).

In developing practical means to implement the provisions of Articles 6.6 and 6.7, the EU Ecolabelling Board (EUEB) has identified the hazard classifications for the restriction of substances and preparations. These are reported in Appendix III and form the basis for the criteria proposal set out with this study.

2 Definition and Categorisation

Mattresses are products designed to provide support and comfort for lying and sleeping, with the specific focus of this product group being bed mattresses. Within this group further distinction is often made between mattress types, often by their main core material (e.g. latex, PUR, springs). There is therefore a variety of common mattress types to consider within this product group. Other special types of mattresses designed for a specific purpose, e.g. medical mattresses and air beds, may also be described separately and are often considered outside the standard 'everyday' mattress types. "Scandinavia bed mattresses" are also included within the EU Ecolabel bed mattress classification, though they can be also defined as "mattress supports". Mattress supports are differentiated from bed frames or bedsteads (which are widely categorised as furniture) as they provide extra spring or support, rather than just providing a surface to place a mattress on. Items typically defined as mattress supports for instance include divans and metal and wood sprung supports (i.e. "Scandinavian bed mattress"). A further description is provided below in Section 2.1. Wood sprung supports are sold as part of a mattress system and cannot be separated from the mattress. Further description is provided below.

This section provides a technical description of the most common 'everyday' mattress types and reviews the existing categorisation used in the EU Ecolabel and in other sources.

2.1 Technical Description of Mattresses

Before analyzing the categorization used for bed mattresses in the EU Ecolabel, it is useful to provide the reader with a technical description of the different types of mattress included in the labelling scheme. In particular, the description includes composition of these mattresses and how this is linked to their functionality.

2.1.1 Mattresses components

A typical mattress consists of three main sections:

- The **Core**, which provides support in the mattress and whose composition is generally used to classify mattresses in one of the categories described above (e.g. latex foam, PUR foam or springs).
- The **Shell** (or padding/wadding), which is a layer around the core used to refine the overall properties of the mattress. All mattresses with a spring interior and some of the mattresses with other core materials contain a shell
- The **Tick** (or ticking) is the outer cover of the mattress and provides a comfortable and protective top layer.

The precise composition of a mattress depends on the desired properties of the mattress; for example the firmness can be varied to suit customer needs. Each of these sections is described in more detail below.

Core Materials

The core of the mattress is usually the main factor used to classify mattresses. The different core materials offer distinct properties, and allow manufacturers to offer different mattress types to purchasers. The three main core materials are latex, PUR and springs, though other materials may be used for specific types of mattress, for example wool or coconut fibres in baby mattresses.

Latex

Latex foam is used in mattress cores due to its durability, widespread availability and as it provides suitable levels of comfort for use in mattresses.

The latex used in mattresses can either be naturally or synthetically derived, with a mixture commonly used in mattresses to obtain the desired properties. Stakeholders indicated that synthetic latex accounts for between 5 – 100% of the latex contained in the mattress.

Natural latex originates from rubber trees, where it is contained suspended in the sap. Further processing makes it ready for foaming. Styrene butadiene rubber is commonly used as the synthetic latex in mattresses. This is produced by the polymerisation of styrene and butadiene. Natural and synthetic latex foams are blended together to optimise the product, based on:

- Properties - synthetic latex has more uniform properties and is more durable, natural latex has greater elasticity.
- Consistency – the properties and quality of natural latex can vary, synthetic latex can be produced more consistently
- Cost – synthetic latex is cheaper to produce than natural latex

In addition to the source of the latex, two processes exist for the production of latex foam from feedstock materials: the Dunlop process and the Talalay process. [a] Both are used in the production of the latex cores for mattresses and may use natural, synthetic or mixtures as a feedstock. There was some indication from stakeholders that the Talalay process is more energy intensive, however no studies could be found to quantify this difference. However, both processes are used in industry as they impart different properties to the latex, e.g. Dunlop latex is generally heavier and more durable while Talalay has a wider range of firmness grades.[b]

PUR

Polyurethane foam (or PUR) is a commonly used material for many furniture based applications, including mattresses and seating.

PUR is made through the production of polyurethane through a polymerisation reaction. The feedstock material varies but it is primarily a non-renewable petrochemical resource, such as oil and gas. Polyurethane is foamed using a blowing agent.[c] In the past these blowing agents have been halogenated hydrocarbons, however, according to stakeholders, carbon dioxide is much more common now. The production process can be controlled to define the properties of the foam, particularly the density.

Memory foam mattresses are also derived from PUR, through the addition of modifiers in the production of the foam. This foam is softened by the human body heat, therefore moulds and remoulds to provide close support. Memory foams may either make up a full mattress, but may also be used as a layer in other mattress types.

Springs

The springs used in mattress cores are made from steel, however there are a variety of spring designs used, with different shapes and configurations, [c]:

- Pocket springs
- Bonnell springs
- LFK (LeichtFederKern) springs
- Continuous springs

Each of these options offers different performance. For example pocket sprung mattresses contain separate, individually wrapped springs and they are considered to offer the best performance as springs are able to move separately. By comparison, continuous springs are composed of wires that form

a Latices: Applications of latices , Blackley D. C., Springer, 1997
b http://www.savvyrest.com/why-savvy-rest/natural-dunlop-talalay, accessed 19/12/2011
cc European Ecolabel – Bed mattresses, Tauw Milieu, 2006

multiple interwoven springs. This is typically seen as a solution offering lower performance, but it is cheaper.

Other factors are varied to further refine the properties of the sprung core, such as the number and size of the springs or the diameter of the wire.

The existing EU Ecolabel criteria specify the use of a closed loop system for cleaning these springs. This is included as the final production stage of spring production involves the production of the spring coil from the wire, which requires oil for lubrication. Oil must be removed before incorporation into the mattress by mean of organic solvents. The EU Ecolabel criteria also ban the use of a galvanic coating on the springs, which may be added to help preventing corrosion.

Shell
Mattresses commonly have a shell of materials around the core to refine the overall properties of the mattress.[a] For example, they may help equalizing weight distribution to provide more support or allowing better air flow or also protecting the mattress core.

All sprung mattresses have this material, and many mattresses with foam based cores. Often mattress shells are composite structures. The materials mainly used include: PUR foam, latex foam, horse or camel hair, coconut fibres, polyester, cotton, wool, flax, hemp, felt, jute and sisal. These materials are held together by glue or sewing.

Tick
The tick is the outer layer of the mattress, helping hold and protect the inner core and shell materials. It is also used to add comfort to the mattress. Common materials used for the tick include cotton, polyester, silk, wool and viscose. The tick can be fixed to the mattress or removable. [a]

2.1.2 Mattresses supports & Scandinavian Type Mattresses

Within the existing EU Ecolabel criteria provision is made for mattress supports made of wood. This is to allow for a type of bed/mattress system commonly found in the Scandinavian countries (i.e. Denmark, Finland, Norway and Sweden).[a] These bed systems can be considered as a hybrid between a mattress and mattress support. They consist of a wooden frame with integrated springs, witha mattress fixed on top of this (normally with a sprung core). This unit is covered with a thin replaceable mattress pad.

This system is typically included within the “mattress supports” category for classifications and statistics. However, it is differentiated from other mattress supports, such as divans, in the sense that mattress and other components of a Scandinavian bed mattress are fixed together.

2.2 Definitions of Mattresses

2.2.1 Existing Ecolabel categorisation

Within the existing EU Ecolabel criteria document, mattresses are described using the following definition[b]:

1. *The product group ‘bed mattresses’ shall comprise:*
    a. *Bed mattresses, which are defined as products that provide a surface to sleep or rest upon for indoor use. The products consist of a cloth cover that is filled with materials, and that can be placed on an existing supporting bed structure;*

[a] European Ecolabel – Bed mattresses (Previous revision document), Tauw Milieu, 2006
b Decision 2009/598/EC of 9 July 2009

b. *The materials filling the bed mattresses, which may include: latex foam, polyurethane foam and springs;*
c. *Wooden bed bases that support the bed mattresses.*

2. *The product group shall include spring mattresses, which are defined as an upholstered bed base consisting of springs, topped with fillings, as well as mattresses fitted with removable and/or washable covers.*
3. *The product group shall not comprise inflatable mattresses and water mattresses, as well as mattresses classified under Council Directive 93/42/EEC (medical devices).*

This definition targets the inclusion of the most commonly available types of mattress for common use both domestically and commercially. Products which are specifically identified as being included are spring mattresses, defined as upholstered bed bases consisting of springs, topped with fillings, as well as mattresses fitted with removable and/or washable covers. Wood-based supports that are specifically designed to provide extra supports for the mattress are also included. However this is interpreted to not include standard wooden bed frames or bedsteads, but rather allow 'Scandinavian' type mattress systems. These consist of a wooden frame housing a spring system with an attached mattress, often covered by a thin, replaceable mattress pad. The mattress units are sold as single, non-separable units, therefore have been included within the bed mattress product group.

Products specifically excluded are: inflatable mattresses, as they are not commonly used for as permanent mattresses, water beds, as previous revisions and data in Section 3 indicate that they comprise a very minor part of the market, and mattresses which fall under the medical equipment category, according to Council Directive 93/42/EEC. These devices are specifically designed to provide medical or therapeutic effects and therefore have different functions and technical specifications than a typical bed mattress. For example, this includes products with pressure relieving systems (for example adjustable air pockets) and bed and mattress systems which are designed to work together to provide therapeutic benefit such as preventing bed sores. However, even if excluded from the scope of the EU Ecolabel, these mattresses could be relevant within the GPP scheme.

It should also be noted that, within the EU Ecolabel scheme, specific criteria are applied to latex, polyurethane foam, springs and wood. Therefore, the product group scope and the criteria are written in a way that recognises these different mattress types. Indeed, these criteria directly map onto the different types of mattress and wooden mattress support available on the market. This distinction, based on construction material, is also commonly used to differentiate between mattress types by other ecolabel schemes, industry and trade data.

2.2.2 Other mattress classification systems

Other sources for the definition and classification of mattress types include other ecolabel schemes, industrial statistical classifications and the mattress and bedding industry itself. Each is described below.

Other environmental labelling schemes with specific product groups for mattresses
In addition to the EU Ecolabel, three other environmental labelling schemes have been identified as having a specific product group for bed mattresses. The definitions used are summarized in Table 2.

The core definition provided in these three schemes appears consistent with the one used for the EU Ecolabel and common agreement on the exclusion of inflatable (or air) and water mattresses can be observed. Nevertheless, no mention of medical or therapeutic products is explicitly made and some variation is present in the types of products considered and in the terminology used.

Both Austrian and German environmental labels state to include mattresses with an integrated frame, which can be put on a bed frame or designed for free standing. While upholstered bed are also included within the EU Ecolabel scope, the terms "bed base" is here used, without referring explicitly to the

possibility of integrating the function provided by a bed frame. Moreover, it should be noted that this type of products could also be included within the category of "mattress supports" (see below). In contrast, the Green Mark scheme specifically excludes any mattress support type products. Head rest pillows instead appears to be considered only by Blue Angel, at least where they form part of the mattress and are made of the same materials. Further clarification seems necessary and input from the stakeholders about these issues would be much appreciated.

Table 2: Definitions of bed mattresses used by other Ecolabel schemes

Scheme	Definition
Austrian Ecolabel (Austria)[a]	**A surface to sleep or rest on consisting of a strong cloth cover filled with material that can be placed on a bed frame.** **Includes mattresses with an integrated frame, i.e. upholstered bases, which may be put on a bed frame or designed for free standing.** **Excludes inflatable and water mattresses.**
Blue Angel (Germany)[b]	**A surface to sleep or rest on consisting of a strong cloth cover filled with material that can be placed on a bed frame.** **Includes mattresses with an integrated frame, i.e. upholstered bases, which may be put on a bed frame or designed for free standing. Head rest pillows included where they form part of the mattress and are made of the same materials.** **Excludes inflatable and water mattresses.**
Green Mark (Taiwan)[c]	**Includes the cushioning core and the upholstery layers, but exclude the bed-frame and the mattress foundation.** **Excludes inflatable mattresses and water mattresses.**

Though not specifically outlined in any of the definitions of these schemes, the criteria themselves also provide an indication of a *de facto* classification based on the different core materials. Each scheme has specific criteria targeting each of the common core materials (e.g. latex, polyurethane foam, and springs). Though materials are not specifically outlined within the product group definition, the EU Ecolabel categorization is thus acknowledged within the criteria themselves.

The Nordic Swan scheme is not considered within this comparison since mattresses fall under its criteria for furniture, and no specific criteria for mattresses are provided there.

Production and trade classifications

Within the EU-27 the most comprehensive production and trade data is produced by Eurostat, the statistical office of the European Union.[d] The data provided is separated using the PRODCOM categories and Combined Nomenclature (CN) codes for production and trade respectively. Within the bed mattress product group, PRODCOM categories and CN codes match almost exactly.[e] Table 3 lists the relevant categories for this product group from both classifications, providing a summary description for each. An abbreviation has been assigned to each category and used throughout the report, particularly in the market survey.

a Austrian Ecolabel – Bed Mattresses, UZ55, Austrian Ecolabel, January 2011
b Basic Criteria for Award of the Environmental Label – Mattresses, RAL-UZ 119, Blue Angel, April 2010
c http://greenliving.epa.gov.tw/GreenLife/eng/E_Criteria.aspx, April 2010 revision, accessed 6/9/2012
d http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home
e Note – this is not true for all PRODCOM and CN codes.

PRODCOM and CN categorization fits quite well with the existing EU Ecolabel with respect to mattresses based on latex, PUR, springs or other materials (though the technical descriptions used are slightly different). A significant portion of products falling in the "mattress supports" category falls instead outside the scope of the EU Ecolabel for bed mattresses and should be more appropriately considered as furniture (for example wooden or metal frames or divans). However, certain Scandinavian mattresses which are wood-based fall within the support categorisation and form a part of the entire mattress support category. These mattress supports are included explicitly by point 2 of the EU Ecolabel categorisation, though they can be considered a kind of "hybrid product". Bed bases are indeed composed of a mattress, which perfectly fits within the scope of the EU Ecolabel for bed mattresses, plus a support which seems technically similar to the products belonging to the "wooden furniture" category. The same may be extended also to other products belonging to the group of "mattress supports", e.g. sofa-beds. This is an issue that could be opened for discussion and further investigated also with the beneficial contribution from the stakeholders.

Table 3: Mattresses - 2010 CN and corresponding PRODCOM codes

Database	Codes	Description	Abbre-viation
PRODCOM	**31031100**	Mattress supports (including wooden or metal frames fitted with springs or steel wire mesh, upholstered mattress bases, with wooden slats, divans)	**Supports**
CN	**94041000**	Mattress supports for bed frames (excl. spring interiors for seats)	
PRODCOM	**31031230**	Mattresses of cellular rubber (including with a metal frame; excluding water-mattresses, pneumatic mattresses)	**Latex**
CN	**94042110**	Mattresses of cellular rubber	
PRODCOM	**31031250**	Mattresses of cellular plastics (including with a metal frame; excluding water-mattresses, pneumatic mattresses)	**PUR**
CN	**94042190**	Mattresses of cellular plastics	
PRODCOM	**31031270**	Mattresses with spring interiors (excluding of cellular rubber or plastics)	**Spring**
CN	**94042910**	Mattresses with spring interiors	
PRODCOM	**31031290**	Other mattresses (excluding with spring interiors, of cellular rubber or plastics)	**Other**
CN	**94042990**	Mattresses, stuffed or internally filled with any material (excl. cellular rubber or plastics, with spring interior, and pneumatic or water mattresses and pillows)	

Source: Eurostat, PRODCOM/COMEXT

The 'Other mattresses' category includes mattresses with fillings not accounted for by the other categories. For example, this includes mattresses where the primary filling is cotton or coconut fibres. It is useful to note that these materials may be present in other mattress types as padding/wadding; however, they may not form the major component of the filling.

Based on the definitions provided above, it is understood that air-filled mattresses and water mattresses are not included within the overall mattress grouping. As they are already excluded from the EU Ecolabel, their classification has not been pursued further.

Organisational classifications

Several relevant industry organisations exist specifically related to mattresses. These may be EU based, such as the European Bedding Industries Association (EBIA), or based in a specific country, such as the UK's National Bed Federation (NBF).

Technical classification of mattress types across these industry organisations is relatively consistent with the ones described above. The EBIA represents eight EU national federations and three multinational organisations, the definitions used are therefore taken as a good industrial reference within the EU.

Within the EBIA classifications, five different mattress categories are identified: PUR, latex, sprung, waterbeds and air mattresses.[a] The first three of these categories represent the major mattress types as identified within the EU criteria, and further sub-categories for each technology are defined, shown in Table 4. The differences between each of these are described above in Section 2.1, with each technology defined in the sub-classifications bring slightly a different function or performance to the mattress, thus appealing to different markets.

Table 4: Classifications and sub-classifications used by the EBIA

Main technology	Distinguishing factor	Sub-classifications
PUR	**Foam type**	Polyether PU foam, highly resilient foam, visco-elastic (memory) foam
Latex	**Material source**	Natural, synthetic
Sprung	**Spring design**	Bonnel, LFK springs and pocket sprung systems

Source: European Bedding Industries Association

The NBF operates a similar but slightly different categorisation, based partly on technology and partly on performance. The key groupings used are shown in Table 5.[b]

Table 5: Mattress groupings used by the NBF

Grouping	Description
Sprung mattresses	**All mattresses containing springs**
Non-sprung mattresses	**PU Foam, Latex, hair, gel, feather, viscose (memory) foam, wool, water/flotation, air, fibre**
Special feature mattresses	**Lumbar zones, his and hers zoning, waterproof, 'no need to turn', non turn/one-sided, climate control**

Source: National Bed Federation

The first two of these groups are exclusive of each other, i.e. non-sprung includes latex, PUR and other filings groups, as defined by other classifications, and sprung accounts for all spring based mattresses. The special feature mattress group is based on function, and may contain mattresses from the other two categories. Therefore, whilst useful as a guide to the performance and utility of a mattress, it is less relevant as a grouping for this study.

Mattress supports, including wooden bed bases, fall outside the scope of the definitions for mattresses used by both of these organisations. This indicates some discrepancy between the EU Ecolabel and the industry definition of mattresses, as the definition extends slightly further for the EU Ecolabel. However, this is not viewed as a major issue as the different types of mattress are still well aligned.

Additional classifications

Other mattress groupings also exist, providing an indication of size and firmness.[c] For example, mattresses are often rated at various graduations from 'soft' up to 'firm' to provide an indication of their performance. However, no precise standard exists and the rating varies between manufacturers, making direct comparison difficult. Therefore this can be viewed as providing guidance to the purchaser rather than offering a useful classification system for the EU Ecolabel.

Various mattresses sizes exist corresponding to different bed sizes. Standard sizes exist both in dimensions and terminology.[d] However, the precise dimensions and designations vary from territory to

a http://www.europeanbedding.eu/technologies.html, accessed 08/12/2011
b http://www.bedfed.org.uk, accessed 09/01/2012
c http://www.bedfed.org.uk/, accessed 8/12/2011
d For examples a single mattress is about 0.9m by 1.9m across the EU. However a double mattress is 1.4m by 1.9m in most of the EU, but 1.2m by 1.9m in the UK

territory, and even from manufacturer to manufacturer.[a] Again this does not provide a suitable alternative classification for mattresses; however, it does demonstrate that criteria should be applicable equally to all mattress sizes.

Therefore, whilst these groupings are useful for purchasers and the industry, they are not of practical use for distinguishing between mattress types for the purposes of the EU Ecolabel.

2.3 *Preliminary Comments from Stakeholders on Definition and Categorisation*

As part of the stakeholder consultation, feedback on the product group definition and categorisation was requested, using the following description:[b]

Proposal number: 1	**Definition of bed mattress product group**
Problem: The existing definition of the bed mattress product group may not be completely appropriate nor inclusive of all mattress types available on the market. The definition above appears to be appropriate for sprung, non-sprung and certain 'special feature' mattresses. However other mattress types may exist and should be included. The GPP scope must also be appropriate for mattresses obtained through public procurement mechanisms, which may have different compositions, construction and uses compared to mattresses purchased for private use. In particular, mattresses for hospitals may make up a substantial proportion of publically procured mattresses. Therefore it is essential that consideration is given to whether such mattresses fall within the definition of 'medical equipment' and are therefore excluded or whether they can be included within the scope of the GPP criteria. It is important that the scope is unambiguous as well as representative of the market as a whole.	

Five stakeholders replied to this section. The general feedback is that the existing definition of the EU Ecolabel scope for bed mattresses is appropriate, particularly as it is based on the function provided rather than on a specific product or construction. One of the stakeholders proposed to include the "wooden bed bases" within the product group "wooden furniture". Nevertheless, even if bed bases can be considered a "hybrid product" because of their material composition, the function provided perfectly fits within the EU Ecolabel definition of bed mattresses. In case, the issue seems to understand if criteria specifically related to the wooden base are sufficiently aligned with the criteria for wooden furniture.

Stakeholders agreed that medical mattresses fall within the scope of GPP, as well as other mattress types. These mattresses often shows very different properties and compositions than standard, commercial and domestic mattresses because of the specific function they have to provide, for example the prevention of bed sores, resistance to fluids or hygiene specifications. These special mattresses are not "fit for purpose" with the existing EU Ecolabel crtieria.

[a] http://www.preciousbedding.com/common-mattress-dimensions-a-9.html, accessed 8/12/2011

b *The full stakeholder questionnaire can be found in Appendix IV: Stakeholder* questionnaire.

The points above are developed further in the provisional recommendations section.

Summary and discussion

The existing definition is felt to be appropriate for the EU Ecolabel, however the GPP criteria should allow also for the inclusion of medical mattresses.

Nevertheless, some specific points of discussion are opened to the stakeholders:

1. Is the definition provided for "**upholstered bed bases**" appropriate or some clarifications / further technical elements should be provided? In particular it could be necessary to state explicitly if the integrated frame can be designed for **free standing** or for being **placed on a bed frame**
2. Is the definition provided for "**wooden bed bases**" appropriate or some clarifications / further technical elements should be provided apart? In particular it could be necessary to state this product is also known as "**Scandinavian bed mattresses**", or refer to technical standards.
3. Are all the mattress components **to be included e**xplicitly within the definition? For instance, wording of **article 1 paragraph b** could be changed to "the materials filling **and covering** the bed mattresses, which may include: latex foam, polyurethane foam, springs and **textiles**.

Moreover, it would be interesting to explore with the stakeholders if further information / examples are available on the mattress types used in public procurement and on the technical differences existing with the conventional domestic mattresses.

3 Market Analysis

3.1 Introduction

3.1.1 Aims and methods

The EU-27 market for bed mattresses is analyzed in this section to understand what changes occurred since the last revision of the EU Ecolabel criteria. Moreover, it is investigated whether any such changes need to be reflected in the criteria to ensure they are relevant to the best environmentally performing products. Data and information have also been collated on market structure, public procurement, product innovation and environmental labelling.

The market analysis is based on a variety of available literature and statistical databases. The study is conducted for 2010 (the latest year for which data have been reported by at least half of the Member States) and the preceding two years. In analysing trends of production and trade (Section 3.6), data are collated for the preceding five years. These data principally consist of information from the PRODCOM[a] database, for production, and from the COMEXT[b] database, for trade data.

Nevertheless, it should be noted that:

1. Some gaps exist in these databases. For instance, some countries consider their data to be confidential while some other values are reported as relatively low, or as zero, which may indicate that reporting may not be fully consistent across all EU27 Member States.
2. Mattresses and mattress supports have been preliminarily considered within this work. Mattress supports include Scandinavian bed mattresses and bed bases, which are relevant for this revision, plus other products which are excluded from the scope of the EU Ecolabel for bed mattresses. Scandinavian bed mattresses will only form a portion of this overall figure but no more specific information could be found. Stakeholders are kindly invited to provide any useful information/contribution for the refinement of this analysis.

3.2 Market Structure

3.2.1 Small and medium sized enterprises

Whilst the larger mattress suppliers have a comprehensive product list, small and medium-sized enterprises in the mattress industry tend to focus on niche products and national consumer demands in the European market. There is a strong market for premium mattress products often produced by small companies. This is typified by the Italian mattress market, where in 2005 the average manufacturer employed only six people.[c] The vast majority of the mattresses produced at these firms are produced for the domestic Italian market, with some premium exports to other western European countries.

There are often quite significant local differences between consumer mattress preferences across Europe. Different cultures prefer different kinds of mattresses, bed frames and materials. This means that there is a large number of smaller nationally focused brands, all of which are strong within their individual markets.[d] The Italian market, for example, favours rubber-style mattress products and is dominated by local manufacturers. [c]

[a] PRODCOM, *Prodcom annual data, 2005-2010.* Available at http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/introduction

[b] COMEXT, *EU27 Trade Since 1988 By CN8,* Available at http://epp.eurostat.ec.europa.eu/newxtweb/

[c] Italian Trade Commission, 2011 available at: http://www.italtrade.com/focus/6728.htm

[d] Hilding Anders, *The bed market.* Available at: http://www.hildinganders.se/en/markets-brands/bed-market

Due to these varying consumer preferences across Europe, there is significant scope for competition amongst manufacturers and consumer brands. This not only explains the number of brands within the market, but also the large number of smaller producers. There are, for example, over 400 mattress manufacturers in Italy alone. [c] A similar situation can be seen in other EU countries. Table 6 outlines the estimated turnover and employment size band for mattresses manufacturers in the UK. Assuming the European Commission definition for an SME[a], of the 115 mattress manufacturers in the UK, an estimated 78% are defined as SMEs by turnover band and 90% by employment size band. This highlights the importance of SMEs within the mattress market in the UK.

Table 6: Estimated turnover and size employment band for mattress manufacturers in the UK (2008)

Turnover size band (thousands of GBP)	0-49	50-99	100-249	250-499	500-999	1 000-4 999	5 000+	Total
Number of mattress manufacturers	5	10	10	20	10	35	25	115

Employment size band (nr. of employees)	0-4	5-9	10-19	20-49	50-99	100-249	500+	Total
Number of mattress manufacturers	25	20	15	25	10	10	10	115

Source: Adapted from FIRA, Competitiveness of the UK furniture manufacturing industry, 2010. Original Source; ONS2008. UK Business: Activity, Size and Location – 2008. Figures collated using SIC (03) categories.

3.2.2 Drivers in the mattress industry

The mattress industry is influenced by a large number of factors that essentially impact on consumers' willingness to invest in these relatively high value products: GDP, consumer confidence, household savings and unemployment.[b] The currently weak economy across Europe is therefore likely to have had an impact on the mattress market. Consumers have become more cautious or unable to make large purchases: this may especially affect sales of mattresses, which may be used beyond their recommended ten year life span[c]. There is also a tendency to replace mattresses in the year of new home purchases; fewer people buying homes means less demand for mattresses. It may also be that moving into new rented accommodation has the same effect, i.e. encourages the replacement of some furniture items, including mattresses.

In recent years there has, however, been an increasing focus on interior design and associated home furnishings where beds - and therefore mattresses - play a part. An increase in demand for high-end mattresses, in particular niche products such as organic mattresses, can be identified as another industry driver. An ageing population may also prove to be a positive influence on the mattress market as the health benefits of mattresses may become more important. This could result in increasing demand especially in high end, high quality mattresses.

3.3 Production [d]

Table 7 presents figures on the production of mattresses across the EU-27 Member States in 2010. Figures are expressed both in terms of sold volume (i.e. product units) and in terms of production value. EU production of mattresses in 2010 totalled EUR 5 billion (EUR 3.8 billion excluding mattress supports),

[a] European Commission, *SME definition*, *2003* Available at: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm
[b] Hilding Anders, *Driving forces in the market,* Available at: http://www.hildinganders.se/en/markets-brands/bed-market/driving-forces-market
[c] Sealy, *FAQ.* Available at: http://www.sealy.com/Customer-Service/FAQs.aspx
[d] Throughout this report, production is measured in terms of values and volumes of sold production. Sold production refers to products manufactured by the enterprise and sold outside the enterprise during the reference period. This variable corresponds most closely to the part of the production that is put on the market.

or 67.6 million units (48 million units excluding mattress supports), although it is important to note that data are not reported for some countries due to confidentiality issues.[a]

Sold volume of mattresses in 2010 across the EU-27 comprises, in terms of sold volume:

- 29% mattress supports
- 26% spring mattresses (37% excluding mattress supports)
- 23% PUR mattresses (32% excluding mattress supports)
- 9% Latex mattresses (13% excluding mattress supports)
- 13% other mattresses (18% excluding mattress supports)

For comparison, the market analysis carried out for the previous revision of the EU Ecolabel criteria for mattresses estimated that:

- The total sold volume of mattresses in 2005 was 33.1 million units (excluding mattress supports). This consisted of 64% spring mattresses, 22% PUR, 7% latex and 7% other mattress types.
- The 2010 market would have been still dominated by spring mattresses (65% of total sold volume), followed by PUR mattresses (20%), latex mattresses and the other mattress types (7% share each).

Differences are apparent between the market composition provided in this report and in the previous revision. It should be noted that a 5 year gap exists between the two analyses and it may be that the changes have occurred due to preference changes over time (for example, the estimated volume of spring mattresses is significantly lower in this study, increasing the share of other mattress types within the market). Different data sources are also used, which may contribute to these differences.

In terms of value, the production of mattresses across EU-27 can be broken down as follows:

- 34% spring mattresses (45% excluding mattress supports)
- 25% mattress supports
- 24% PUR mattresses (31% excluding mattress supports)
- 10% Latex mattresses (13% excluding mattress supports)
- 8% other mattresses (11% excluding mattress supports)

Table 8 further analyses the figures above to show which countries have the largest production shares for each mattress type:

- For mattress supports, Germany has the highest percentage of sold volume (25%), followed by Italy (15%). In terms of production value, Germany also represented the greatest share (19%) followed by France (18%).
- For latex mattresses, Italy has the largest production share by sold volume (58%), followed by France (24%). Looking at the production value, Italy similarly led (39%), followed by France (33%).
- For PUR mattresses, Germany has the highest sold volume share (23%), followed by Poland (20%). Looking at the production value, however, Germany led (28%) followed by France (17%).
- For spring mattresses, the United Kingdom has the highest production share based on sold volume (24%), followed by Germany (18%). The UK also represented the largest share (24%) in terms of production value, followed by Germany (13%).
- For the other mattress types, Italy has the highest production share by sold volume (35%), followed by Poland (13%). However, in terms of the value of production Italy led (40%), followed by Spain (14%).

[a] Data for 2009-2005 can be found in Appendix II

Table 7: Production of bed mattresses in EU-27, Sold volume in thousand units / Value in EUR million (2010)

Country	SUPPORTS		LATEX		PUR		SPRINGS		OTHERS		TOTAL	
	Volume (1000 units)	Value (M€)	**Volume (1000 units)**	Value (M€)	**Volume (1000 units)**	Value (M€)	**Volume (1000 units)**	Value (M€)	**Volume (1000 units)**	Value (M€)	**Volume (1000 units)**	Value (M€)
Austria	**193**	19.03	**51**	9.30	**626**	74.07	**56**	5.23	**158**	10.97	**1 084**	119
Belgium	**476**	53.91	**:C**	-	**1 395**	89.36	**933**	75.96	**:C**	-	**2 804**	219
Bulgaria	**:C**	5.71	**:C**	-	**24**	1.99	**87**	4.43	**:C**	-	**111**	12
Cyprus	**-**	0	**-**	0	**-**	-	**-**	0	**-**	0	**-**	0
Czech Republic	**:C**	1.85	**225**	17.99	**41**	5.03	**13**	1.05	**:C**	22.34	**279**	48
Denmark	**8**	1.70	**18**	0.70	**792**	98.42	**158**	19.63	**8**	0.13	**984**	121
Estonia	**95**	1.86	**2**	0.44	**-**	-	**58**	4.17	**21**	0.57	**176**	7
Finland	**108**	13.59	**7**	0.58	**388**	18.14	**176**	17.92	**4**	0.04	**683**	50
France	**2 454**	221.47	**1 467**	160.53	**1 886**	203.83	**1 192**	197.64	**:E**	-	**6 999**	783
Germany	**4 979**	231.25	**68**	11.74	**3 513**	331.11	**3 220**	220.51	**250**	11.84	**12 030**	806
Greece	**:C**	-	**:C**	-	**-**	-	**228**	30.31	**25**	7.03	**253**	37
Hungary	**51**	3.02	**12**	1.17	**95**	3.95	**13**	2.13	**:C**	-	**171**	10
Ireland	**106**	7.23	**-**	0	**:C**	:C	**174**	34.46	**:C**	-	**280**	42
Italy	**2 884**	164.03	**3 526**	189.35	**341**	48.82	**1 954**	193.88	**3 045**	163.62	**11 750**	760
Latvia	**:C**	-	**:C**	-	**-**	-	**13**	1.84	**:C**	-	**13**	2
Lithuania	**17**	0.59	**-**	0	**92**	0.84	**98**	5.55	**332**	7.86	**539**	15
Luxembourg	**-**	0	**-**	0	**-**	-	**-**	0	**-**	0	**-**	0
Malta	**-**	0	**-**	0	**-**	-	**-**	0	**-**	0	**-**	0
Netherlands	**122**	30.58	**29**	4.74	**21**	3.67	**175**	131.31	**:E**	31.66	**347**	202
Poland	**:C**	0.01	**74**	11.15	**3 030**	171.00	**2 423**	50.47	**1 630**	18.15	**7 157**	251
Portugal	**1**	-	**64**	0	**18**	1.13	**699**	20.61	**187**	-	**969**	22
Romania	**:C**	-	**-**	-	**-**	-	**402**	-	**:C**	4.22	**402**	4
Slovakia	**:C**	-	**:C**	-	**:C**	:C	**:C**	-	**86**	-	**86**	-
Slovenia	**:C**	165.67	**:C**	22.04	**-**	-	**:C**	193.29	**:C**	57.05	**-**	438
Spain	**2 069**	92.59	**109**	-	**457**	47.85	**1 349**	37.55	**519**	13.76	**4 503**	486
Sweden	**886**	38.6	**:C**	7.95	**:C**	:C	**130**	56.63	**197**	-	**1 213**	103
United Kingdom	**2 272**	174.78	**:C**	7.41	**1 487**	45.19	**4 228**	408.21	**881**	22.64	**8 868**	658
Confidential Data	**2 876**	7.40	**381**	35.09	**1 192**	37.66	**88**	9.76	**1 407**	37.66	**5 944**	127.58
EU27 TOTAL	19 596	**1 235**	6 033	**480**	15 397	**1 182**	17 866	**1 723**	8 750	**410**	67 642	**5 029**

Source: Eurostat, PRODCOM; (:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Table 8: Production, % Sold volume across EU-27 for each mattress category (2010)

Country	SUPPORTS (% sold volume)	LATEX (% sold volume)	PUR (% sold volume)	SPRING (% sold volume)	OTHER (% sold volume)
Austria	1%	1%	4%	0%	2%
Belgium	2%	:C	9%	5%	:C
Bulgaria	:C	:C	0%	0%	:C
Cyprus	0%	0%	0%	0%	0%
Czech Republic	:C	4%	0%	0%	:C
Denmark	0%	0%	5%	1%	0%
Estonia	0%	0%	0%	0%	0%
Finland	1%	0%	3%	1%	0%
France	13%	24%	12%	7%	:E
Germany	25%	1%	23%	18%	3%
Greece	:C	:C	0%	1%	0%
Hungary	0%	0%	1%	0%	:C
Ireland	1%	0%	:C	1%	:C
Italy	15%	58%	2%	11%	35%
Latvia	:C	:C	0%	0%	:C
Lithuania	0%	0%	1%	1%	4%
Luxembourg	0%	0%	0%	0%	0%
Malta	0%	0%	0%	0%	0%
Netherlands	1%	0%	0%	1%	:E
Poland	:C	1%	20%	14%	19%
Portugal	0%	1%	0%	4%	2%
Romania	:C	0%	0%	2%	:C
Slovakia	:C	:C	:C	:C	1%
Slovenia	:C	:C	0%	:C	:C
Spain	11%	2%	3%	8%	6%
Sweden	5%	:C	:C	1%	2%
United Kingdom	12%	:C	10%	24%	10%

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated
Source: Eurostat, PRODCOM

Legend:	< 5%	5-10%	10-20%	20-50%	> 50%

There are widespread differences between the unit values (i.e. the ratio of production value to sold volume) of the mattresses produced across EU27 States. Table 9 reports these values for the different mattress types and the different EU-27 countries with reference 2010. Mattresses with spring interiors sold across all EU-27 Member States show the highest average values per unit (96.34 €), followed by PUR mattresses (80.56 €), latex mattresses (77.43 €), mattress supports (71.84 €) and other mattress types (47.60 €). Moreover, the analysis highlights that some States appear to be producing more expensive products than others. For example, the Netherlands' production of spring interior mattresses is only 1% above that of Ireland in terms of *units* of products; however, the Netherlands production *value* is 64% higher. The Netherlands show the highest unit value for all the products for which data are available (i.e. excluding 'other mattress types')

Table 9: Unit value across EU-27 for each mattress category (2010)

Country	SUPPORTS (€/unit)	LATEX (€/unit)	PUR (€/unit)	SPRING (€/unit)	OTHER (€/unit)
Austria	98.69	182.39	118.32	94.11	69.41
Belgium	113.37	:C	64.06	81.46	:C
Bulgaria	-	:C	82.98	50.95	:C
Cyprus	-	-	-	-	-
Czech Republic	:C	79.88	122.78	81.08	:C
Denmark	212.75	38.67	124.32	124.24	16.75
Estonia	19.61	220.00	-	71.95	27.24
Finland	126.26	83.14	46.76	101.81	10.75
France	90.26	109.42	108.10	165.80	:C
Germany	46.45	172.62	94.25	68.48	47.36
Greece	:C	:C	-	133.19	281.08
Hungary	59.16	97.42	41.62	163.46	:C
Ireland	68.30	-	:C	198.05	:C
Italy	56.88	53.70	143.17	99.21	53.73
Latvia	:C	:C		141.69	:C
Lithuania	34.64		9.16	56.61	23.66
Luxembourg	-	-	-	-	-
Malta	:C	-	-	-	-
Netherlands	315.21	274.00	174.57	322.95	:C
Poland	:C	63.99	56.43	54.19	19.42
Portugal	19.64	174.16	62.56	72.21	97.07
Romania	:C	-	-	51.28	:C
Slovakia	:C	:C	:C	:C	49.05
Slovenia	:C	:C	-	:C	:C
Spain	80.06	202.16	104.71	143.32	109.92
Sweden	104.51	:C	:C	288.88	69.85
United Kingdom	76.93	:C	30.39	96.55	25.70
EU Average	71.14	77.43	80.56	96.34	47.60

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated
Source: Eurostat, PRODCOM

3.3.1 Production of mattresses by country

Table 10 presents the value and the volume of total mattress production across EU-27 for 2010. The top five countries with the largest market share, accounting for 71% of the total sales value of production of manufactured goods, are:

- Germany (16%)
- France (16%)
- Italy (15%)
- United Kingdom (13%)
- Spain (10%)

In terms of sold volume of production the top five countries with the largest market share across the EU-27 for 2010 are:

- Germany (18%)
- Italy (17%)
- United Kingdom (13%)
- Poland (11%)
- France (10%)

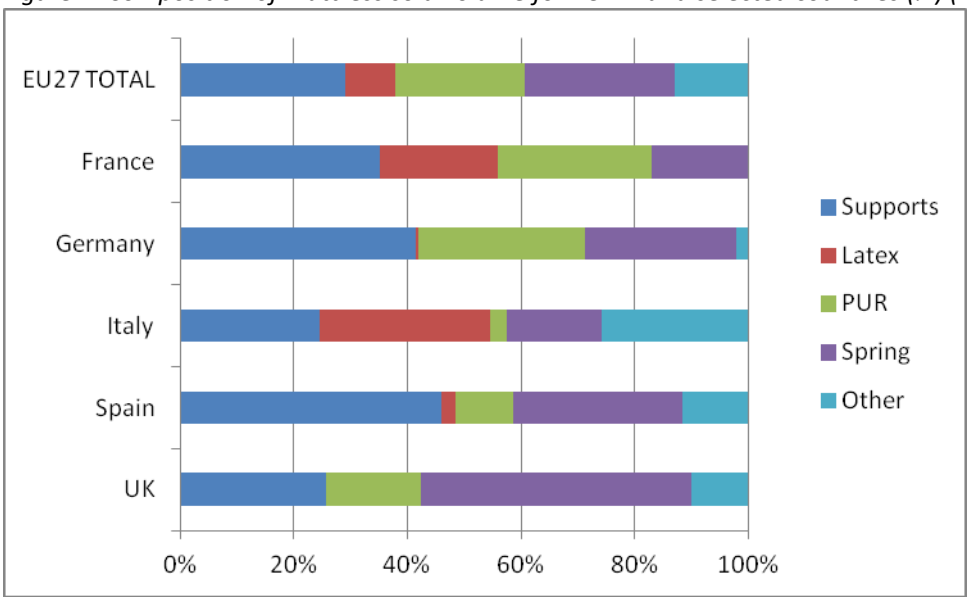
Table 10: Total production of mattresses across EU-27 (2010)

Country	Sold volume (thousand units)	% of total	Total value (EUR million)	% of total
Austria	1 084	1.6%	119	2.4%
Belgium	2 804	4.1%	219	4.4%
Bulgaria	111	0.2%	12	0.2%
Cyprus	-	-	0	-
Czech Republic	279	0.4%	48	1.0%
Denmark	984	1.5%	121	2.4%
Estonia	176	0.3%	7	0.1%
Finland	683	1.0%	50	1.0%
France	6 999	10.3%	783	15.6%
Germany	12 030	17.8%	806	16.0%
Greece	253	0.4%	37	0.7%
Hungary	171	0.3%	10	0.2%
Ireland	280	0.4%	42	0.8%
Italy	11 750	17.4%	760	15.1%
Latvia	13	0.0%	2	0.0%
Lithuania	539	0.8%	15	0.3%
Luxembourg	-	-	0	-
Malta	-	-	0	-
Netherlands	347	0.5%	202	4.0%
Poland	7 157	10.6%	251	5.0%
Portugal	969	1.4%	22	0.4%
Romania	402	0.6%	4	0.1%
Slovakia	86	0.1%	-	-
Slovenia	-	-	438	8.7%
Spain	4 503	6.7%	486	9.7%
Sweden	1 213	1.8%	103	2.0%
United Kingdom	8 868	13.1%	658	13.1%
Confidential data	5 944	8.8%	127.58	2.5%
EU27 TOTAL	67 642		5 029	

Source: Eurostat, PRODCOM

Figure 1 analyzes this information further to determine the composition of the mattress sold volume in 2010 for EU-27 and a selection of countries which show the highest values of production.

Figure 1: Composition of mattress sold volume for EU-27 and selected countries (%) (2010)



Source: Eurostat, PRODCOM

Looking at the composition of mattress production across the EU-27, mattress supports and spring interiors are the most represented products. The composition of mattress products produced by each country in 2010 is outlined below:

- Production in Spain consists predominantly of mattress supports (46%), that is followed by spring mattress (30%). The share of spring mattresses is 55% without taking into account for mattress supports. The production volume of latex mattresses is not shown for Spain.
- The United Kingdom also produces a high proportion of one mattress type; spring mattresses (48%). The share of spring mattresses is 64% without taking into account for mattress supports. The production volume of latex mattresses is not shown for UK.
- Italy shows a relatively consistent spread across proportion of mattress types produced, but latex represents the highest proportion of the overall production (30%). This corresponds with Italy being the market leader for production of this type of mattress across the EU-27. Italy also displays higher proportion of 'other mattress types' (26%) than other top producing countries. Previous figures increase to 40% and 36%, respectively, without taking into account for mattress supports. Production of PUR mattresses appears marginal in Italy.
- Production data for France also present a generally consistent spread across all mattress types, but mattress supports have the greatest production volume (35%), followed by PUR mattresses (27%). The share of PUR mattresses is 41% without taking into account for mattress supports. The production volume of other mattresses is not shown for France.
- Germany, like France, also shows mattress supports as the highest produced products (41%). Significant market share are also covered by PUR and spring mattresses (29% and 27%, respectively). On the contrary, production of latex mattresses appears marginal while the production volume of other mattresses is not shown for Germany. The share of PUR and spring mattresses is 49% and 46%, respectively, without taking into account for mattress supports.

3.4 Trade

3.4.1 Relative weight of trade compared to production[a]

In 2010, total value of all mattresses produced across the EU-27 was EUR 5 billion, while total imports of mattresses across the EU-27 amounted to EUR 1.4 billion and exports to EUR 1.7 billion. Table 11 summarises total sold production values and trade values across all mattress types in the EU-27. The percentage of total value that represents trade is also reported.[b]

Table 11: Total values of sold production and trade (2010)[c]

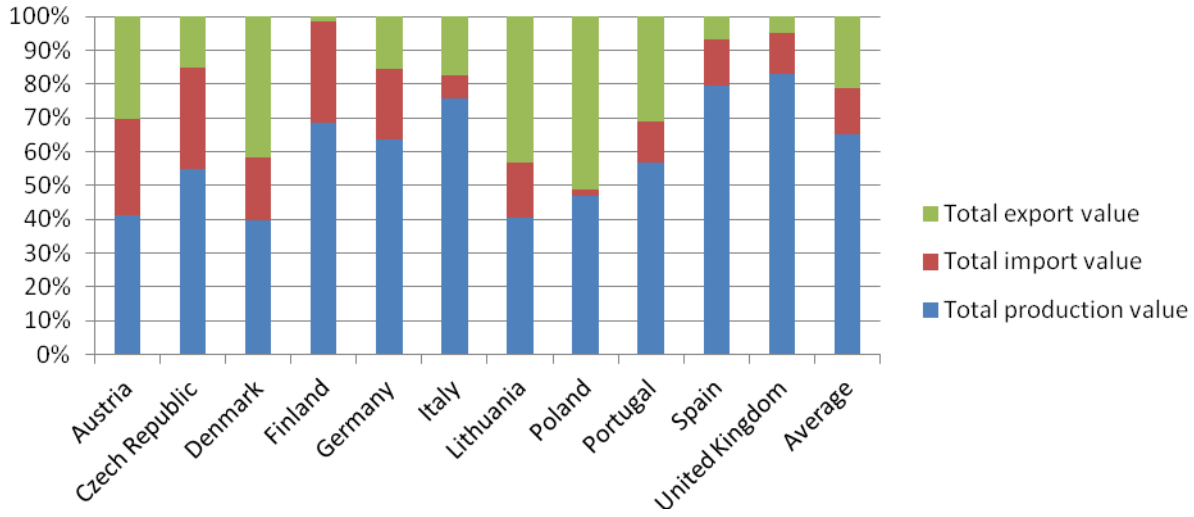
Country	Total production (EUR million)	Total import (EUR million)	Ratio import to prod.	Total export value (EUR million)	Ration export to prod.
Austria	119	82	0.69	87	0.73
Belgium	219	70	0.32	197	0.90
Bulgaria	12	4	0.31	4	0.31
Cyprus	0	4	-	1	-
Czech Republic	48	27	0.55	13	0.28
Denmark	121	56	0.46	127	1.05
Estonia	7	4	0.60	13	1.83
Finland	50	22	0.44	1	0.02
France	783	200	0.25	74	0.09
Germany	806	265	0.33	194	0.24
Greece	37	17	0.44	4	0.11
Hungary	10	10	1.00	10	0.97
Ireland	42	12	0.29	12	0.30
Italy	760	69	0.09	176	0.23
Latvia	2	3	1.70	2	0.84
Lithuania	15	6	0.41	16	1.06
Luxembourg	0	10	-	0	-
Malta	0	1	-	0	-
Netherlands	107	143	1.33	91	0.86
Poland	369	13	0.03	404	1.09
Portugal	81	18	0.22	44	0.55
Romania	21	8	0.41	2	0.08
Slovakia	4	14	3.29	8	1.99
Slovenia	0	31	-	32	-
Spain	**486**	83	**0.17**	41	**0.08**
Sweden	**144**	93	**0.64**	69	**0.48**
United Kingdom	**658**	96	**0.15**	38	**0.06**
EU27	**4 902**	1 359	**0.28**	1 659	**0.34**

Source: Production data from Eurostat, PRODCOM (2010); Trade data from COMEXT (2010)

a Note: Value data has been used for comparison of trade relative to production. Volume data has not been used as production volume is reported in units and trade volume in tonnes. This limits accurate comparisons of production and trade volumes.
b From this data it is also possible to estimate apparent consumption in terms of value, as production value + import value – export value. However, this is not addressed in this report because data quality would not allow for an accurate calculation of the apparent consumption for a significant portion of countries
c See Appendix VII for breakdown by mattress type

It is important to note that the PRODCOM trade value data are not complete for all countries. Since some confidential values are included, in some cases total production value may be different than stated. To account for this, Figure 2 shows the value that is apportioned to production and trade for a selection of EU-27 Member States. These States have been selected because they have complete data across production and trade for 2010 and as such give a more accurate representation of the relative weight of trade compared to production.

Figure 2: Percentage weight of trade values and sold production values for selected countries (2010)



Source: Production data from Eurostat, PRODCOM (2010); Trade data from COMEXT (2010)

3.4.2 Total EU27 Trade

Table 12 and Table 13 show the Eurostat statistics on imports and exports, presenting the sum of the EU-27 intra- and extra-Europe trade data for 2010.[a]

Across the EU27, the largest importer in terms of value is Germany with a value of about EUR 0.3 billion which accounts for 19% of the total EU-27 import. The largest exporter is Poland with a value of EUR 0.4 billion (24% of the total EU-27 export). In 2010, total imports to the EU-27 States were 267 tonnes, with a value of EUR 1.4 billion. Total exports were 57 tonnes, with a value of EUR 1.7 billion.

For mattress supports:

- The value of imports is EUR 271 million, i.e. 20% of the overall trade. This also corresponds to 22% of the production value of mattress supports in EU-27 in 2010. The largest importers in terms of volume in 2010 were the Netherlands (14%) and Germany (12%). In terms of value this was reversed, with Germany the largest importer (15%) followed by the Netherlands (14%).
- The value of exports is EUR 319 million, i.e.19% of the overall trade. This also corresponds to 26% of the production value of mattress supports in EU-27 in 2010. The largest exporter was Germany (29%) followed by Poland (17%). In terms of monetary value Germany also had the greatest export value (28%), followed by Belgium (13%).

For latex mattresses:

- The value of imports is EUR 112 million, i.e. 8% of the overall trade (10% with the exclusion of mattress supports). This also corresponds to 23% of the production value of mattress supports in EU-27 in 2010. The largest importer in terms of volume was Austria (21%) followed by France (18%). This was reversed in terms of value, with France being the largest importer (18%) followed by Austria (12%).
- The value of exports is EUR 181 million, i.e. 11% of the overall trade (14% with the exclusion of mattress supports). This also corresponds to 38% of the production value of mattress supports in EU-27 in 2010. The largest exporters in volume terms were Italy (52%) followed by Poland (15%). In monetary value, Italy (51%) and Poland (12%) were also the largest exporters.

For PUR mattresses:

- The value of imports is EUR 456 million, i.e. 34% of the overall trade (42% with the exclusion of mattress supports). This also corresponds to 39% of the production value of mattress supports in EU-27 in 2010. The largest importers in terms of both volume and value were Germany (38% and 32% respectively) and France (14% volume and value).
- The value of exports is EUR 619 million, i.e. 37% of the overall trade (46% with the exclusion of mattress supports). This also corresponds to 52% of the production value of mattress supports in EU-27 in 2010. The largest exporters in volume were Poland (53%) and Belgium (12%). Poland was also the largest exporter by value (37%), followed by Denmark (16%).

For mattresses with spring interiors:

- The value of imports is EUR 238 million, 18% of the overall trade (i.e. 22% with the exclusion of mattress supports). This also corresponds to 14% of the production value of mattress supports in EU-27 in 2010. The largest importers in terms of volume and value were Sweden (18% and 15% respectively), followed by the UK (17% and 14% respectively).
- The value of exports is EUR 242 million, 15% of the overall trade (i.e. 19% with the exclusion of mattress supports). This also corresponds to 14% of the production value of mattress supports in EU-27 in 2010. The largest exporters by volume were Portugal (26%) followed by Poland (19%). In monetary value, however, the largest exporters were Belgium (21%) followed by Poland (16%).

a Data for 2005-2009 can be found in Appendix III

Table 12: EU-27 total trade in mattresses, value of imports and exports expressed in terms of EUR millions (2010)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL	
	Import value (M€)	Export value (M€)	Import value (M€)	Export value (M€)	Import value (M€)	Export value (M€)	Import value (M€)	Export value (M€)	Import value (M€)	Export value (M€)	Import value (M€)	Export Value (M€)
Austria	24.49	13.48	26.65	8.35	8.87	25.26	5.77	31.98	3.25	20.92	81.84	87.17
Belgium	28.27	3.55	18.39	13.33	6.60	41.31	13.48	80.51	49.91	11.55	70.15	196.77
Bulgaria	0.24	1.61	0.92	0.36	0.58	0.12	1.53	0.16	1.66	0.26	3.72	3.74
Cyprus	0.40	0.22	0.86	1.08	1.62	0.01	-	0.07	0.51	-	4.18	0.59
Czech Republic	4.40	4.32	8.82	5.94	3.05	2.71	0.26	4.71	4.21	1.39	26.53	13.28
Denmark	9.94	9.95	8.20	11.78	15.72	12.51	3.64	100.10	6.14	4.39	55.60	126.79
Estonia	0.12	0.10	1.82	1.10	1.08	1.05	0.78	2.83	7.38	0.84	4.22	12.88
Finland	3.63	1.09	5.21	8.90	3.14	0.02	0.01	0.37	0.55	0.16	21.98	1.12
France	34.18	20.36	63.33	19.29	62.59	15.97	20.25	5.87	10.14	21.81	199.74	74.05
Germany	39.35	10.74	147.97	21.63	44.84	88.61	6.49	45.02	24.97	29.35	264.53	194.44
Greece	2.62	2.15	3.89	4.00	3.86	0.06	2.66	0.12	0.66	0.54	16.51	4.04
Hungary	1.16	2.33	2.88	2.97	0.88	7.29	0.01	0.42	2.17	0.06	10.22	9.95
Ireland	1.41	0.18	1.61	3.84	4.90	11.40	0.01	0.27	0.01	0.81	11.95	12.50
Italy	9.85	10.42	21.19	6.53	20.99	17.40	92.69	7.01	8.20	50.36	68.98	175.67
Latvia	0.19	0.15	1.43	0.94	0.42	0.32	0.14	0.20	0.45	0.44	3.13	1.56
Lithuania	0.26	0.12	3.71	0.88	1.05	2.91	0.04	0.77	2.34	9.73	6.03	15.79
Luxembourg	2.70	2.01	1.34	1.65	2.76	0.01	0.00	0.02	0.00	0.01	10.47	0.05
Malta	0.15	0.15	0.24	0.25	0.35	0.00	-	0.00	0.00	-	1.14	0.00
Netherlands	37.45	7.39	51.35	29.61	16.73	8.90	0.65	53.88	9.08	18.98	142.52	91.50
Poland	4.34	2.22	2.58	0.74	2.74	26.31	21.50	230.95	38.61	86.17	12.61	403.54
Portugal	1.47	2.15	3.69	7.08	3.40	1.46	4.47	0.32	30.05	7.97	17.79	44.27
Romania	0.65	0.72	3.84	1.33	1.95	0.02	0.00	0.02	1.18	0.38	8.49	1.61
Slovakia	1.79	2.93	3.87	1.88	3.41	2.63	0.01	0.25	0.59	4.93	13.88	8.40
Slovenia	10.02	1.12	15.76	2.81	1.04	9.92	0.86	16.75	1.96	2.68	30.75	32.16
Spain	24.52	8.39	15.03	11.83	23.54	6.70	4.11	9.97	11.55	8.21	83.30	40.54
Sweden	13.04	2.49	20.16	35.43	21.67	29.27	0.93	17.89	13.21	7.59	92.79	68.89
United Kingdom	14.36	1.81	21.11	34.39	24.05	6.49	1.18	8.54	13.58	8.21	95.73	38.01
EU27	271.00	112.15	455.85	237.93	281.84	318.69	181.47	619.02	242.37	297.75	1 358.76	1 659.29

Source: E*urostat, COMEXT, (2010)*

Table 13: EU-27 total trade in mattresses, volume of imports and exports in terms of tonnes (2010)

Country	SUPPORTS		RUBBER		PUR		SPRING		OTHER		TOTAL	
	Import Vol. (tonnes)	Export Vol. (tonnes)	Import Vol. (tonnes)	Export Vol. (tonnes)	Import Vol. (tonnes)	Export Vol. (tonnes)	Import Vol. (tonnes)	Export Vol. (tonnes)	Import Vol. (tonnes)	Export Vol. (tonnes)	Import Vol. (tonnes)	Export Vol. (tonnes)
Austria	7 606	4 515	4 855	815	3 696	2 865	1 483	504	1 173	1 843	18 813	10 542
Belgium	7 817	8 572	484	1 529	2 620	12 885	2 359	8 057	1 466	2 095	14 746	33 137
Bulgaria	75	41	238	407	132	26	106	774	164	41	715	1 289
Cyprus	84	4	36	-	136	10	369	128	496	-	1 120	-
Czech Republic	2 164	1 336	842	32	1 718	839	1 778	1 657	520	123	7 021	3 988
Denmark	3 197	3 911	1 671	669	981	7 793	2 999	964	2 325	1 055	11 173	14 391
Estonia	38	520	15	153	388	458	417	1 866	165	188	1 023	3 184
Finland	1 077	5	146	-	809	25	2 185	115	435	8	4 651	152
France	9 836	3 423	3 995	4 619	11 571	554	4 748	916	8 555	2 770	38 704	12 282
Germany	10 237	26 405	1 969	890	30 475	7 572	5 795	6 195	4 798	3 346	53 274	44 407
Greece	932	20	272	176	611	13	1 061	155	783	89	3 660	452
Hungary	480	2 204	517	3	518	72	954	395	148	8	2 617	2 682
Ireland	535	1 110	22	1	291	14	1 263	2	1 387	24	3 498	1 150
Italy	4 572	3 880	2 029	17 895	3 750	1 341	1 697	1 652	2 690	9 276	14 738	34 045
Latvia	60	347	21	21	192	32	291	100	95	97	660	596
Lithuania	89	2 035	17	8	459	244	227	621	230	2 141	1 021	5 048
Luxembourg	298	3	141	0	117	3	173	1	167	1	896	8
Malta	40	4	20	-	23	3	89	0	93	-	264	-
Netherlands	12 105	1 681	1 264	70	7 612	9 182	6 720	1 079	4 221	2 279	31 922	14 291
Poland	2 091	15 421	469	5 092	353	58 248	108	10 806	519	20 702	3 540	110 269
Portugal	709	478	330	902	554	34	1 446	15 047	469	1 342	3 508	17 802
Romania	315	7	123	1	591	1	493	261	498	126	2 019	396
Slovakia	627	590	318	-	758	24	539	130	546	629	2 788	1 374
Slovenia	4 031	3 817	213	126	2 885	2 143	843	573	200	585	8 172	7 245
Spain	7 797	2 505	1 695	569	3 454	2 453	3 962	2 188	6 591	3 030	23 499	10 745
Sweden	5 031	6 621	414	118	2 804	2 379	11 244	1 127	3 702	510	23 195	10 755
United Kingdom	6 151	877	510	112	3 581	668	10 614	2 522	5 833	1 027	26 689	5 208
EU27	87 993	90 332	22 627	34 207	81 079	109 879	63 959	57 833	48 268	53 335	303 925	345 586

Source: Eurostat, COMEXT, (2010

For 'other' mattress types:

- The value of imports is EUR 282 million, i.e. 21% of the overall trade (26% with the exclusion of mattress supports). This also corresponds to 69% of the production value of mattress supports in EU-27 in 2010. The largest importers in terms of volume were France (18%) followed by Spain (14%). In terms of monetary value, France had the greatest value (22%), followed by Germany (16%).
- The value of exports is EUR 298 million, i.e. 18% of the overall trade (22% with the exclusion of mattress supports). This also corresponds to 73% of the production value of mattress supports in EU-27 in 2010. The largest exporters in terms of volume were Poland (39%) followed by Italy (17%). Poland and Italy also led in terms of value (29% and 17% respectively).

Table 14 further analyses the overall trade volumes. Net exports are calculated as total export volume less total import volume. Volumes include both intra and extra trade. Negative figures are found where the calculation provided higher values for total imports than for than total exports.

Table 14: Net export volumes of mattress across the EU-27 in terms of tonnes (2010)

Country	Total import volume (tonnes)	Total export volume (tonnes)	Net export volume (tonnes)
Austria	18 813	10 542	-8 271
Belgium	14 746	33 137	18 391
Bulgaria	715	1 289	574
Cyprus	1 120	142	-978
Czech Republic	7 021	3 988	-3 034
Denmark	11,173	14 391	3 218
Estonia	1 023	3 184	2 161
Finland	4 651	152	-4 499
France	38 704	12 282	-26 422
Germany	53 274	44 407	-8 867
Greece	3 660	452	-3 207
Hungary	2 617	2 682	66
Ireland	3 498	1,150	-2 348
Italy	14 738	34 045	19 307
Latvia	660	596	-64
Lithuania	1 021	5 048	4 027
Luxembourg	896	8	-888
Malta	264	7	-257
Netherlands	31 922	14 291	-17 631
Poland	3 540	110 269	106 729
Portugal	3 508	17 802	14 294
Romania	2 019	396	-1 623
Slovakia	2 788	1 374	-1 414
Slovenia	8 172	7 245	-927
Spain	23 499	10 745	-12 754
Sweden	23 195	10 755	-12 440
United Kingdom	26 689	5 208	-21 481
EU27 total	303 925	345 586	41 661

Source: calculated from COMEXT (2010)

3.4.3 Intra-EU trade

Table 16 presents the composition of intra-EU trade volumes by mattress type. In terms of weight, 45% of total intra-EU trade is imports and 55% exports. In contrast to production, PUR mattresses represent the greatest traded mattress type, with 32% of total intra-EU imports and 34% of total intra-EU exports.

Table 15: Intra-EU trade volume by mattress type in terms of tonnes (2010)

Mattress type	Volume of imports (tonnes)	% share of imports	Volume of exports (tonnes)	% share of imports
SUPPORTS	127 178	27%	146 430	25%
LATEX	40 094	9%	59 335	10%
PUR	148 319	32%	196 895	34%
SPRING	96 871	21%	96 756	17%
OTHER	54 549	12%	81 753	14%
TOTAL	**467 011**		**581 169**	

Table 16 presents Intra-EU trade volumes across the EU-27 by mattress types.

Intra-EU imports
In 2010 intra-EU imports represented nearly 79% of all mattress imports by weight. The largest importers were:

- Germany, representing 19% of total intra-EU mattress imports. Its main trading partners were Poland (61%) and Italy (24%).
- France, accounting for 14% of total intra-EU mattress imports. Its main trading partners were Belgium (30%) and Poland (27%).
- The Netherlands, accounting for 10% of total intra-EU mattress imports. Its main trading partners were Belgium (41%) and Poland (23%).

Intra-EU exports
In 2010 intra-EU exports represented nearly 85% of all mattress exports by weight. The largest exporters were:

- Poland, representing 35% of total intra-EU mattress exports. Its main trading partners were Germany (34%) and Sweden (12%).
- Germany, accounting for 13% of total intra-EU exports. Its main trading partners were the Netherlands (33%) and Austria (22%).
- Belgium, accounting for 11% of total intra-EU exports. Its main trading partners were the Netherlands (50%) and France (42%).

Table 16: Intra-EU trade in mattresses, volumes of imports and exports in terms of tonnes (2010)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL	
	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)
Austria	5 226	3 867	4 846	655	3603	1 863	1 171	353	956	1 573	15 802	8 311
Belgium	7 475	8 509	366	1 503	2157	12 365	2 046	7 991	721	1 968	12 764	32 336
Bulgaria	66	40	238	394	114	23	20	752	119	34	557	1 243
Cyprus	75	0	32	0	120	10	309	119	334	0	870	129
Czech Republic	2 160	1 306	837	31	1677	836	1 748	1 656	438	117	6 860	3 946
Denmark	3 102	1 286	1 394	388	929	5 524	2 533	171	1 011	340	8 968	7 708
Estonia	38	520	11	153	387	438	139	1 344	129	150	703	2 604
Finland	1 021	2	146	0	798	6	2 180	28	351	2	4 495	37
France	7 494	1 970	3 977	3 816	11167	335	4 513	801	6 235	2 151	33 385	9 073
Germany	6 699	22 372	1 678	552	28948	6 348	3 745	4 905	3 425	2 448	44 495	36 624
Greece	896	15	259	172	571	13	801	144	123	36	2 649	380
Hungary	479	2 158	509	0	498	56	728	390	139	3	2 354	2 607
Ireland	372	1 110	22	1	255	12	1 102	2	520	12	2 270	1 136
Italy	1 986	3 251	1 972	15 395	3 375	891	1 442	1 010	915	5 682	9 690	26 229
Latvia	58	346	5	21	181	32	170	93	59	88	475	579
Lithuania	89	1 498	17	3	447	241	179	235	208	1 816	939	3 792
Luxembourg	298	3	141	0	117	3	173	1	167	1	895	7
Malta	36	0	19	0	22	0	11	0	20	0	108	-
Netherlands	8 641	1 597	880	14	7 304	9 115	6 199	874	1 760	2 137	24 783	13 736
Poland	1 693	14 551	76	5 049	303	55 796	96	8 611	293	17 225	2 461	101 232
Portugal	651	459	330	891	553	1	1 397	14 535	448	989	3 379	16 876
Romania	275	7	119	1	585	1	420	217	298	65	1 696	291
Slovakia	625	23	306	0	752	13	454	130	515	616	2 653	781
Slovenia	276	3 541	208	51	2 859	1 223	236	186	120	491	3 698	5 491
Spain	7 530	1 867	1 284	454	3 105	1 808	3 910	2 086	4 384	2 258	20 213	8 473
Sweden	4 639	2 549	254	94	2 143	1 271	10 087	585	3 208	278	20 331	4777
UK	3 380	738	250	68	2 379	451	5 261	2 321	759	799	12 028	4 376
EU27	**65 279**	**73 584**	**20 172**	**29 701**	**75 349**	**98 673**	**51 066**	**49 538**	**27 654**	**41 276**	**239 520**	**292 773**

Source: Eurostat, COMEXT, (2010)

3.4.4 Extra-EU trade

In terms of weight, 55% of total extra-EU trade is imports and 45% exports. Within this total, mattress supports and 'other mattress types' were the largest traded volumes, respectively accounting for 35% and 32% of total extra-EU imports and for 32% and 23% of total extra-EU exports. This is shown in Table 18, which breaks down extra-EU trade by mattress type. Table 18 presents extra-EU trade volumes by mattress types across the EU-27. By comparing intra- and extra-EU trade data it is possible to observe that mattresses are mainly traded within the EU-27 borders. In terms of overall amounts, extra-EU imports account indeed for 14% of the intra-EU imports, while extra-EU exports account for 9% of the intra-EU exports.

Extra-EU imports

In terms of weight, the largest extra-EU importers of goods in 2010 were:

- The United Kingdom with 23%. Its main trading partners were China (57%) and Turkey (37%).
- Germany with 14%. Its main trading partners were Turkey (27%) and Switzerland (26%).
- The Netherlands with 11%. Its main trading partners were China (42%) and Turkey (32%).

Extra-EU exports

In terms of weight, the largest extra-EU exporters of goods in 2010 were:

- Poland with 17%. Its main trading partners were Norway (29%) and Switzerland (17%).
- Italy with 15%. Its main trading partners were Switzerland (17%) and Japan (15%).
- Germany, also with 15%. Its main trading partner was Switzerland (64%).

Table 17: Extra-EU trade volume by mattress type in terms of tonnes (2010)

Mattress type	Volume of imports (tonnes)	% share of imports	Volume of exports (tonnes)	% share of imports
SUPPORTS	**22 713**	35%	**16 748**	32%
LATEX	**2 455**	4%	**4 505**	9%
PUR	**5 730**	9%	**11 206**	21%
SPRING	**12 893**	20%	**8 295**	16%
OTHER	**20 614**	32%	**12 059**	23%
TOTAL	**64 405**		**52 813**	

Source: Eurostat, COMEXT, (2010)

Table 18: Extra-EU trade in mattresses, volume of imports and exports in tonnes (2010)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL	
	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)	Import volume (tonnes)	Export volume (tonnes)
Austria	2 380	648	9	160	93	1 003	312	151	216	270	3 011	2 231
Belgium	342	63	118	26	463	520	313	66	745	127	1 982	801
Bulgaria	9	1	0	13	18	3	87	21	45	7	159	45
Cyprus	9	4	4	0	16	0	60	9	162	0	251	13
Czech Republic	4	30	5	2	41	4	31	1	82	6	162	42
Denmark	96	2 625	278	281	52	2 269	466	793	1 314	715	2 205	6 683
Estonia	0	0	4	0	1	19	278	522	37	38	320	580
Finland	56	3	0	0	11	19	5	87	84	6	156	115
France	2 342	1 453	18	803	404	219	235	116	2 320	619	5 319	3 209
Germany	3 538	4 033	291	339	1 527	1 223	2 050	1 290	1 374	898	8 780	7 783
Greece	36	5	14	4	40	0	261	11	660	52	1 010	73
Hungary	0	46	8	3	20	16	226	4	9	6	263	76
Ireland	163	0	1	0	36	3	161	0	867	12	1 228	15
Italy	2 586	630	57	2 500	375	450	255	642	1 775	3 595	5 049	7 816
Latvia	2	1	16	0	11	1	121	6	36	9	185	16
Lithuania	0	537	0	5	12	3	48	386	22	325	82	1 256
Luxembourg	0	0	0	0	0	0	0	0	1	0	1	0
Malta	4	4	1	0	0	3	78	0	73	0	157	7
Netherlands	3 464	84	385	56	309	67	521	205	2 461	142	7 139	555
Poland	399	871	393	42	50	2 452	12	2 195	225	3 477	1 079	9 037
Portugal	58	19	0	11	1	33	49	512	21	353	129	927
Romania	40	0	4	0	7	0	73	44	200	61	323	105
Slovakia	2	568	12	0	6	11	85	0	31	14	135	593
Slovenia	3 755	276	5	75	27	920	607	388	81	95	4 474	1 754
Spain	267	638	411	115	349	645	53	103	2 207	772	3 287	2 272
Sweden	392	4 072	161	25	661	1 108	1 156	542	493	232	2 863	5 978
UK	2 770	140	260	45	1 202	218	5 353	202	5 075	228	14 660	832
EU27	**22 713**	**16 748**	**2 455**	**4 505**	**5 730**	**11 206**	**12 893**	**8 295**	**20 614**	**12 059**	**64 405**	**52 813**

Source: COMEXT trade data (2010)

3.5 *Market Trends*

3.5.1 Production

Trends in mattress production volume

The recent trend that can be observed in EU mattress production volumes is that of a stagnating industry, declining by an average compound annual growth rate (CAGR) of 6% per year between 2005 and 2010, as shown in Table 19. Figure 3 outlines the trends in production graphically.

In general, volumes have remained steady across all mattress types and the declining average CAGR could be partly attributed to the changes seen in mattresses of PUR. This mattress category has shown a large decrease in volume (-52%) between 2005 and 2006, but has remaining relatively steady since. Total production units show a sharp decrease between 2005 and 2006 (again, predominantly due to the drop in production volume of mattresses of PUR) and show a more steady decrease continuing into 2010.

Total production volume across all mattress types in the EU-27 decreased by 27% between 2005 and 2010. The only increase in volume of production is seen within the category 'other mattresses' (31%). Mattress supports (-8%), spring mattresses (-23%) and latex mattresses (-24%) have all shown a decrease, with mattresses of PUR representing the largest decrease in volume of production (-54%).

These changes represent the CAGR between 2005 and 2010 of:

- + 5.6% per year for other mattresses
- - 1.7% per year for mattress supports
- - 5.0% per year for spring mattresses
- - 5.3% per year for latex mattresses
- - 14.5% per year for 'PUR mattresses
- - 6.1% per year on overall (-7.6% excluding mattress supports)

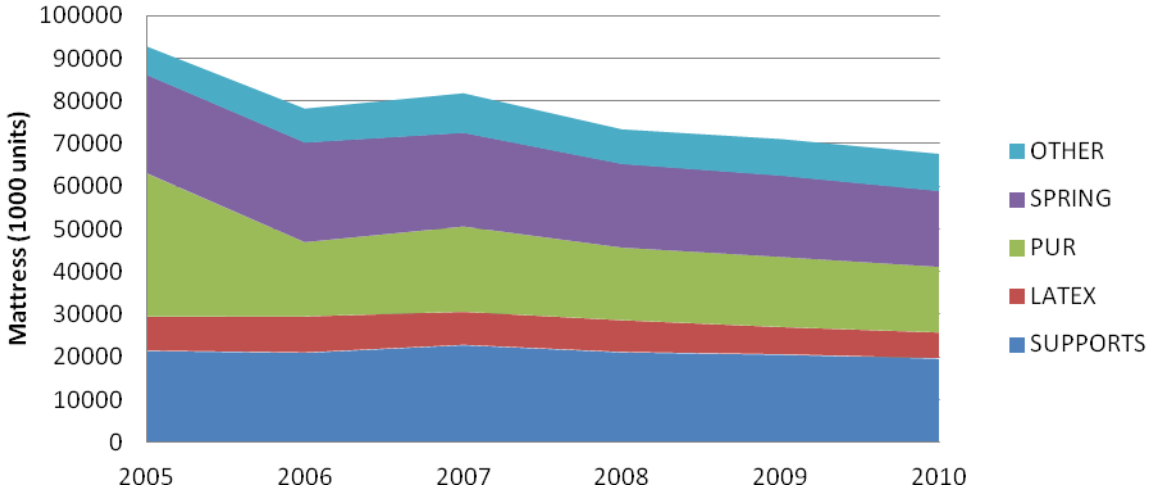
The three year CAGR identifies growth trends of mattress production between 2008 and 2010. In general terms, production across all mattress types has shown an overall decrease of -4.0% per year. As before, positive CAGR can be seen with 'other mattress types' (3.7%). All other mattress categories show a negative growth rate.

Table 19: *Trends in mattress production, sold volumes in terms of units (2005-2010)*

Mattress type	2005 (1000 units)	2006 (1000 units)	2007 (1000 units)	2008 (1000 units)	2009 (1000 units)	2010 (1000 units)	% change 2005-2010	5 year CAGR (%)	3 year CAGR (%)
SUPPORTS	21 392	20 951	22 745	21 063	20 530	19 596	-8%	-1.7%	-3.5%
LATEX	7 941	8 461	7 759	7 460	6 388	6 033	-24%	-5.3%	-10.1%
PUR	33 687	17 431	20 000	17 038	16 454	15 397	-54%	-14.5%	-4.9%
SPRING	23 077	23 400	22 000	19 673	19 145	17 866	-23%	-5.0%	-4.7%
OTHER	6 676	7 955	9 293	8 130	8 593	8 750	31%	5.6%	3.7%
TOTAL	**92 774**	**78 198**	**81 797**	**73 364**	**71 110**	**67 642**	**-27%**	**-6.1%**	**-4.0%**

Source: own calculations based on Eurostat PRODCOM database, 2010

Figure 3: *Trends in mattress production, sold volumes across EU27 by mattress type (2005-2010)*



Source: Eurostat PRODCOM database, 2010

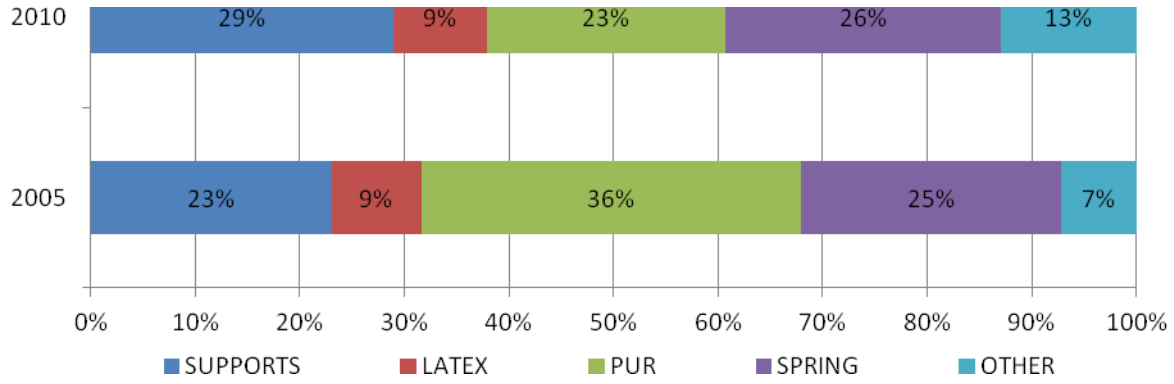
Composition of mattress production 2005-2010

Figure 4 further illustrates how the composition of mattress production changed from 2005 to 2010. PUR mattresses registered the largest decrease in terms of sold volume across the EU27, from 36% to 23%. While the proportion of latex mattresses maintains stationary at 9%, a market share increase is instead observed for mattress supports (6% points), spring mattresses (1% points) and other mattress types (6% points). Nevertheless, sold volume increased only for this last category (+31% from 2005 to 2010).

Trends in mattress production value

A comparable analysis of the sold production trends can be conducted in terms of production value. Table 20 shows the changes in values of each mattress type from 2005 to 2010. Total EU production of mattresses grew by an average 0.5% CAGR between 2005 and 2010 (1.2% excluding mattress supports). Production values apparently increase for 'other mattress types' (64%) and PUR mattresses (42%). Decreasing values are instead registered for mattress supports, latex mattresses and mattresses with spring interiors.

Figure 4: *Changes in the composition of the sold volume of mattresses (2005-2010)*



Source: Eurostat PRODCOM database, 2010

These changes translate to the following average CAGRs across the mattress types:

- The category 'other mattresses' shows the highest CAGR with a 10.3% increase year-on-year
- PUR mattresses grew with a CAGR of 7.3%
- All other mattress categories show negative growth rates between -2.5% and -1.5% year-on-year

The three year CAGR identifies growth trends of mattress production between 2008 and 2010. The value across all mattress types produced in the EU-27 has shown an overall decrease of -3.2% year-on-year (-2.4% excluding mattress supports). Positive CAGR can be seen with PUR (0.9%) and other mattress types (0.3%). Mattress supports show the greatest decrease in value between 2008 and 2010 with a -5.4% CAGR.

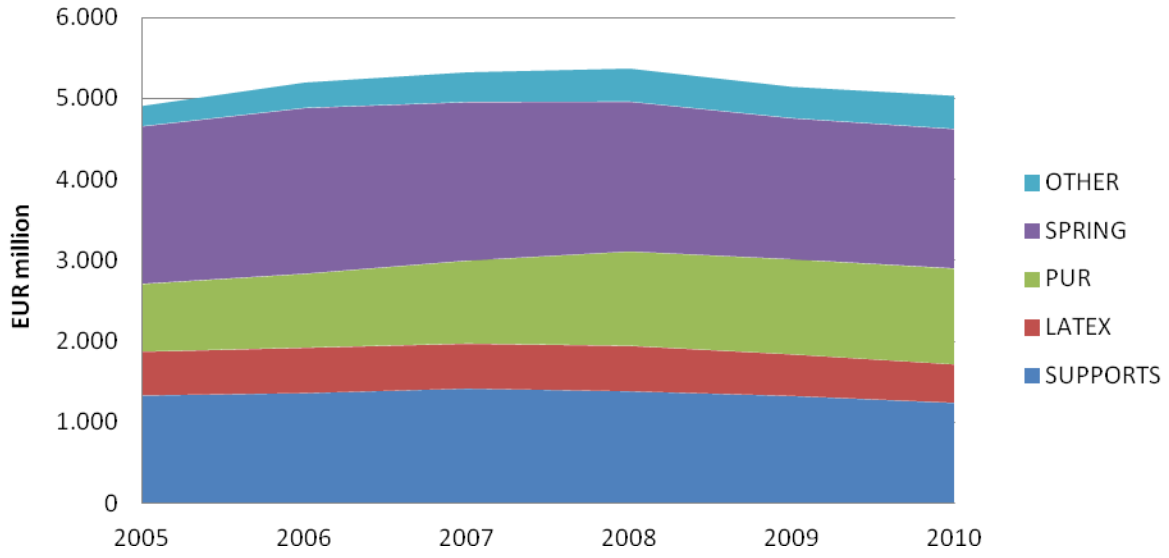
Table 20: *Trends in mattress production values (2005-2010)*

Mattress type	2005 (€million)	2006 (€million)	2007 (€million)	2008 (€million)	2009 (€million)	2010 (€million)	% change 2005-2010	5 year CAGR (%)	3 year CAGR (%)
SUPPORTS	1 327	1 357	1 413	1 380	1 321	1 235	-7%	-1.4%	-5.4%
LATEX	546	566	560	567	519	480	-12%	-2.5%	-8.0%
PUR	832	908	1 020	1 160	1 170	1 182	42%	7.3%	0.9%
SPRING	1 948	2 050	1 960	1 852	1 744	1 723	-12%	-2.4%	-3.6%
OTHER	250	313	367	407	387	410	64%	10.3%	0.3%
TOTAL	**4 904**	**5 194**	**5 321**	**5 366**	**5 141**	**5 029**	**3%**	**0.5%**	**-3.2%**

Source: own calculations based on Eurostat PRODCOM database, 2010

Figure *5* outlines the trends in value of various mattress types produced in the EU-27 between 2005 and 2010. In general terms, production values remain relatively steady, with spring interior mattresses and 'other mattresses category' being characterized by the highest and the lowest turnover, respectively. The total production value in the EU-27 has increased by 3% from 2005 to 2010 (6% excluding mattress supports). However, it has decreased by 6% from 2008 to 2010 (-5% excluding mattress supports). This is predominantly due to a significant decrease in the total value of PUR mattresses, mattress supports and spring mattresses, which decreased in value by 15%, 10% and 7%, respectively, from 2008 to 2010.

Figure 5: Trends in mattress production, value across EU27 by mattress type (2005-2010)



Source: Eurostat PRODCOM database, 2010

Production forecasts

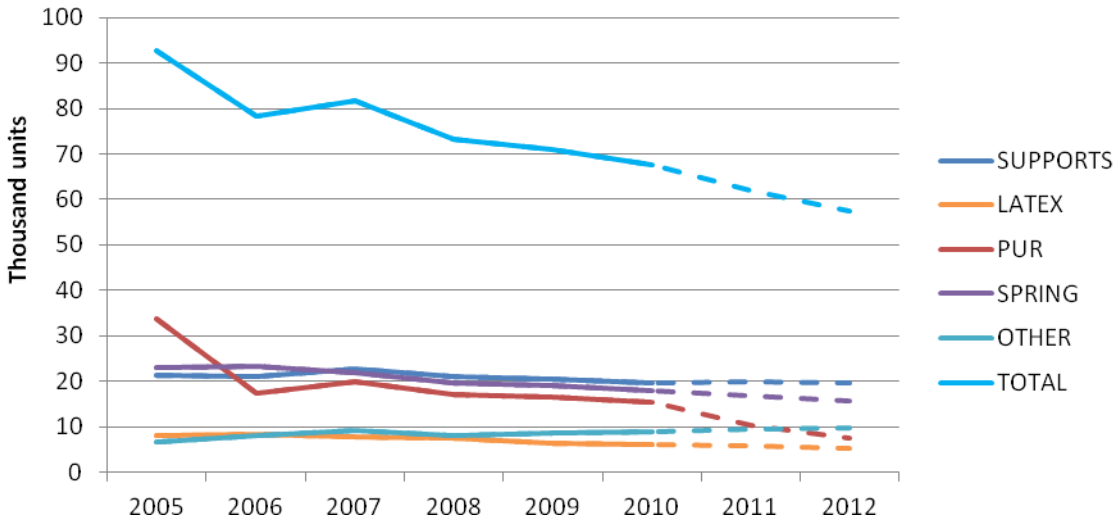
Overall, assuming a continuation of current trends in the sold volumes of mattresses, it is likely to expect a further decrease by 2012. Figure 6 outlines the expected trends in the sold volumes of mattresses, both across the EU-27 and for individual mattress types. This decrease can be seen across most of the mattress types:

- Mattress supports seem to remain relatively steady across 2005-2012, with only a slight decrease
- Mattresses of latex also appear to remain relatively steady, although again a slight decrease by 2012 has been projected.
- Mattresses of PUR show the largest projected decrease in volume sold by 2012. Volume sales across these mattress types appear to be the most volatile between 2005 and 2012 showing both the largest year-on-year increase and decrease between these time periods.
- Mattresses with spring interiors show a steady decrease by 2012.
- Other mattress types appear to be the only category that may show a slight increase in volume by 2012. This increase is, however, small and does not have a large impact on the overall decline in mattress volumes.

On the contrary, more optimistic forecast may be obtained focusing on value. Global Research & Data Services, for instance, consider that it is possible a growth in value of 2.7% per year until 2015, which was qualitatively confirmed in the previous trend analysis[a] The choice of forecast would seem to depend upon the view about the EU GDP.

As outlined above, these trends can be affected by a wide range of factors within the market. Figure 7 shows EU27 GDP growth (%) against mattress production value growth (%) from 2006 to 2010. Although a direct correlation between the two is not apparent, it seems as though production value growth in the mattress market does somewhat follow GDP growth. This is especially clear with the large drop in 2009 and the subsequent rise that follows. This demonstrates that the trends and projections are subject to a wide variety of factors, including GDP, that may have an impact on the mattress market in the future.

Figure 6: Total sold volumes of mattresses, trends and forecasts *across the EU-27 and by mattress type (2005-2012)*



Source: own calculations based on Eurostat PRODCOM database, 2010

a Global Research & Data Services (2010), Mattresses - Europe

Figure 7: EU-27 GDP growth and mattress production value growth (2005-2010)

Source: own calculations based on Eurostat PRODCOM database, 2010

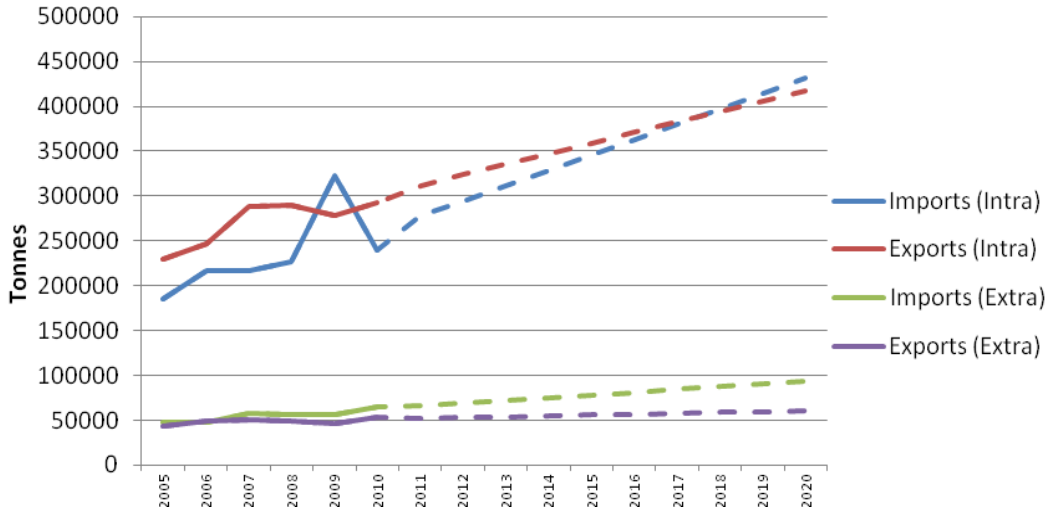
3.5.2 Trade

Figure 8 outlines the trend in mattresses trade in the EU-27 in terms of tonnes. Imports and exports are shown for both intra and extra EU-27 trade. Trends are calculated based on import and export quantities of the previous years. As such, data to 2010 is based on COMEXT data and projections have been made to 2020 based on this historic data. Assuming current trends of trade:

- Intra-EU exports are likely to see a steady increase.
- Intra-EU imports, continuing with the current trends, may see a steeper increase than exports. In 2014, it is projected that imports and exports may reach the same level of volume.
- Extra- EU exports show a steady increase.
- Extra-EU imports also show a steady increase, but at a faster rate than imports. According to these projections, the gap between extra-EU imports and exports is likely to increase.

Both import and export values are expected to increase, following current trends. It should be noted, however, that these trends are assuming few changes in the mattress market. As noted earlier, the mattress market is influenced by a variety of factors including GDP, consumer confidence, household savings and unemployment.

Figure 8 : Forecast of intra and extra-EU trade quantity for mattresses across EU27 (2005-2020)



Source: Calculated from Eurostat, COMEXT, (2010)

The mattress market is predominantly focused around production for domestic use. Mattresses for institutional use often have extra requirements that apply, compared to mattresses for household use. The composition of these mattresses might also differ because of this. In this section of the report, an estimation of the total number of mattresses publically procured across the EU-27 is provided. This figure can be used to determine what percentage of volume of total sold mattresses across the EU-27 could be represented by purchases of public interest.

Materials and methods

In terms of public procurement, the main areas for mattress purchases are: hospitals, nursing care homes, prisons and army accommodation. This is not an exhaustive list, but analysis of these sectors aims to capture most of the public expenditure on mattresses across the EU-27.

In order to estimate the public procurement levels of mattresses, data have been gathered for all of the facilities mentioned above. Specific data on public purchase of mattresses are not readily available and so, where necessary, alternative information have been used to produce indicative values. Where data are available, such as for prisons and army accommodation, actual figures for mattress purchased have been extrapolated from individual Member States to give an estimation across the whole EU-27. Where assumptions have been made or alternative information used, this has been stated in the workings.

Mattresses in use in the public sector

Hospital mattresses producers are often specialists in health products, and mattresses are supplied alongside other medical equipment. There are, however, examples of domestic suppliers producing mattresses for hospital use. For example, Elite - a Swiss bedding manufacturer - produces two types of medical mattresses, both with a foam core and a PVC mattress cover. All are sanitised and conform to European fire safety standards.[a]

Hospital mattresses appear predominantly to be made of a polyether foam or latex foam core with a PVC cover as a protective layer. Foam mattresses for domestic use are often more expensive than inner sprung mattresses, but for hospital use they are deemed to be more comfortable. Foam mattresses can also be made to conform to different lying and sitting positions by bending with adjustable bed frames. There is a variety of different standard mattresses in use throughout Europe and a set of grades within these, dependent on the patient's risk level. Due to constant use, a considerably higher turnover rate than mattresses for other uses.[b] In UK it is for instance estimated that the life of a UK standard hospital mattress is only 9-18 months,

Mattresses for nursing care homes can vary by type, as with hospital mattresses. The use and required functionality of the mattresses is similar to that for hospital use. For this section of the report, care home mattresses are assumed to have the same life span as hospital mattresses.

As with hospitals, prisons show a tendency to use foam mattresses for reasons of functionality. These are purchased in large quantities, and have a relatively short life span. In the UK, for instance, 53 000 foam mattresses and 48 000 pillows are purchase by the UK's Prison Service annually. In total 40 000 of these items are disposed of yearly due to soiling, misuse or wear and tear.[c]

Prison mattresses differ from domestic mattresses in a variety of ways. As with hospitals mattresses, they are predominantly made with a foam core and provided with a protective PVC layer. High on the list of regulating factors for prison mattress production is flammability: mattresses must conform to strict fire regulation standards.

a Elite Beds, 2011 Available at: http://www.elitebeds.ch/en/hopitaux/viscopedic.html
b Available at: http://www.judy-waterlow.co.uk/pressure_ulcer_preventative_aids.htm
c BIS/Ministry of Justice, 2009. Forward Commitment Procurement Demonstration Project: HM Prison Service Zero Waste Prison Mattress System. Available at http://www.bis.gov.uk/assets/biscore/corporate/migratedd/publications/c/cs02_hmps.pdf

For instance, the 2008-09 procurement initiative to introduce the *Zero Waste Wipe Clean Mattress and Pillow Solution* (UK) has increased the life span of a mattress to an average of 22 months. It has also reduced the cost and environmental impact of disposing of the mattress. This contract is for the supply, collection and recycling of highly flame retardant, robust, wipe clean prison mattresses and pillows.

In the following section the volume of mattresses that are purchased annually by each public sector across the EU-27 is estimated. Information are then collated to enable a comparison of sector-by-sector mattress procurement across the EU-27. Data for 2008 are used as this is the most recent year for which the most complete data are available.

Hospitals

In estimating the number of mattresses purchased for hospital beds, data on available hospital beds have been used as an alternative source of data. It is assumed that the number of beds equals the number of mattresses. It is likely that, within these figures, there are a number of different mattress types due to the variety of mattresses used within the healthcare industry. Final figures should therefore be regarded with caution.

The turnover of mattresses in hospital is assumed to be one mattress every 18 months. Table 21 shows the number of hospital beds and the estimated number of mattresses purchased annually by EU-27 Member State. The total number of hospital mattresses purchased across the EU27 is therefore estimated to be around 1.8 million units in 2008.

Table 21: Estimate of hospital mattresses purchased annually (2008)

Country	Available hospital beds (1000 units)	Estimate of mattresses purchased annually (1000 units)	Country	Available hospital beds (1000 units)	Estimate of mattresses purchased annually (1000 units)
Austria	64	43	Latvia	17	11
Belgium	70	47	Lithuania	23	15
Bulgaria	50	33	Luxembourg	3	2
Cyprus	3	2	Malta	3	2
Czech Republic	75	50	Netherlands	77	52
Denmark	20	13	Poland	252	168
Estonia	8	5	Portugal	36	24
Finland	35	23	Romania	141	94
France	441	294	Slovakia	35	24
Germany	674	450	Slovenia	10	6
Greece	54	36	Spain	147	98
Hungary	71	48	Sweden	26	17
Ireland	22	15	United Kingdom	206	137
Italy	223	149	EU27 total	2 786	1 858

Source: Eurostat, hospital beds by type of care, available beds in hospitals (HP.1) (2008)

Nursing and residential care facilities

The number of mattresses purchased for nursing and residential care facilities was roughly estimated from data available on the use of nursing care beds. It is assumed that one bed requires one mattress. As with hospitals, 18 months was assumed to be the life span of a mattress in use.

Table 22 provides an estimate of the number of mattresses purchased annually for nursing and residential care facilities and the available number of beds. In order to provide an estimate for gaps in the data, the following methodology has been used:

- It has been assumed that the number of beds is proportional to population in that country. This assumption enables us to estimate figures for countries for data were previously unavailable.
- The average ratio of mattresses purchased annually per person has been calculated (this is given by the average, weighted by the population) for the countries where this information is available.
- The ratio of mattresses purchased to population in Table 22 has then been used to calculate an estimate of the number of mattresses purchased for the countries where data were previously unavailable (average ratio of mattresses purchased annually per person across EU27 x population per country).

Table 22: Estimate of nursing care mattresses purchased annually / Ratio of beds to population (2008)

Country	Available nursing care beds (1000 units)	Estimate of mattresses purchased annually (1000 units)	Population in 2008 (million people)	Ratio of mattresses purchased per population (thousand mattresses/million people)
Austria	*:*	*34*	*8.32*	-
Belgium	129	*86*	10.67	8.06
Bulgaria	4	*3*	7.64	0.39
Cyprus	*:*	*3*	*0.79*	-
Czech Republic	69	*46*	10.38	4.43
Denmark	46	*31*	5.48	5.66
Estonia	8	*5*	1.34	3.73
Finland	54	*36*	5.30	6.79
France	535	*357*	62.13	5.75
Germany	*:*	*338*	*82.22*	-
Greece	*:*	*46*	*11.21*	-
Hungary	81	*54*	10.05	5.38
Ireland	23	*15*	4.40	3.41
Italy	191	*128*	59.62	2.15
Latvia	5	*3*	2.27	1.32
Lithuania	*:*	*14*	*3.37*	-
Luxembourg	*:*	*2*	*0.48*	-
Malta	3	*2*	0.41	4.87
Netherlands	169	*113*	16.41	6.89
Poland	88	*59*	38.12	1.55
Portugal	*:*	*44*	*10.62*	-
Romania	21	*14*	21.53	0.65
Slovakia	31	*20*	5.40	3.70
Slovenia	*:*	*8*	*2.01*	-
Spain	199	*133*	45.28	2.94
Sweden	137	*91*	9.18	9.91
United Kingdom	527	*351*	61.19	5.74
EU27 Total	**2 320**	**2 037**	**495.82**	**4.11**

**(:) = data not available, estimation provided in italics are based on average EU-27 figures*
Source: Eurostat, hospital beds by type of care, available beds in hospitals (HP.2) (2008)
Population data sourced from Eurostat, Population on 1 January by age and sex

Prisons

The estimation is based on UK data. Table 23 shows the quantity of mattresses purchased for use by prisoners from 2008-2010 in the UK. It should be noted that these figures do not include private prisons, as they source items independently. From the data provided, it is possible to calculate the average expenditure for one mattress for 2010, which is approximately £44.[a] This is calculated by dividing total value in 2008 by total quantity of mattresses ordered in 2010 (data are reported in Table 23).

Table 23: Mattress order quantity for UK Prisons 2008-2010

Item and Description	2008		2009		2010		Last three years	
	Quantity (units)	Value (£)	Quantity (units)	Value (£)	Quantity (units)	Value (£)	Total quantity (units)	Total value (£)
435. Mattress, F/R Foam, STD 1.9m long	41 357	1 794 067	39 074	1 695 030	38 277	1 660 456	118 708	5 149 553
436. Mattress, F/R Foam, 7 feet, 2.2m long	799	43 026	952	51 265	550	29 618	2 301	123 909
437. Mattress Hospital, F/R Foam	180	10 055	234	13 071	153	8 547	567	31 673
438. Mattress Narrow, F/R Foam, 1.9m long	3 395	156 815	4 190	193 536	5 955	275 061	13 540	625 412
Sub-total	**45 731**	**2 003 963**	**44 450**	**1 952 903**	**44 935**	**1 973 682**	**135 116**	**5 930 548**

Source: http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110301/text/110301w0004.htm#1103022002766

Using prison population data as an indicator and assuming one mattress per person, the above data for the UK were extrapolated to provide estimates of the number of mattresses purchased annually across the EU-27. UK prison population was 93 000 in 2008 and in the same year nearly 46 000 mattresses were purchased. This equates to mattresses being purchased for 50% of the prison population on an annual basis. This is equal to assume a constant prisoner population and a mattresses life span of two years. Table 24 uses this information to estimate the number of mattresses purchased annually across the EU-27. The estimated volume of mattresses purchased for prisons across the EU-27 in 2008 is estimated to be 303 000 units.

*Table 24: Estimate of prison mattresses purchased annually (2008)**

Country	Prison population (1000 people)	Estimate of mattresses purchased annually (1000 units)
Austria	8	4
Belgium	10	5
Bulgaria	10	5
Cyprus	1	0
Czech Republic	20	10
Denmark	4	2
Estonia	4	2
Finland	3	2
France	64	32
Germany	73	37
Greece	:	:

a UK Parliament website, Prisons: furniture. Available at: http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110301/text/110301w0004.htm#1103022002766

Hungary	15	7
Ireland	3	1
Italy	58	29
Latvia	7	3
Lithuania	8	4
Luxembourg	1	0
Malta	0	0
Netherlands	15	7
Poland	85	42
Portugal	11	5
Romania	26	13
Slovakia	8	4
Slovenia	1	1
Spain	74	37
Sweden	7	3
United Kingdom	93	44
EU27	**609**	**299**

**(:) = data not available*
Source: Eurostat, prison population (2008)

Army accommodation

To calculate the number of mattresses purchased for army accommodation, army personnel data were used. However, unlike other sectors, it cannot be assumed that one person equals one mattress, as army accommodation varies greatly.

Within the UK, for instance, army personnel either live in private accommodation or single family accommodation housing (SFA) or make use of single living accommodation (SLA) which provides individual bed spaces. Private accommodation can be excluded from the data, as furniture, including mattresses, is purchased by individuals not by the public body. Similarly, SFA housing is often provided unfurnished and so is excluded from the data. The number of SLA bed spaces is therefore used as a indicator of the number of army mattresses in use in the UK. Table 25 indentifies the number of SLA bed spaces for UK army personnel both in the UK and overseas.

Table 25: number of SLA bed spaces for UK army personnel.

Location	Global purchase of mattresses for UK army personnel (1000 units)	UK SLA bed spaces (1000 units)	Estimate of UK SLA mattresses purchased (1000 units)
UK	**-**	129	40
Overseas	**-**	18	5
Total	**45**	**147**	**45**

Source: Global purchase of mattresses data available at:
http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm100913/text/100913w0002.htm
SLA data available at: http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110304/text/110304w0002.htm

Also included in Table 25 is the number of mattresses purchased for UK army personnel globally in 2008. It is assumed that these mattresses are for SLA bed spaces. The number of mattresses purchased in the UK can be thus calculated as: Global mattress purchase / total number of SLA bed spaces x number of SLA bed spaces in UK.

Hence, 40 000 mattresses are estimated being purchased in 2008 in the UK for army personnel. Since there are 194 000 army personnel in the UK; 40 000 equates to mattresses being purchased for an estimated 20% of the army personnel population in 2008.

This figure is extrapolated across each of the EU27 countries in Table 26. Across the EU27, an estimated 365,000 mattresses was supposed being purchased in 2008 for army personnel in SLA.

Table 26: Estimate of army mattresses purchased annually (2008)

Country	Army personnel (1000 people)	Estimate of mattresses purchased annually (1000 units)
Austria	27	5
Belgium	37	7
Bulgaria	34	7
Cyprus	13	3
Czech Republic	24	5
Denmark*	26	5
Estonia	3	1
Finland	35	7
France	347	69
Germany	252	50
Greece	134	27
Hungary	21	4
Ireland	10	2
Italy	187	37
Latvia	5	1
Lithuania	9	2
Luxembourg	1	0
Malta	2	0
Netherlands	46	9
Poland	130	26
Portugal	37	7
Romania	75	15
Slovakia	15	3
Slovenia	7	1
Spain	138	28
Sweden	17	3
United Kingdom	194	40
EU27	**1 826**	**364**

Source: European Defence Agency, Defence Data of EDA participating Member States in 2009
**sourced separately from: Danish Defence, facts and figures (2011)*

Results and discussion

Data regarding the annual volume of mattresses purchased for hospitals, nursing care, prisons and army personnel are presented in Table 27. The relative significance of mattresses procurement in public activities can be estimated by comparing the global figure of Table 27 with the sold volume of mattresses in the EU-27.

Mattresses for nursing and residential care homes and hospital mattresses accounted for the greatest proportion of total estimated public procurement (an estimated 45% and 41% respectively). Army mattresses accounted for an estimated 8% and prison mattresses 7%. Overall, army and prison mattress public procurement is much lower than for hospitals and nursing care homes. This is perhaps to be expected as the overall number of beds in these sectors is much lower than the number that is required in care-giving facilities. Moreover, it also implicitly indicates that the weight of the uncertainties involved in the estimation of the number of beds for prisons and army can be considered of secondary

importance. In other words, a refinement of the estimation should focus mainly on the health care sector.

For the purposes of comparison, in 2008, the total sold volume of production across all mattress types in the EU-27 was 67.6 million units (48 million units excluding mattress supports). An estimated 4.6 million units, or 7% of this (10% excluding mattress supports), can be thus attributed to public procurement, according to the estimation provided in this analysis.

Table 27: Estimate of total public procurement of mattresses purchased annually (2008)

Country	Hospital mattresses est. (1000 units)	Nursing care mattresses est. (1000 units)	Prison mattresses est. (1000 units)	Army mattresses est. (1000 units)	Total est. (1000 units)
Austria	43	34	4	5	86
Belgium	47	86	5	7	145
Bulgaria	33	3	5	7	48
Cyprus	2	3	0	3	8
Czech Republic	50	46	10	5	111
Denmark	13	31	2	5	51
Estonia	5	5	2	1	13
Finland	23	36	2	7	68
France	294	357	32	69	752
Germany	450	338	37	50	875
Greece	36	46	:	27	109
Hungary	48	54	7	4	113
Ireland	15	15	1	2	33
Italy	149	128	29	37	343
Latvia	11	3	3	1	18
Lithuania	15	14	4	2	35
Luxembourg	2	2	0	0	4
Malta	2	2	0	0	4
Netherlands	52	113	7	9	181
Poland	168	59	42	26	295
Portugal	24	44	5	7	80
Romania	94	14	13	15	136
Slovakia	24	20	4	3	51
Slovenia	6	8	1	1	16
Spain	98	133	37	28	296
Sweden	17	91	3	3	114
United Kingdom	137	351	44	40	572
EU27	**1 858**	**2 037**	**299**	**364**	**4 558**

3.6 Technical Innovation in the Mattress Market

New product types in the mattress market are currently focussed around the development of foam technologies, including the use of nanotechnologies.

There is a variety of ways in which innovations in nanotechnology have been applied to mattresses. The introduction of 'nanofoams' produces a foam mattress that responds much in the same way as memory

foam, although it has not penetrated the market in the way that memory foam has. Nanotechnology can also produce a 'self cleaning' effect when applied to mattress coverings by preventing dirt and liquids from sticking to the mattress surface.[a] This not only reduces the need for mattress replacement, but also minimises the need to wash mattress covers. This technology is currently mostly in use in North America. The *Magniflex* brand has also released a new technology in the US that allows nanotechnology to deliver the benefits of essential oils in its 'aromatherapy' collection.[b]

An increase in 'eco-friendly' beds is also apparent, both within SMEs who often specialise in these technologies or within the larger mattress manufacturers who have begun to produce ranges for this market.[c] Although there is no universal standard for what is considered an 'eco-friendly' bed, this term usually refers to the use of natural, organic materials such as soy-based foam or organic rubber. These mattresses are currently more costly than traditional mattresses, although it is conceivable that, as the demand for these products increases, costs could fall.[d]

As well as new products, new processes - mainly in terms of reducing waste to landfill - are becoming more common for example materials recycling or reuse. However, there may be limitations on the quantity of mattresses which can be formally reused.. The typical lifespan of a domestic mattress is roughly 8-10 years[e], and legislation on mattress safety is regularly revised so that old mattresses quickly fall outside the safety boundaries set for fire, health and other factors.

It is possible that the drive to purchase more eco-friendly products will also reduce household mattress turnover through by encouraging longer life-spans. Although eco-mattresses often represent the high end of the mattress market, the purchase of these means that mattresses will need to be replaced less frequently and they are often of higher quality than cheap mattresses which need to be replaced more regularly.

Mattress collection by companies and local governments is becoming more prevalent. Problems occur as mattresses are bulky and so collection has to be done locally or the mattress will be taken straight to landfill. In the US, there are a variety of innovative processes that reduce mattress waste to landfill. SVDP located in Oregon, for example, run a mattress recycling programme termed D3: "divert, reduce, reuse, recycle".[f] Many of the mattresses are collected from city or council waste transfer sites, although mattresses from hotels are also collected.[g]

Mattress components can also be recycled, including PU foam which can be remanufactured into carpet pads. This innovative process has been as for a model in several areas, including a similar mattress repurposing scheme in Aberdeen, Scotland. Also in Scotland, the *SpringBack* programme was established in 2005 and is the first UK-based scheme to deconstruct used mattresses and sell or reuse the components. Again, the mattresses are collected which reduces the need for transportation of heavy mattresses to another site. It is estimated that 7 000 mattresses were processed in 2005, increasing to an annual figure of nearly 70 000 currently.[h] This is perhaps indicative of the growing recognition of the need for processes to divert mattresses from landfill.

Within the UK, the Ministry of Justice has implemented a programme in prisons with the outcome of producing a zero waste mattress and pillow solution, essentially reducing mattress waste to landfills.

a Solutions for the mattress industry, Nanotechnology. Available at: http://www.quality-fabrics.com/mattress-ticking/mattress-nanosphere.php
b Furniture world magazine, Magniflex Introduces Bed Bug Repelling Mattress, (2010). Available at: http://www.furninfo.com/absolutenm/templates/NewsFeed.asp?articleid=12128
c Hilding Anders Trendspotting, Green is the new black, 2010. Available at: http://www.hildinganders.com/en/innovation/trends-tendencies/hilding-anders-trend-spotting
d Hilding Anders Trendspotting, Green is the new black, 2010. Available at: http://www.hildinganders.com/en/innovation/trends-tendencies/hilding-anders-trend-spotting
eSealy, FAQ. Available at: http://www.sealy.com/Customer-Service/FAQs.aspx
f Environmental News Network, California facility proves that mattress recycling can work, 2007. Available at: http://www.enn.com/pollution/article/28112

h SpringBack group, Mattress Recycling. Available at: http://www.springbackgroup.org.uk/mattress-recycling

Through market engagement, the UK's Prison Service outlined a strategy that enabled mattresses and pillows not classified as hazardous waste to be recycled, repurposed and reused. This not only reduces the quantity of mattresses sent to landfill, but also reduces costs within the prison service that are incurred through supply and disposal, estimated to be £2.8 million annually.[a]

3.7 Environmental Labelling

Since the establishment of the EU Ecolabel, the number of mattress manufacturers producing Ecolabel products has been relatively low. There are currently only two manufacturers with Ecolabel products, outlined in Table 28:

Table 28: holders of Ecolabel products, by country and mattress type

Manufacturer	Origin	Number of Ecolabel products	Ecolabel product type
Carpenter APS	Denmark	2	-
Elite SA	Switzerland	Estimated 23	Variety of inner sprung mattresses and mattresses made from natural soy foam.

Source: Adapted from eco-label.com

To have a rough indication on the market penetration of the EU Ecolabel for bed mattresses, the following ratio was calculated: 'number of EU Ecolabel licenses' / 'apparent consumption (in EUR billion)'. Considering bed mattresses having 25 products which have been awarded the EU Ecolabel (133 products according to the Ecolabel workplan for 2011-2015[b]) and an apparent consumption of EUR 3.5 billion, the value of the two indicators would be equal to 7.14 (38.00 considering the information provided in the Ecolabel workplan). For the sake of comparison, textiles, which is one of the most successful product groups within the EU Ecolabel scheme, scores 37.62 with 4665 products awarded EU. Similar considerations could be extended also to the number of licence holders. Nevertheless, further data on the market volume of products awarded EU Ecolabel would be welcome to provide more refined statistics.

As well as the EU Ecolabel, which operates on a European basis, there is a variety of national labels that can be applied to mattresses, including 'Nordic Swan' (Norway), 'The Blue Angel' (Germany), 'Green Mark' (Taiwan) and the Austrian Ecolabel (Österreichisches Umweltzeichen) launched in 1991. A lack of harmonization between some of these labels may result in a lack of incentive for producers to acquire both a regional label and the EU Ecolabel. For many smaller producers of mattresses, it may be that the local market is more vital than the global or even European market and so national labels may be more familiar and accepted.

Despite this relatively low uptake of environmental labels, 'green' product lines are seeing an increase. Hilding Anders has, for example, developed 'Green bed mattresses' in which the fabrics are 58% manufactured from bamboo (renewable material) and with a high proportion of recycled polyester.[c] The current use of biodegradable materials in mattress production also demonstrates a commitment to eco-friendly production. Simmons, for example, developed a collection in 2008 with the base latex layer made from materials which are biodegradable (e.g. sap from the rubber tree).

This trend in 'green' mattress lines is predominantly market-led, as consumers of higher end products create a demand for more environmentally-friendly or organic products.

a BIS/Ministry of Justice, Forward commitment procurement: practical pathways to delivering innovation, 2009. Available at http://www.bis.gov.uk/assets/biscore/corporate/migratedd/publications/c/cs02_hmps.pdf
b http://ec.europa.eu/environment/ecolabel/about_ecolabel/pdf/work_plan.pdf
c Hilding Anders, 2011 Available at: http://www.hildinganders.se/en/innovation/latest-innovations/family-green

3.8 The 'Eco-mattress' Market

The increase in 'green' mattress product lines has resulted in the production of a variety of mattress types that can be considered eco-mattresses. These mattresses can be broken down into four broad mattress types:

- *Organic cotton:* farmed and processed without the use of pesticides, chemicals or toxic additives. Organic mattresses made of natural latex and cotton can, however, present a potential fire hazard and therefore they often need to be treated with fire-retardant chemicals. They may also be coated with plastics to render them waterproof or covered with polyester to make washing easier. 'Green cotton' mattresses are also produced, the fundamental difference being that pesticides and synthetic fertilisers used during farming. The rest of the process is additive-free as with organic cotton.
- *Wool:* a natural material, wool has anti-allergy, -bacterial, -mould and -mildew properties and is also naturally fire resistant. It can be added into mattresses as a filling or used as padding. It is, however, relatively expensive especially compared to synthetic foam mattresses which offer similar benefits. Wool mattresses still require a core made of springs, foam or latex.
- *Latex:* Although latex can be synthetic, natural latex can be derived from rubber tree's sap, which is both a natural and renewable material. Latex is often used as a mattress topper but it is more frequently being utilised to replace inner springs as the mattress core. Natural latex is hypo-allergenic and mattresses made from it are much more buoyant than those made from cotton or wool. Latex is, however, costly and mattresses made entirely of 100% natural latex are high end products.
- *Hemp.* Hemp mattresses can also be produced, with hemp providing similar benefits to wool. It is, however, a less widespread material and it is only utilised by niche providers.

In general, 'eco-mattresses' limit the use of chemicals, in particular petrochemicals or polyurethane foam. Synthetic mattresses often have fire resistant treatments added to them during manufacture in order to conform to safety standards. Polybrominated diphenyl ethers (PBDEs) are frequently mentioned as the most typical treatment, and are often associated with poor health.

There is a growing market for 'eco' memory foam mattresses made through the processing of soy or cedar oil in place of petroleum, although the extent to which these ingredients are used varies across mattress brands. Often a percentage of the foam will be replaced with these 'eco' materials, meaning that most soy foam mattresses are not 100% eco-mattresses. Essentia, a producer of foam mattresses based in Canada, claims to be the only manufacturer in the world that produces 100% natural memory foam.[a] It is also claimed that other eco-memory foam mattresses may only contain around 2-15% natural foam with the rest made up of petroleum based foam.

3.9 Summary

Summing up, the following points can be highlighted from the market analysis:

- The mattress market in Europe is fragmented, with a few large global manufacturers active in addition to a number of smaller somewhat more nationally-focused players. Small and medium-sized enterprises in the mattress industry focus on niche products and national consumer demands in the European market.
- 48 millions of bed mattresses have been produce in the EU-27 in 2010 (67 million units with the inclusion of mattress supports). The total value of the mattresses produced was EUR 3.8 billion (EUR 5 billion including also mattress supports). Total imports of bed mattresses across the EU-27

[a] Essentia natural memory foam. Information available at: http://www.myessentia.com/natural-foam

amounted to EUR 1 billion (EUR 1.4 billion with mattress supports) and exports to EUR 1.3 billion (EUR 1.6 billion with mattress supports).

- Excluding mattress supports, the sold volume of bed mattresses in the EU-27 is mainly composed of spring mattresses (37%) and PUR mattresses (32%). Latex mattresses and other types of mattresses instead account for 13% and 18%, respectively.
- In terms of production value, top-five countries account for 70% of the total market. These are: Germany (16%), France (16%), Italy, (15%), the United Kingdom (13%) and Spain (10%). In terms of sold volume of production, top-five countries account for 69% of total market. These are: Germany (18%), Italy (17%), The United Kingdom (13%), Poland (11%) and France (10%). The main producers of spring mattresses are the UK and Germany. The main producers of PUR mattresses are Germany, Poland and France. The main producer of latex and other mattress types is Italy, followed by France and Poland.
- In terms of trade, bed mattresses are a product which appears principally traded between neighbour countries. Trade with extra-EU countries is approximately one tenth of the overall trade. Import/export figures are significantly higher for PUR mattresses than for other mattress types.
- If current trends in the mattress market continue, there is likely to be an overall decrease in the volume of mattresses sold across the EU-27. Factors such as GDP, consumer confidence, household savings and unemployment will, however, influence the mattress market. Nevertheless, value has appeared to remain relatively steady between 2005-2010, which could represent an increase in the value of each mattress or which could be due to a change in the product mix of mattresses sold.
- The mattress market is predominantly focused around production for domestic use. Mattresses for institutional use often have extra requirements and are sold through different supply chains. In 2008, the total sold volume across all mattress types in the EU-27 was 52 million units (73 million units with mattress supports). An estimated 6% of this (about 9% including also mattress supports), was attributed to public procurement through the purchase of mattresses for use in hospitals, care and residential facilities, prisons and army.
- The number of mattress manufacturers producing EU Ecolabel products has been relatively low. There is, however, a variety of national labels that can be applied to mattresses, including 'Nordic Swan' (Norway), and 'The Blue Angel' (Germany) and 'Green Mark' (Taiwan).These labels currently seem to have a higher uptake than the EU Ecolabel.
- There has been a recent trend towards high-end, 'green' mattress products. This trend is predominantly market led, as consumers of higher end products create a demand for more environmentally friendly or organic products.

Discussion points

Stakeholders are kindly invited to provide any feedback and source of information which could be used to learn more on the market of bed mattresses. In particular, the following pieces of information would be considered of importance:

1. Information on **Scandinavian type mattress supports** and on their market.

2. Further technical details on the **market segmentation** of the bed mattresses market (e.g. sub-categories of mattresses available in the market, material composition and origin, manufacturing processes and technologies used)

3. Statistics related to the **penetration of EU Ecolabel and other environmental labellling** schemes (e.g. number of license-holders, number of product, market volumes)**.**

4 Technical Analysis

The aim of this technical analysis is to evaluate the different categories of mattress identified in the previous sections, identifying the most significant sources of environmental impact and use this information to propose how criteria could be changed. The analysis will be based on life cycle assessment (LCA) information related to bed mattresses and which have been gathered as part of this project. These LCA data, inclusive of information from Environmental Product Declarations (EPD), are reviewed in the section below and used to identify what are the 'hot-spots' present in the lifecycle of a mattress. Discussion on specific issues of relevance for this revision process will be based on the outcomes of this analysis, the feedback received from stakeholders and additional information on key environmental aspects, such as the use of hazardous substances. This will provide a basis for proposing provisional recommendations for the EU Ecolabel and GPP criteria. However, it is important to observe that this is a first draft of the analysis and that a revised version of the document will be provided before the 2nd AHWG in order to integrate further material of discussion and information/comments from stakeholders.

4.1 Survey on Lifecycle Assessment information available for bed mattresses

4.1.1 Review of LCA information

Within the project, a comprehensive analysis was carried out in order to identify the LCA information on bed mattresses which were so far made public. A relatively limited amount of publically available LCA information on bed mattresses has been identified. The most relevant sources of information are reported in
Table 29 with each reviewed in more detail below. Relevance of the study within this revision, accomplishment to recognised standards (e.g. ISO 14040 or PAS 2050), quality of the information provided and date of the background study have been used as main criteria of selection. Studies identified within this area, but not deemed relevant are shown in section 4.1.2 below. It should be observed that quantitative information from different studies should not be directly compared because of different methodological assumptions behind each study.

Stakeholders are kindly invited to provide further information which could be integrated into the present analysis.

Table 29: Summary of LCA studies and LCA schemes relevant to this criteria revision

Name of the study, author(s) and year	Scope, Functional unit, System boundaries	Environmental parameters considered
EU Eco label for Bed Mattresses. The Greek LCA study - Establishment of ecological criteria[a] **A.D. Boura (HELCANET, Greece)** **2004**[b]	4 types of mattresses (PUR foam, latex foam, spring interior and Scandinavian mattress) 1m^2 of mattress, fit for use Cradle-to-grave	12 impact categories, no information provided on the impact assessment method(s) considered: Abiotic resource depletion Greenhouse gas emissions Human toxicity Acidification Ozone depletion Eutrophication and oxygen demand

a http://www.emsc.ch/cost628/assets/Greek_LCA_for-bed_mattresses.pdf
b http://www.emsc.ch/cost628/assets/Minutes_WG1.pdf

		Photochemical oxidation (smog) Ecotoxicity Landscape demolition Use of energy Nuisance (odour) Solid waste
Mattresses LCA – Final Presentation **Climact, Vito and Belgian Department for Health, Food Chain Safety and Environment**[a] **2011**	9 mattress value chains representative for 4 different mattress types. 1 adult mattress (2m x 0.9m) Cradle-to-use	ReCiPe's midpoint indicators. Normalized scores reported for 18 indicators[b]: Agricultural land occupation Climate change Fossil depletion Freshwater ecotoxicity Freshwater eutrophication Human toxicity Ionising radiation Marine ecotoxicity Marine eutrophication Metal depletion Natural land transformation Ozone depletion Particulate matter formation Photochemical oxidant formation Terrestrial acidification Terrestrial ecotoxicity Urban land occupation Water depletion
Furniture Carbon Footprinting **FIRA (UK)**[c] **2011**	19 double mattresses, including spring and foam mattresses (more detailed information not provided) A double mattress Cradle to gate	Greenhouse gases emissions, calculated according to PAS 2050:2008
Environmental Product Declarations for Beds and Mattresses[d] **EPD Norge - The Norwegian EPD foundation** **2005**	Different kind of mattresses 1m^2 of mattress, fit for use (guaranteed lifetime of 15 years, corresponding to a technical lifetime of at least 25 years). Cradle-to-grave	Parameters to be declared (as prescribed in the specific PCR): Product content of hazardous substances (formaldehyde, bromated flame retardants, heavy metals). Emissions to air (Fossil CO2, CH4, N2O, NOx, SOx, NMVOCs, Dioxins, Heavy metals) Emissions to water (Phosphates,

a Mattress LCA – Final Presentation, Climact & Belgian Department for Health, Food Chain Safety and Environment, 6th May 2011
b http://www.lcia-recipe.net/
c Furniture Carbon Footprinting, FIRA, 2011
d http://www.epd-norge.no/

		Nitrates, Dioxins, Heavy metals) Wastes (Material recycling, Incineration with energy recovery, Incineration without energy recovery, Disposal, Hazardous waste) Impact assessment indicators (Global warming potential (GWP 100 years) [kg CO2-eq.], through CML 2001; Ozone layer depletion potential (ODP, steady state) [kg R11-eq.], through CML 2001; Acidification potential (AP) [kg SO2], through CML 2001; Photochemical ozone creation potential (POCP) [kg ethen-eq.], through CML 2001; Eutrophication potential (EP) [kg phosphate-eq.], through CML 2001; Heavy metals [kg Pb-eq.], through EcoIndicator 95) Material resources (Virgin renewable resources, Recycled renewable resources, Virgin non-renewable resources, Recycled non-renewable resources) Land usage Energy consumption (Fossil fuels, Nuclear fuels, Renewable fuels, Miscellaneous fuels)
Rapport de synthese PROPILAE (PROjet PILote pour l'Affichage Environnemental) des produits d'ameublement **Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME)** **2010**[a]	**Information to be processed yet**	Information to be processed yet

EU Eco label for Bed Mattresses. The Greek LCA study - Establishment of ecological criteria[b]

A LCA study was carried-out in one of the previous revisions of the EU Ecolabel with the aim of setting and revising environmental criteria area for bed mattresses. As such, it fits well with the present exercise

a Rapport de synthese PROPILAE (PROjet PILote pour l'Affichage Environnemental) des produits d'ameublement, FCBA (France), 2009
b The Greek LCA study – Establishment of ecological criteria, Boura, A. D., Presentation as part of a previous revision.

because the mattress types considered in the assessment are representative for the products included within the EU Ecolabel scope.

The functional unit for this study was defined as $1m^2$ of useable mattress and the full life cycle considered in the modelling. The LCA was performed according to the SETAC guidelines and the draft technical standards of the series ISO 14040 series. Life cycle inventory data were gathered both from manufacturers (e.g. for intermediate flows related to production processes) and from secondary sources, such as general databases (e.g. BUWAL, ETH) or related studies. However, the available presentation mainly contains qualitative information and provided an overview of the impact categories measured and of the identified environmental hot-spots. Impact categories and normalisation factors considered in the study are shown in Table 30. Impacts characterized for each category were divided by normalization factors (whenever applicable) and referred to an equivalent basis of comparison. The normalized results are shown in figure 9 and may be used to provide an indication about the relative importance of environmental issues within the life cycle of bed mattresses.

Table 30: Impact categories and normalisation factors considered in the Greek LCA study

Impact category (No information provided on the impact assessment method considered	Normalization factor
Abiotic resource depletion	1×10^{-10} % of world reserves per capita per day
Greenhouse gas emissions (global warming)	33 kg CO_2 eq per capita per day
Human toxicity	0.3 g per capita per day
Acidification	266 g SO_2 eq per capita per day
Ozone depletion	Not Available
Eutrophication and oxygen demand	145 g PO_4eq per capita per day
Photochemical oxidation (smog)	49 g ethylene eq. per capita per day
Ecotoxicity	3452 m^3 per capita per day
Landscape demolition	Not Available
Use of energy	460 MJ per capita per day
Nuisance (odour)	Not Available
Solid Waste	2.35 kg per capita per day

Source: EU Eco label for Bed Mattresses. The Greek LCA study - Establishment of ecological criteria

Results of the normalization show lower variation between the different mattress types compared with differences between impact categories.

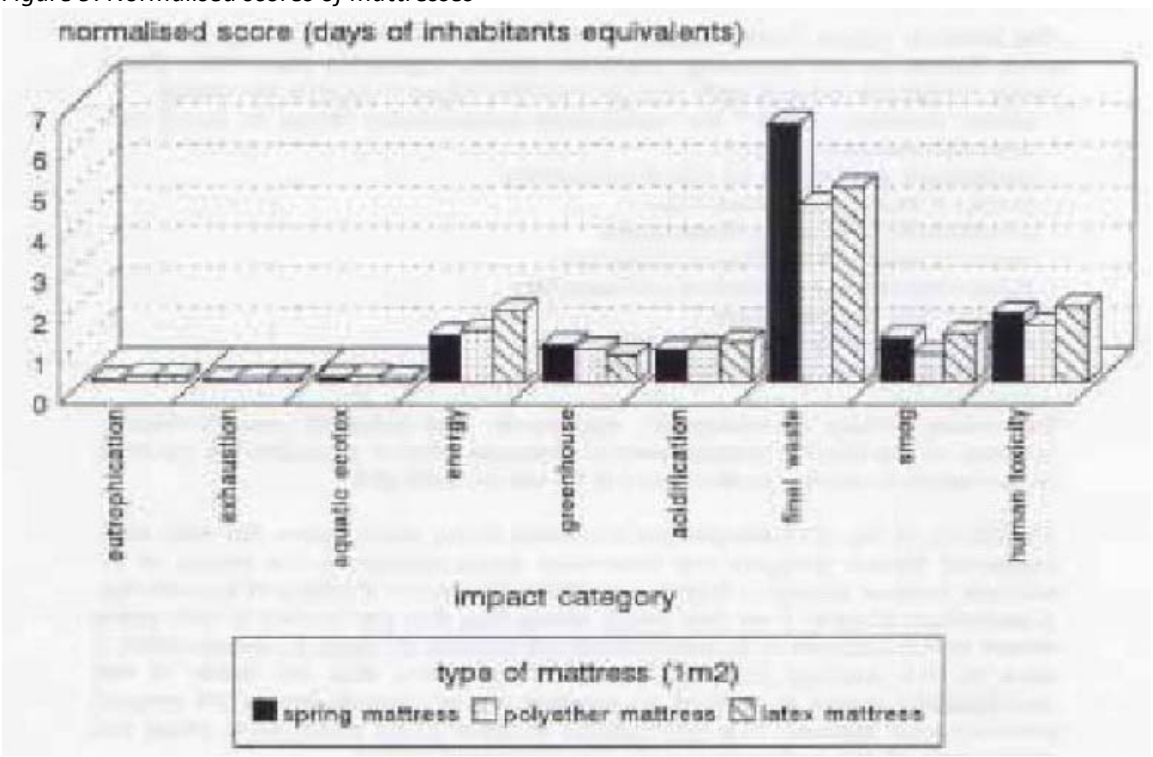
The highest impacts were registered for waste production: this was mostly attributed to disposal of the bed mattress to landfill. Other factors of lower importance were found to be:

- Energy use, GHG emissions, acidification – mainly arising from the production of the main core materials (i.e. PUR foam, latex foam and steel)
- Smog and human toxicity – mainly associated with emissions of CxHy, SO_2 and NOx from the production of steel, synthetic rubber, PUR foam and cotton.

Contribution to the other impact categories also appeared mainly associated with the production of materials used for mattress manufacturing.

These findings suggest that the major impacts of a mattress lifecycle are associated with the potential disposal of old mattresses in landfill and with the production of the components which are then used to manufacture mattresses.

Figure 9: Normalised scores of mattresses



Source: EU Eco label for Bed Mattresses. The Greek LCA study - Establishment of ecological criteria

LCA study from Climact, Vito and Belgian Department for Health, Food Chain Safety and Environment[a]

This study, produced for the Belgian Department for Health, Food Chain Safety and Environment, is one of the most comprehensive studies so far identified. Nevertheless, only the main outcomes of the study have been made publically available, in the form of presentation. The purpose of this study was to identify the environmental hotspots within the life cycle of bed mattresses and to support the Government of Belgium in developing environmental policy.

Within this study, three mattress values chains were assessed, each one comparing the environmental profile of three different bed mattress types. Therefore, nine different lifecycles were modelled overall. PUR and sprung mattresses were assessed for all the three case studies. Latex mattresses were modelled for two supply chains, while bamboo fibre based mattress used in the third. Since the provided information was made anonymous, the three case-studies are indicated as A, B and C in this document.

The study appears to conform to the LCA related ISO standards. The functional unit set the study is the surface provided by one conventional adult mattress (i.e. 2m x 0.9m, indicatively), and the system boundaries exclude the use and disposal of the mattress, but included all impacts from the production of the raw materials to delivery to the user (transport either by the distributor or the consumer themselves). The midpoint categories of the Recipe impact assessment method were considered in the assessment. This corresponds on measuring impacts related to the eighteen different categories shown in Table 31. These impact factors were also normalised to provide an indication of what could be the most critical environmental areas.

a Mattress LCA – Final Presentation, Climact & Belgian Department for Health, Food Chain Safety and Environment, 6th May 2011

The source and quality of data used is acknowledged as being "variable", ranging from primary to secondary data. It is estimated that the uncertainty associated with the data is between 15% and 35%. The study also acknowledges that there is difficulty comparing across different life cycle performances due to incomplete consistence of the data, particularly for production and energy consumption associated with stores and storage.

However, based on the normalized indicators of Recipe, the ranking of the impact categories by environmental relevance was reasonably consistent across the different mattress and value chains.

Water toxicity and eutrophication as well as natural land transformation generally have the highest impacts in all the case-studies, while human toxicity and fossil depletion could be considered as a further group of critical areas. Normalized scores of other impact categories appear consistently much lower along the study.

Table 31: Impact categories and normalisation factors considered in the Belgian LCA study

Impact categories	Units	Normalization factor
Agricultural land occupation	m^2a	0.000221
Climate change	kg CO_2 eq	0.000089
Fossil depletion	kg oil eq	0.000526
Freshwater ecotoxicity	kg 1,4-DB eq	0.0924
Freshwater eutrophication	kg P eq	3.97
Human toxicity	kg 1,4-DB eq	0.00165
Ionising radiation	Kg U235 eq	0.00016
Marine ecotoxicity	kg 1,4-DB eq	0.242
Marine eutrophication	kg N eq	0.0806
Metal depletion	kg Fe eq	0.0014
Natural land transformation	m^2	6.18
Ozone depletion	kg CFC-11 eq	45.4
Particulate matter formation	Kg PM10 eq	0.067
Photochemical oxidant formation	Kg NMVOC	0.0177
Terrestrial acidification	kg SO_2 eq	0.029
Terrestrial ecotoxicity	kg 1,4-DB eq	0.122
Urban land occupation	m^2a	0.00245
Water depletion	m^3	Not Available

Source: Climact & Belgian Department for Health, Food Chain Safety and Environment.

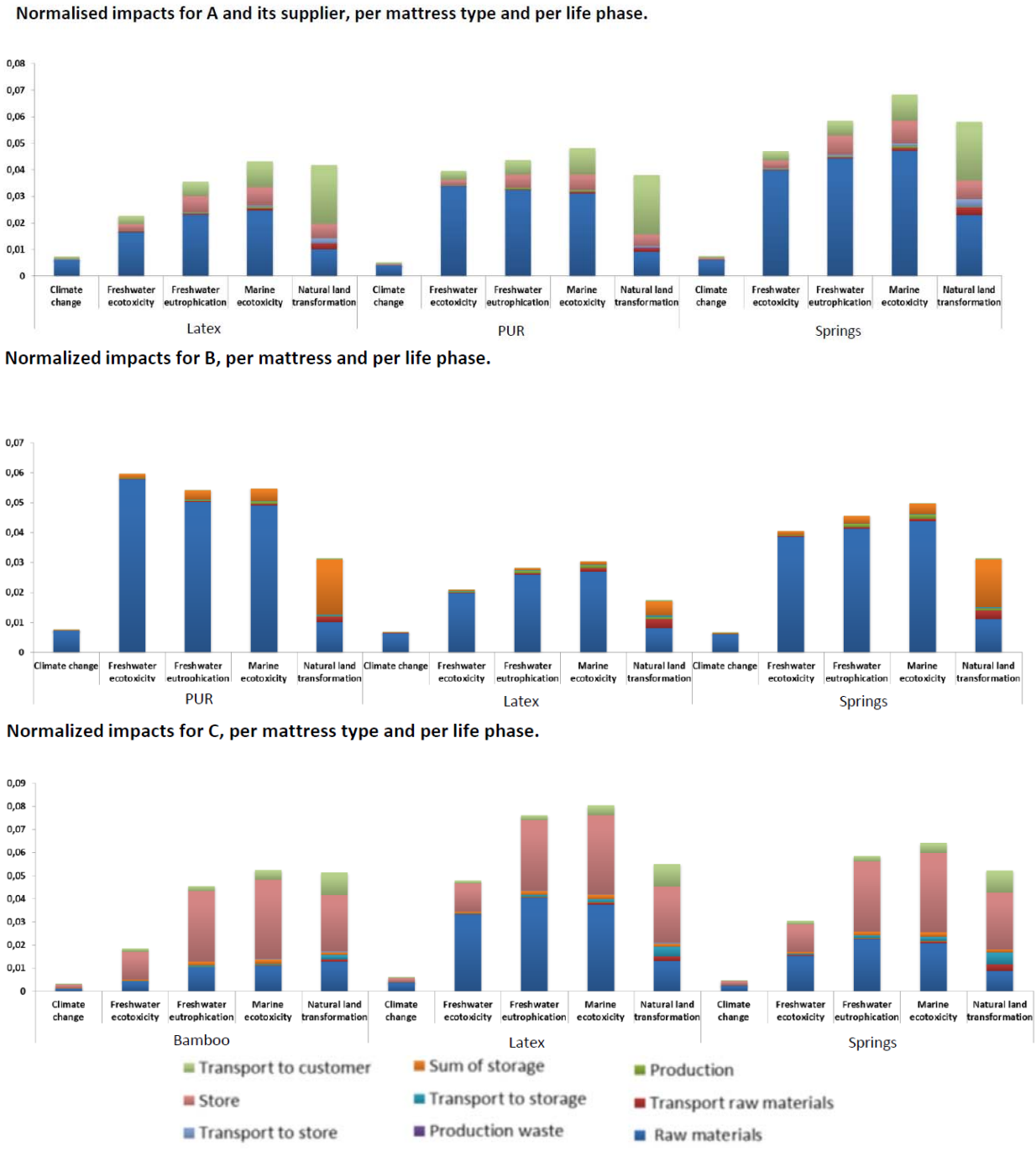
Further analysis within the study identified the 'hotspots' within the lifecycle. The most important impacts for each of the modelled lifecycles are shown in Figure 10. This data includes a breakdown of the different lifecycle phases.

Even if a ranking among the different mattress types cannot be drawn, it is apparent that raw materials are the largest contributions in the majority of both scenarios and impact categories. Other factors which under specific conditions could produce significant adverse effects were found to be transport of the final product and energy use at storage site and at retail store, though each varying from scenario to scenario. Factors such as transport of raw materials, production and transport to storage were found to have lower contributions to the overall impacts. No further details are currently available on the main sources contributing to these impacts.

The information provided within this study can be used to qualitatively evaluate the hot-spots of the product group. A broad range of impacts are assessed and, within these, the sourcing and production of the raw materials was identified as having some of the largest impacts, independent of scenario and

mattress type. Moreover, the study suggests that also factors as product delivery and energy use during storage could be significant sources of environmental impacts for this product group. However, it should be also noted that the disposal of the bed mattress was not considered in this study, which can be also considered a critical aspect in the bed mattresses life cycle.

Figure 10: Selection of normalised indicators for each mattress type considered in scenarios A, B and C and showing individual impacts per life phase.



Source: Climact & Belgian Department for Health, Food Chain Safety and Environment

Study on the Furniture Carbon Footprinting from FIRA (UK)[a]

FIRA recently published a study presenting a series of carbon footprints from furniture calculated using LCA methodology. Their aim of this study was to inform business about the carbon emissions associated with the lifecycle of the different items they produce and to indicate where these emissions could be reduced.

Within this study the GHG emissions associated with the cradle-to-gate lifecycle of mattresses has been calculated. This was based on the BSI publication PAS 2050:2008 "Specification for the assessment of the life cycle greenhouse gas emissions of goods and services", but adapted to suit the needs of the furniture sector. Carbon footprint data for 19 different mattresses were produced, with a standard UK double mattresses (2.6 m^2) used as the functional unit. However, no indication is provided about the specific mattress types assessed. The quality of data varies within this study due to the broad scope. Where possible this was obtained directly from manufacturers and relevant organisations, however it is made clear that some information was estimated. However, it is not clear from the document where secondary information has been used or how it might influence the results, specifically for mattresses. As this is a carbon footprint study, only GHG emissions are reported. The overall average impact was found to be 80 kg CO_2 eq per mattress, with values ranging from 41 kg CO_2 eq to 164 kg CO_2 eq. Table 32 provides an overview of the carbon footprint values calculated.

Table 32: Carbon footprint values for mattresses and percentage contribution from different components

Mattress	GHG emissions ($kgCO_2e$)	Contribution to total GHG emissions (%)								
		Timber & Board	Foams & fillings	Textiles	Metal	Plastic	Packaging	Transport	Utilities	Other
1	44	0	56	14	16	0	7	2	5	0
2	66	0	38	26	25	0	5	3	3	0
3	43	0	56	14	16	0	7	2	5	0
4	164	0	79	17	0	0	2	2	1	0
5	61	0	31	16	45	0	2	2	5	0
6	51	0	19	17	54	0	2	2	6	0
7	87	0	46	7	41	0	1	1	4	0
8	83	0	51	13	29	0	1	1	4	1
9	81	0	44	7	41	0	1	1	4	1
10	83	0	82	6	0	1	6	1	4	0
11	71	0	25	29	39	0	1	1	4	0
12	68	0	3	25	45	0	3	1	22	0
13	64	0	14	5	52	0	3	2	24	0
14	102	0	28	36	17	0	2	2	15	0
15	126	0	38	10	38	0	2	1	12	0
16	83	0	56	1	29	4	2	1	6	0
17	105	0	35	3	46	6	3	2	5	1
18	41	0	35	3	40	3	5	3	13	0
19	91	0	55	11	19	5	3	1	5	0
Avg.	**80**	**0**	**44**	**14**	**29**	**1**	**3**	**2**	**7**	**0**

Source: FIRA[b]*. Percentage values may not add to 100% due to rounding errors.*

a Furniture Carbon Footprinting, FIRA, 2011
b Furniture Carbon Footprinting, FIRA, 2011

These data indicate that production of the raw materials have the largest impacts in terms of carbon footprint, as also highlighted in the previous studies. The study also indicates there is large variation in the data, both in overall impact for each mattress and in the separate contributions arising from each phase. It should be however remarked that different case studies have been considered, without stating explicitly the mattress types that were assessed. Within the study various assumptions have been moreover made which could lead to the omission of many of the impacts associated with storage, transport to use and retail. These could be significant sources of impact, as the Belgian study found, though this may be less noticeable for the single GWP measure.

Norwegian Environmental Product Declaration (EPD) – Product Category Rules for bed mattresses[a]

EPDs are mechanism allowing companies to publish a set of standardised environmental data about their products and allowing customers to get informed about environmental parameters associated with the products they purchase. The data are generated using a LCA approach, with a set of product category rules (PCRs) defining methodological assumptions, data and indicators required for each product group. These PCRs are produced in consultation with industry and government to ensure they fairly depict the environmental performance of the products belonging to the group. Mattresses and beds were included within the Norwegian EPD scheme as a sub-category of furniture.

The PCR document outlining the required scope of the LCA for this product group was defined in 2005[b], and identifies impacts which require calculation. Therefore PCRs provide some insight into the major areas of concern in terms of environmental impact for a mattress. As with other studies, the functional unit is area-based (1m^2 fit for laying), but also specifies a lifetime (guaranteed lifetime of 15 years, corresponding to a technical lifetime of at least 25 years). To be certified, the LCA needs to cover the full lifecycle of the mattress from production of raw materials to final disposal. The required impact assessment categories and calculation methods are shown in Table 33.

A list of EPDs for bed mattresses produced in Norway was kindly provided. However, none of them is in place at present and, apart from providing a general hint on environmental areas of possible concenr, it appears difficult to extract more detailed pieces of information which can be used within this revision.

Table 33: Environmental parameters to be declared according to the EPD-Norge's PCR for bed matressest

Product composition	Materials resource	Land usage	Energy consumption	Impact assessments	Emissions and wastes
Materials used Content of hazardous substances (formaldehyde, bromated flame retardants, heavy metals).	Virgin renewable resources Recycled renewable resources Virgin non-renewable resources Recycled non-renewable resources	Land usage	Fossil fuels Nuclear fuels Renewable fuels Miscellaneous fuels	Global warming potential (GWP 100 years) [kg CO_2-eq.], through CML 2001 Ozone layer depletion potential (ODP, steady state) [kg R11-eq.], through CML 2001 Acidification potential (AP) [kg SO_2], through CML 2001 Photochemical ozone creation	Emissions to air (Fossil CO_2, CH_4, N_2O, NOx, SOx, NMVOCs, Dioxins, Heavy metals) Emissions to water (Phosphates, Nitrates, Dioxins, Heavy metals) Wastes (Material recycling, Incineration

a http://www.epd-norge.no/
b http://pcr-library.edf.org.tw/data/norway/NPCR04BedsE_2.pdf

				potential (POCP) [kg ethen-eq.], through CML 2001 Eutrophication potential (EP) [kg phosphate-eq.], through CML 2001 Heavy metals [kg Pb-eq.], through EcoIndicator 95	with energy recovery, Incineration without energy recovery, Disposal, Hazardous waste)

Rapport de synthese PROPILAE (PROjet PILote pour l'Affichage Environnemental) des produits d'ameublement

The information contained in this study was not analyzed yet but will be inserted in the next version of this report.

Further LCA information on the materials composing bed mattresses

Frome the review above, it comes out that a significant portion of the environmental burdens of a bed mattress is associated with the materials used. If necessary, this section will provide further LCA information on the main materials used in the manufacture of a bed mattress.

4.1.2 Other sources of information not considered

Other LCA studies have been identified, but they are not discussed in detail here because the scope of the study, followed methodology or lack of supporting information make them less useful for this work:

- An academic LCA study comparing alternative production structures for beds in Jamaica.[a] Whilst mattresses are included in the assessment as part of the bedding system, the information provided do not seem detailed enough to be of use here. Moreover, the supply chain and the different scenarios analyzed do appear relevant for this work.
- The Nest Company indicates that an LCA complying with the ISO 14040 standards has been produced to promote their *Eden Eco Mattress* range.[b] However no methodological and calculation details are provided.
- Sleepmaker Australia published a carbon footprint of a full lifecycle for one of their *Forrest Collection* bed range in 2011.[c] This includes a mattress as well as the frame, so is not directly applicable to this work. The aim of this study was to identify the offset GHG emissions required to make their product carbon neutral, as part of the *carbonNZero* programme.[d]
- Furudahls Plast AB produced an LCA of hygiene mattresses used by Swedish healthcare. This was published in 1999 therefore it is not considered relevant to this study.[e]
- GBS Enterprise produced a document studying the carbon impact of mattress protectors in 2009 according to PAS2050.[f,g] However, these products are not representative of the bed mattress product group therefore are excluded from this study.

a Environmental evaluation of localising production as a strategy for sustainable development: a case study of two consumer goods in Jamaica, Russell S.N., Allwood J.M., Journal of Cleaner Production, 16 (2008) 1327-1338
b http://www.nest-sleep.co.uk/content/the_science_of_eden_eco_mattress/, accessed 10/01/2012
c Summary of carboNZero certification: Sleepmaker Australia Forrest Collection bed range, www.carbonzero.co.nz/documents/disclosure_Sleepmaker_2011.pdf, accessed 28/9/2011
d http://www.carbonzero.com.au/, accessed 12/12/2011
e Life Cycle Assessment of hygiene mattresses used by the Swedish health care, Furudahls Plast AB, 2009
f Bolwig, S., and Gibbon, P. (2009) 'Emerging product carbon footprint standards and schemes and their possible trade impacts' Riso DTU, National Laboratory for Sustainable Energy
g http://carbonfund.org/site/pages/land/carbonfree_product_index#gbs, accessed 10/01/2012

- FORCE Technology in 2010 produced a study of a Tempur PUR mattress but no information is so far shared publicly.

4.1.3 Summary of LCA findings and definition of environmental criteria areas

From the review above it appears that reporting of GHG emissions (i.e. the "carbon footprint") is more common within this sector than reporting other environmental measures. This is unsurprising given current trends in environmental reporting. However, the review shows that also other impacts should be taken into account when analyzing the environmental performance of a mattress, particularly because GHG emissions could be not a priority for policy making.

The Greek LCA study identified that the most critical aspect associated with the lifecycle of a mattress is the disposal of the bed mattress itself. This is an issue which is not yet included within the current EU Ecolabel approach and could be an interesting criteria area to discuss and address during this revision process.

The Greek LCA study recognized that also consumption and processing of raw materials can be other sources of environmental concern with respect to:

- Energy use
- GHG emissions
- Acidification
- Smog
- Human toxicity

The more recent Belgian LCA study and the FIRA's carbon footprint study confirmed that raw materials are the element which mainly defines the environmental profile of a bed mattress. Nevertheless, the Belgian LCA also suggests that product distribution and storage may play a significant role.

While the importance of GHG emissions appears of less importance in the Belgian study, the group of impact categories which can be identified as potential areas of primary concern are:

- Water toxicity
- Eutrophication
- Natural land transformation

Human toxicity and fossil depletion could also represent potential areas of concern, as it is suggested by the Greek study. However, it should be noted that the picture of the environmental impacts depicted in the Belgian study is not complete because of the exclusion of the end of life stage from the analysis. This can be considered a sensitive area because of the common practice of mattress disposal in landfill.

The Greek and the Belgian LCA studies suggest that an environmental ranking among the different mattress types cannot be drawn. All in all and based on the impact assessment methods selected in the two analyses, raw materials could primarily affect eight environmental areas:

- Energy use
- GHG emission
- Acidification
- Smog formation
- Human toxicity
- Water toxicity
- Eutrophication
- Land transformation.

The importance of the environmental areas identified above is also suggested by their inclusion in the parameters required by the Norwegian EPD guidelines, which could be consulted while addressing revision with respect to these issues.

The technical analysis will be developed further to understand the specific issues which could be ruled in the revision. In this context, the information contained in the French study will be integrated to the present analysis and more detailed LCA information on the raw materials may be gathered, if necessary. However, it is apparent that benefits could be pursued through the control of the sourcing and consumption of raw materials.

Moreover, it should be observed that health issues associated to the products available in the market are perceived by consumer as a key factor for the selection of inherently safer articles. Great attention on this topic is given also within the EU Ecolabel scheme. Criteria area related with these issues will be discussed in the following section, whenever revision of the existing criteria may be considered appropriated.

Summary for discussion

Summing up, the following criteria area can be identified from this preliminary LCA review:

1. Waste management of the bed mattresses – Avoidance of bed mattress disposal in landfill

This appears the most critical issue. However, this is considered in none of the existing EU Ecolabel criteria for bed mattresses. The topic is included in the criteria discussion section (see Section 4.2 – point 1g).

2. Production and consumption of bed mattresses components - Reducing the environmental impacts associated with bed mattresses components

Bed mattress components appear the main contribution for most of the environmental categories analyzed within this review. The environmental issues identified are: Energy use, GHG emission, Acidification, Smog formation, Human toxicity, Water toxicity, Eutrophication and Land transformation.

Energy use is included in the criteria discussion section (see Section 4.2 – point 1a) and this is inherently related to GHG emission. Further analysis is considered necessary to understand whether and how to include this and other environmental aspects within the revision (this will be add to Section 4.2 – point 1a).

Benchmarking of the above issues could be a challenging task due to the lack of environmental information on bed mattresses, as highlighted during the LCA review.

Standard -complying declarations could be an alternative approach to be explored in case benchmarking resulted of difficult implementation.

In any case, impacts due to mattress components could be decreased through the control of the sourcing and the application of eco-design principles aimed at saving raw materials whilst preserving the functionality and quality of the product.

It should be acknowledged that dealing with these issues could also contribute to increase producer environmental responsibility.

3. Impacts from storage and transport of the product – Promoting best practices of product storage and delivery

During the LCA review, it was found that storage and transport of the product could also be significant source of environmental burdens, under particular conditions.

Promoting best practices within these sectors could be an added value of the EU Ecolabel. This will be

included in the next section of the document within the issues to be discussed with stakeholders (i.e. section 4.2 – point 1a).

Health issues associated to the products available in the market are also perceived by consumer as a key factor for the selection of inherently safer articles. Great attention on this topic is already given also within the EU Ecolabel scheme. Criteria area related with these issues will be discussed in the following section, whenever revision of the existing criteria may be considered appropriated.

4.2 Discussion on specific criteria issues

A series of criteria-related issues of relevance for discussion within this revision were identified, based on preliminary stakeholder consultation, market and legislation analyses, and LCA review. Criteria issues have been grouped by thematic area:

Definition of the Bed Mattress product group (see Section 2)

1. **Environmental criteria areas on the sourcing and production of materials, on the end of life of the product and on other life cycle stages**
   - 1a. Energy and Life Cycle Assessment considerations. NEW area of discussion
   - 1b. Certification of wood. Revision of EXISITING criterion
   - 1c. Use of blowing agents for foam production. Revision of EXISITING criterion
   - 1d. Use of renewable-based materials for fillings. NEW area of discussion
   - 1e. Appropriate use of natural and synthetic materials. NEW area of discussion
   - 1f. Use of organic and conventionally produced materials. NEW area of discussion
   - 1g. Impact of end of life and waste treatment. NEW area of discussion

2. **Limitation in the use of hazardous materials and substances**
   - 2a. Horizontal approach on hazardous chemicals of concern. NEW area of discussion
   - 2b. Use of flame retardants. Revision of EXISITING criterion
   - 2c. Use of biocides. Revision of EXISITING criterion
   - 2d. Use of phthalates. NEW area of discussion

3. **Other issues**

Proposal of amendments and additions to the current EU Ecolabel criteria document will be addressed through the discussion of the issues above. These will also form the basis for the potential development of GPP criteria. EU Ecolabel criteria not discussed here are proposed to remain unchanged.

Discussion on the definition of bed mattresses has been presented previously in Section 2. The other points are discussed below, where a summary is also provided to highlight preliminary findings, draft proposals of and open questions to stakeholders. Stakeholders are kindly invited to provide their valuable feedback, also keeping in mind that some material still needs to be processed and added to this document.

4.2.1 Environmental criteria areas on the sourcing and production of materials, on the end of life of the product and on other life cycle stages

Energy and Life Cycle Assessment considerations

1a) NEW area of discussion: Energy and Life Cycle Assessment considerations

Outline:

The production of bed mattresses is energy intensive and environmental burdens are associated with the life cycle of the product. Reducing the fossil energy demand would lower the carbon intensity of the product. Carbon impacts are also linked to the fuel mix and production efficiency of a country, making location and practice of manufacture important.

Further environmental areas of concerns were identified in the technical analysis and primarily affected by the materials used for bed mattresses manufacture and, on a lower extent, by the transport and storage of the final product.

In Section 4.1, dealing with the LCA review, it was found that energy consumption is one of the potential areas of concern within the product group. Other environmental issues of concern were identified: GHG emissions, Acidification, Smog formation, Human toxicity, Water toxicity, Eutrophication and Land transformation. The largest contributions to these impacts seem associated with raw materials and mattress components. Significant contribution could be also due to the product delivery and to storage/stores. From this point of view, LCA confirms to be an effective tool for helping to identify where criteria should focus. However, it should be noted that some pieces of information still need to be added to the technical analysis.

In the meantime, comments regarding energy issues were made by stakeholders:

- Including criteria specifically based on energy requirements or energy minimisation would present a significant barrier to applicants,
- Setting limits on energy would adversely impact on the performance of mattresses as it would favour products with lower raw material consumption,
- Higher material consumption, and thus energy consumption, may lead to benefits elsewhere, such as improved performance.

Discussion was also presented in Section 4.2.4 on Dunlop and Talalay processes, which are used for latex production and which have different energy consumption requirements. The preliminary conclusion is that both the processes can be required to produce foams with different properties and therefore that a specific technology could not be preferred to the other.

At the time of publishing this report, the LCA analysis is still to be completed and environmental information which could be used to set criteria for raw materials / mattress components appears relatively limited. Nevertheless, this should not stop the discussion about the potential development of EU Ecolabel criteria for LCA related issues. It should be indeed acknowledged that increasing the environmental responsibility of producers within this product group could be an added value for the EU Ecolabel.

It should be also noted that industry appears already experienced with carbon footprinting practices and standards already exist on how to report on products GHGs emissions, which is also indirectly related to the consumption of fossil energy. Selecting manufacture materials based on standard complying declarations could be an alternative approach to be explored in case benchmarking resulted of difficult implementation. Environmental reporting does not mean ensuring that "sustainable" impacts are

produced. However, this could be considered the first step of a process leading producers to increase their sensibility towards environmental issues and which should then be continuously improved in the future.

Impacts due to mattress components could be decreased also through the control of the sourcing and the application of eco-design principles aimed at selecting more efficient materials and at saving resources whilst preserving the functionality and the quality of the product. For this reason it will be interesting to discuss with the stakeholders if there are recommended value which could be set for benchmarking the manufacture of mattresses with respect to single materials/components used.

Storage and transport of the product to the customer could be additional sources of environmental concern. Promoting best practices for these activities could be a valuable element to consider within the EU Ecolabel. Stakeholders are invited to provide any inputs which could be used to rule this issue.

Even if further LCA information is to be investigated, comments from stakeholders will be very useful to address these issues.

Summary for discussion

Preliminary LCA results suggest that the life cycle of bed mattresses produces a few main environmental areas of concern (e.g. Energy consumption, GHG emissions, Acidification, Smog formation, Human toxicity, Water toxicity, Eutrophication and Land transformation). The largest contributions to these impacts seem associated with raw materials and mattress components. Significant contribution could be also due to the product delivery and to storage/stores.

Further LCA information is to be examined but it seems that increasing the environmental responsibility of producers on these issues could be an added value for the EU Ecolabel.

Possibilities of benchmarking could be limited by the availability of environmental information on bed mattresses. Nevertheless, industry appears already experienced with carbon footprinting practices and standards already exist on how to report on products GHGs emissions.

Selecting manufacture materials based on standard complying declarations could be an alternative approach to be explored in case benchmarking resulted of difficult implementation.

Impacts due to mattress components could be decreased also through the control of the sourcing and the application of eco-design principles aimed at selecting more efficient materials and at saving resources whilst preserving the functionality and the quality of the product.

Storage and transport of the product to the customer could be additional sources of environmental concern. Promoting best practices for these activities could be another valuable element to consider within the EU Ecolabel

Stakeholders are kindly invited to provide comments and inputs which could be used to rule these issues

Certification of wood

1b) Revision of criterion 5.1: Certification of wood

Existing criterion: Wood – Sustainable forest management:
All virgin wood used in the product should conform to the following criteria:

a) All virgin solid wood should be from forests which are sustainably managed (i.e. sustainable forest management).

b) 60% of virgin solid wood from forests with certified third party forest certification schemes.

c) Wood not certified must not originate from:
- disputed land rights or primary old growth forests
- illegal harvesting
- uncertified high conservation value forests.

Declarations must be produced to confirm origin.

Since the last revision of bed mattress criteria other EU Ecolabel product groups have adopted stricter controls on the sourcing of wood; for instance the copying and graphic paper product group, agreed in 2011.[a] The new criteria for this product group specify that 100% of virgin fibres must be sourced from forests which are part of a third party certification scheme for sustainable management such as FSC, PEFC, or equivalent. This indicates that it may be appropriate to increase the 60% level specified in the current criteria.

From the feedback received from the stakeholders it is apparent that this issue is relevant only for Scandinavian bed mattresses and thus not affecting other markets. Mixed suggestions were provided by stakeholders from keeping certified sourcing constant at 60% to raising this to 75-100%. Some further points are addressed below:

- Information from industry indicated that only 15% of wood-producing forests (by area) in the world are certified as FSC or PEFC (PEFC, the largest certification body, estimates they certify 60% of this 15%)[b]. However, it should be noted that 15% of forest area could not necessarily represent 15% of wood production.
- The same stakeholder indicated that a problem of traceability is present at production level and that it would be better staying on criteria on legality and not increasing the 60% threshold.

The challenge is to understand if these could be actually a factor limiting the threshold for the certified sourcing of wood.

In 2008 it was estimated that 25% of the total area of certified forests is located in the EU, with the vast majority of the rest in North America (57%).[c] It is also stated that around 60% of timber producing forests are certified in these regions. This indicates that access to certified wood for producers of Scandinavian bed mattresses should not pose a significant issue, although it may do in other territories which may import to the EU. However, one stakeholder indicated that the issue is not related to sourcing; rather it was associated with the traceability of the supplied wood at manufacturing level, as wood may get mixed and used in other non-Ecolabeled products.

It should also be noted that, from early 2013, an EU Directive will be in force making it an offence to place any product containing illegally harvested wood onto the market, and operators must undergo due diligence to confirm the legality of their sources.[d] Therefore, incorporating a stricter criterion can be

a 2011/333/EU: Commission Decision of 7 June 2011 on establishing the ecological criteria for the award of the EU Ecolabel for copying and graphic paper
b PEFC UK – Annual Report 2011, PEFC UK
c Timber Trade Federation, http://www.ttf.co.uk/Environment/Certification.aspx, accessed 12/12/2011
d Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010

seen a way to raise the EU Ecolabel baseline, as all products will need to meet stricter specification in the future.

Other environmental labelling schemes are less stringent. The Austrian Ecolabel specifies at least 50% of wood from sustainable forests, the Blue Angel requires that all wood is sourced from forests which are neither boreal nor tropical. However, this cannot be considered a sufficient reason for not setting more ambitious threshold

Summary for discussion

The information currently gathered suggests that the quantity of certified wood could be increased above 60%. 75% percent was suggested by one stakeholder however there may be the possibility to increase this threshold further.

Based on the gathered information, the preliminary proposal is to set this threshold to 100%. Feedback on this proposal is expected.

In case stakeholders disagree, it would be of very useful to receive:

1. Evidence that the amount of products on the market which can meet this criterion is not satisfactory, thus supporting the need for less stringent requirements**.**
2. Suggestions for alternative proposals and rationales behind.

Use of blowing agents for foam production

1c) Revision of criterion 2.7: Use of blowing agents for foam production

Existing criterion:
Halogenated organic compounds shall not be used as blowing, or auxiliary blowing agents.

Declaration of non-use in production processing required.

Improvements in production processes, particularly for foam, mean that the existing criteria may be out of date - specifically with reference to emissions during production. Though this may impact on the blowing agents used for PUR foam production, it may also have relevance for the production of synthetic latex foam in emulsion styrene butadiene rubber (ESBR) plants.

PUR foam (Criterion 2.7)
Historically both CFCs and HCFCs have been used in the production of PUR foams, and it is widely known these substances are harmful to the environment, particularly as GHGs and as ozone-depleting substances. The present criterion bans the use of any halogenated organic compounds used as blowing agents or auxiliary blowing agents. This aligned with the more recently revised Blue Angel scheme. Stakeholders commonly agree on a complete ban on halogenated hydrocarbons for this use because these compounds had been commonly replaced by carbon dioxide. Based on these pieces of evidence the existing criteria are believed to be appropriate and do not present a barrier to applicants.

Latex (no criterion)
Stakeholders indicated that latex foam production needs no blowing agents. However, research suggests that better alignment with Best Available Techniques (BAT) may be necessary based on the production of

latex foam in ESBR plants. The BAT Reference Document[a] indicates that at present there is no alternative to ESBR for the production of synthetic latex. The other process which may be used (solution-based styrene butadiene rubber) produces rubber with different properties, and is more appropriate for use in applications such as tyres, rather than latex-type rubber. Therefore ESBR is not-substitutable at present (substitution of synthetic latex with natural latex is discussed below).

Two processes exist for the production of synthetic latex: the Dunlop process and the Talalay process.[b] Both are used extensively in the production of the latex cores for mattresses; both using natural resources, synthetic materials or a mixture of the two as a feedstock. There was some indication from stakeholders that the Talalay process is more energy intensive; however, no studies could be found to quantify this difference. Both processes are used in industry as they impart different properties to the latex, e.g. Dunlop latex is firmer around the foam edges.[c] Therefore they cannot be considered substitutable, and the preference of a single process should not be specified within the criteria.

Summary for discussion

Two different foams are used in mattresses – PUR and latex foams.

PUR: At present there is a ban on the use of halogenated hydrocarbon gases as blowing agents within the criteria. This is not understood to be a barrier to uptake as PUR is easily produced using other techniques not reliant on these gases. The recommendation is therefore to keep this criteria in place as it is

Latex: No criteria specifically relate to this foam type at present. However it was indicated that there are two different processes for the production of latex foam (i.e. the Dunlop and Talalay processes), which have different energy consumption requirements. However, it was found that both these processes are required to produce foams with different properties, so no change is suggested.

Feedback on these proposals is expected. In case of disagreement, stakeholders are kindly invited to submit alternative options with associated rationales.

Use of renewable-based materials for fillings

1d) NEW area of discussion: Use of alternative materials based on renewable sources

Outline:
Renewable-based materials may be used to substitute for the commonly-used materials based on petro-chemicals, for instance in foam production. However, the benefits due to the use of renewable feedstock (e.g. natural oils such as castor, soya bean and sunflower) are not universally apparent. For instance substituting arable lands to produce bio-plastic precursors could have negative impacts on local ecosystems, biodiversity and food production.

This point focuses on the use of alternative materials based on renewable feedstock. Certain renewable materials, such as wool and coconut fibres are present in mattresses. These materials are typically used as layers of padding/wadding to augment the performance of the primary filling type (i.e. latex, PUR or springs). Information gathered from industry and stakeholders indicates that their usage could be

[a] European Commission Reference Document, Best Available Techniques in the Production of Polymers, August 2007
b Latices: Applications of latices , Blackley D. C., Springer, 1997
c http://www.savvyrest.com/why-savvy-rest/natural-dunlop-talalay, accessed 19/12/2011

increased; however, it is unlikely that these materials can fully replace the primary filling at present for all mattress types and specifications.

In addition to this, some alternatives exist for feedstock materials; for example, natural oils for the production of PUR and natural rubber. Other naturally available materials already in use are considered below. BASF's *Lupranol Balance*, which can be used as a precursor to foams, is made from castor oil.[a] Ford has also begun using soybean oil based foams (up to 25% of the overall foams used) in their vehicles.[b]

BASF indicates that natural sources may reduce certain environmental impacts, such as waste production and GHG emissions. However, trade-offs are possible, as other factors are expected to increase compared to conventional fossil feedstock (e.g. land use).[c]

The availability of these materials is also unknown at present. For instance, to cover 20% of the market production should need to be on a large enough scale to support the production of 3 million foam mattresses, based on market survey data above.

The comments received from stakeholders support that data are inconclusive at present:

- Overall there was general agreement that renewable materials could be encouraged, where appropriate, but probably in the future rather than immediately. However, sustainability issues need to be addressed and investigated carefully.
- Concerns were expressed about the lack of information demonstrating the benefits of using some renewable materials compared with 'conventional' materials.
- Linked to the above point was the observation that environmental impacts need to be correctly identified and compared. This could differ case-by-case and it would make the process of defining criteria difficult.
- The use of these materials may present new problems such as the presence of allergens or compromising the performance. Sustainability issues about the sourcing of the materials should be also considered.
- Some of the materials currently used in bed mattresses are already derived from renewable sources, e.g. wool, coconut fibres. However, outcomes from revision of the textiles EU Ecolabel criteria also need to be considered for these materials.
- Recycled textile materials from other uses can be used as part of the mattress filling.
- Different types of mattress have very different compositions, and there is also large variability within mattress types depending on specification. Therefore it is difficult to set precise values.

Therefore, further evidence on the benefits of promoting the use of renewable-based materials would be required before this issue is converted into a criterion. However, sustainable sourcing of renewable-based materials could be an issue to be considered here. Stakeholders are kindly invited to provide their feedback.

a http://www.basf.com/group/corporate/en/sustainability/eco-efficiency-analysis/projects/lupranol-balance-50, accessed 14/12/2011
b http://www.plasticstoday.com/articles/ford-applies-soy-based-foam-head-restraints0901201102, accessed 14/12/2011
c "Lupranol BALANCE 50 High Performance". Naturally, BASF, UTECH Europe 2009 Conference MECC, Maastricht, The Netherlands

Summary for discussion

Various options exist for replacing existing sources of materials used in mattresses with renewable alternatives. However, at present it does not appear appropriate to set criteria on the amount of renewable-based materials to be used. This is due to the lack of evidence of the environmental benefits across all materials.

However, this is believed to be a potential issue of concern for future revisions, especially if more evidence will be found.

What could be addressed in the present revision is rather the sustainable sourcing of renewable-based materials.

Stakeholders are kindly invited to provide their feedback.

Appropriate use of natural and synthetic materials

1e) NEW area of discussion: Appropriate use of natural and synthetic materials

Outline:
Certain materials used in mattresses are currently based on either natural materials or on synthetic analogues of naturally occurring materials, e.g. latex foam.

The use of natural materials may seem to be more environmentally friendly: however, evidence suggests that this is not true in all cases. For instance, extending rubber tree plantations to produce natural latex could have negative impacts on local ecosystems, biodiversity and food production.

Inclusion of criteria which encourage the appropriate use of both natural and synthetic materials may be required to ensure the use of the most environmentally friendly option is used, whether it is natural or synthetic. If 'natural' products are specified, similar requirements to those for sustainable forestry products could be adopted, in which third party proof is required to meet the criterion.

Latex is the material is the material of most relevance for this issue. Latex can be either natural (when produced from the sap of the "rubber tree") or synthetic (when produced from chemical synthesis). Both the materials are used in variable quantities in mattresses cores. Stakeholder comments indicated that a mixture of the two is often used in variable proportions, with synthetic latex accounting for between 5% and 100% present in a mattress. This blended approach is taken to optimise various factors associated with the mattress, for instance:

- Properties: synthetic latex has more uniform properties and is more durable, natural latex has greater elasticity.
- Consistency: the properties and quality of natural latex can vary, synthetic latex can be produced more consistently.
- Cost: synthetic latex is cheaper to produce than natural latex.

Overall the mixtures are chosen to provide the optimum performance (and price) of the mattress. Therefore the two types of latex present may not be considered substitutable as they bring different properties to the mattress, and both are required to provide choices in performance to the consumer.

Based on this, it is recommended that at present no action is taken on this due to the non-substitutability of the different latex types, and the function they perform. However, sustainable/secure sourcing of

latex could be considered here, as also highlighted in the point above and suggested by some stakeholders.

Further feedback on this discussion point is welcome.

Summary for discussion

Latex is available either from natural sources (sap of the rubber tree) or synthetically (primarily from chemical synthesis of petrochemicals), with both used in mattresses. A greater use of natural latex could seem to fit with the objectives of the EU Ecolabel, however this is not a straightforward issue to address.

Natural and synthetic latex, indeed, are not always substitutable within a mattress as they have different properties. Therefore, they are both used and mixed in variable proportions to provide the desired performance. There are uncertainties over the sustainable production of latex as this is a natural resource. For this reason, it could be proposed to ensure a "sustainable" origin for the natural latex, as also highlighted in the point above and by some stakeholders.

Further feedback on this discussion point is welcome.

Use of organic and conventionally produced materials

1f) NEW area of discussion: Use of organic and conventionally produced materials

Outline:

Organically produced materials may provide suitable and environmentally beneficial alternatives to certain conventionally produced (non-organic) materials in a mattress. It may be appropriate to specify the inclusion of organically produced materials or substances.

Mattresses contain a variety of naturally produced materials, including cotton, wool, natural latex, hemp, and bamboo and coconut fibres, which may be produced organically or otherwise.[a] These can either be part of the internal filling of the mattress, or may be part of the covering. Many of these are textiles and are available organically, therefore again there is a link to this ongoing textiles revision.

Overall it was widely acknowledged that organically produced materials have been shown to have some environmental and health benefits (dependent on the specific material), though there is often a balance between different positive and negative impact factors. This is demonstrated by LCAs of cotton which have indicated that organically produced materials were better overall in term of impacts of factors such as toxicity and waste, though there could be trade-off with respect to other categories, e.g. land use or water consumption.[b] However, it should be pointed out that there is often a greater difference in impact arising from the choice of material rather than whether it is organic or not, or indeed from production location.

It was also noted by stakeholders that at present the evidence of benefits was not sound for all the materials, therefore inclusion of specific criteria on organic production may be premature and it could be more important to speak of "sustainable" production.

[a] For a definition of “organic” and “organic farming” see the International Federation of Organic Movements http://www.ifoam.org/growing_organic/definitions/doa/index.html

[b] Environmental assessment of textiles, Ediptex, 2007

In terms of existing organic certification schemes, stakeholders indicated that inclusion of organic based criteria may lead to confusion with customers as there are already several separate labelling schemes to certify organically produced goods. Some already applies to mattresses; examples found include:

- No Feathers Please: http://www.nofeathersplease.com/ (wool and cotton)
- Healthy Choice: https://healthychoicemattress.com/organic_cert.htm (latex, various textiles for cover and filling)
- Savvyrest: http://www.savvyrest.com/why-savvy-rest/certifications
- Abaca (UK): http://www.abacaorganic.co.uk/

Therefore consumers who wish to purchase mattresses made of organically produced materials already have this option.

Inclusion of a new criterion specifying the use of some organically produced materials seems unwise under these circumstances. Indeed such action may result in unintended consequences, such as the greater use of synthetic materials or further discouragement of applications due to their greater complexity.

However, some inclusion within the current criteria could be made for textiles. For example, the existing criteria for textile products specify 3% organic cotton used annually.[a] A similar approach to the bed mattress' textiles EU Ecolabel criteria could be taken here, though it is recommended that the outputs of the textiles criteria revision are considered first when available. This approach does not seem applicable to latex since no evidence was found on the existence of different sources of natural latex.

Feedback is expected from stakeholders on this discussion point.

Summary for discussion

Organically produced natural materials have been demonstrated to lead to some health and environmental benefits, compared to conventionally produced natural materials. However, these benefits could be offset by an increase of other environmental burdens. Pros and cons associated with organic products should thus to be considered.

Various organic labeling schemes for bed mattresses already exist, therefore consumers are already offered organic options within this product group.

It is apparent that a careful approach is needed. The criteria could remain as they are now, with no specific requirements for organic materials. Alternatively, a similar approach to the EU Ecolabel textiles criteria could be adopted for certain materials, specifying the amount of organic material to be sourced. Revision of the textile product group is currently underway and the outcomes from this process could be integrated here.

Feedback is expected from stakeholders on this discussion point.

[a] 2009/567/EC, criteria 2

Impact of end of life and waste treatment

1g) NEW area of discussion: Impact of end of life and waste treatment

Outline:
At end of life, mattresses are typically sent to landfill. However, mattresses account for a large proportion of the total waste sent to landfill (10% by volume according to one study for the South East of England), and this represents a large quantity of material which is not recovered.

Criterion 11, durability of mattresses, is loosely linked to this topic**.** The lifetime of a household mattress is expected to be 10 years (or equivalent for different applications). This is measured by loss of height (<15%) and firmness (<20%) after a standard test. A test certificate must be provided to confirm these criteria are met, according to text method EN1957, with comparison of firmness and height after 100 and 30,000 cycles.

The most common disposal route for end-of-life mattresses appears to be landfill. Though the impact of this is not fully taken into account within the LCA data, it is clear this is an important factor to consider. For example, the EU Waste Framework Directive highlights the need to alter disposal routes, favouring prevention of waste, reuse, recycling and energy recovery over sending to landfill.[a] More specifically, the EU Landfill Directive targets the reduction volume of waste sent to landfill and increasing recycling rates.[b] Various schemes have been identified, with several companies operating in this area recovering foam and metal from mattresses for recycling; however, this practice does not appear to be widespread.[c] The recycling process for mattresses is not generally sophisticated, relying on hand separation of materials. This is often complicated by the different compositions of mattresses, as they typically have a large number of different materials present in the wadding, in addition to the main support type. This provides uncertainty over the value of the recycled materials available in mattresses.

The stakeholder consultation raised various issues about the practicalities and potential of other disposal routes, particularly recycling. Several stakeholders responded to this proposal. Points mentioned include:

- There may be hygiene and health issues associated with the end of life processing of mattresses to separate materials out for recycling, as a result of several year of use.
- There were differing opinions over which materials could be recovered/recycled if separation was viable. Most responses indicated that recycling of metals and wood was relatively simple. It was indicated that it was technically possible to recover other materials, however this may be difficult in practice due to economics and contamination. Energy recovery might be more a reasonable option in this case.
- Logistics may be difficult on a large scale due to the bulky nature of these items. This is backed up by the market survey data which indicates that 68 million mattresses are sold *per annum*, indicating that a large number are also disposed of.

It is clear that mattress disposal is an issue of significant concern; however, this is generally an end-of-life issue and therefore outside the direct control of the mattress producers. This makes influencing these practices through the EU Ecolabel scheme difficult unless producers incorporate some form of extended producer responsibility.

Other ways of encouraging alternative disposal could be explored, such as:

- Providing information on best practices of final disposal to consumers,

[a] Council Directive 2006/12/EC on waste

[b] Council Directive 1999/31/EC

[c] Examples include ARES Recycling GmbH (Germany), JBS Fibre Recovery (UK),

- Listing the materials used in the mattresses for the benefit of recyclers,
- Implementing eco-design principles for more efficient use of resources and recycling after use,
- Limiting the quantity of materials used,
- Using recycled materials,
- Assigning a bonus if old mattresses are given back to the producer. This is the approach followed by the Austrian Ecolabel, that also requires a waste management system in place in the production site.

Moreover, durability and quality of mattresses are other factors which have an indirect effect on the end of life impact of mattresses. Stricter requirements for these parameters could be another option to be explored.

Stakeholders are kindly invited to provide their feedback on the actions they consider more feasible within this scheme.

Summary for discussion

End of life processing of mattresses usually involves sending them to landfill, which accounts for a large proportion of landfill volume and contributes large impacts to certain aspects of the environmental burden of mattresses. Recycling is possible, but only occurs on a small scale, and may also be considered unhygienic.

Using the EU Ecolabel scheme to influence end of life practices is difficult as this is usually within the hands of the consumer. Extended producer responsibility schemes are one possible option, but these may be beyond the scope of the EU Ecolabel and GPP schemes. However, other methods of influencing end of life practices should be considered, such as:

- Providing information on best practices of final disposal to consumers,
- Listing the materials used in the mattresses for the benefit of recyclers,
- Implementing eco-design principles for more efficient use of resources and recycling after use,
- Limiting the quantity of materials used,
- Using recycled materials,
- Assigning a bonus if old mattresses are given back to the producer. This is the approach followed by the Austrian Ecolabel, that also requires a waste management system in place in the production site.

Moreover, durability and quality of mattresses are other factors which have an indirect effect on the end of life impact of mattresses. Stricter requirements for these parameters could be another option to be explored.

Stakeholders are kindly invited to provide their feedback on the actions they consider more feasible within this scheme.

4.2.2 Limitation in the use of hazardous materials and substances

Horizontal approach on hazardous chemicals of concern

2a) NEW area of discussion: Horizontal approach on hazardous chemicals of concern

Outline:
Recent changes to the EU Ecolabel legislation (EC/66/2010) have placed further restrictions on the use of hazardous materials and substances. These changes are addressed in Article 6(6):

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

Hazardous materials and substances can be classified through hazard statements / risk phrases (provided in Appendix III).

Derogations of specific substances are allowable in exceptional circumstances where inclusion would prevent take up of the EU Ecolabel or shift the environmental burden to other life cycle phases or impacts (Article 6(7) of the EU Ecolabel regulation).

The restrictions on hazardous substances and materials in the new EU Ecolabel regulation will require the addition of a new criterion to specifically handle these requirements. Restrictions are well defined and, for consistency, the technical wording used as base for discussion in other product groups was taken and adapted here. This wording is shown in Figure 10 and could be modified to reflect any need of this product group.

Figure 10: Preliminary formulation for the criteria dealing with the restrictions on hazardous substances and materials.

Criterion XX - Hazardous substances and mixtures

In accordance with Article 6(6) of Regulation (EC) No 66/2010, the product or any article of it shall not contain substances referred to in Article 57 of Regulation (EC) No 1907/2006 nor substances or mixtures meeting the criteria for classification in the following hazard classes or categories in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council ([a]).

List of Hazard statements ([b]) and Risk Phrases ([c]).
→ See Annex III

The use of substances or mixtures in the final product which upon processing change their properties in a way that the identified hazard no longer applies is exempted from the above requirement.

(a) OJ L 353, 31.12.2008, p. 1.
(b) As provided for in Regulation (EC) No 1272/2008.
(c)As provided for in Council Directive 67/548/EEC (OJ 196, 16.8.1967, p. 1).

Concentration limits for substances or mixtures meeting the criterion for classification in the hazard classes or categories listed in the table above, and for substances meeting the criterion of 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) No1272/2008. Where specific concentration limits are determined, they shall prevail against the generic ones.

Concentration limits for substances meeting criteria of Article 57 (d), (e) or (f) of Regulation (EC) No 1907/2006 shall not exceed 0.01 % weight by weight.

The following substances/uses of substances are specifically derogated from this requirement (to be discussed during the revision)

Assessment and verification
For each part of the product, the applicant shall provide the exact formulation and a declaration of compliance with this criterion, together with related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

Criterion XY - Substances listed in accordance with article 59(1) of Regulation (EC) No 1907/2006

No derogation from the exclusion in Article 6(6) shall be given concerning substances identified as substances of very high concern and included in the list foreseen in Article 59 of Regulation (EC) No 1907/2006, present in mixtures, in an article or in any homogenous part of a complex article in concentrations higher than 0.1% w/w. Specific concentration limits determined in accordance with Article 10 of Regulation (EC) No1272/2008 shall apply in case it is lower than 0.1% w/w.

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

Reference to the list shall be made on the date of application.

The applicant shall provide a declaration of compliance with this criterion, together with related documentation, such as declarations of compliance signed by the suppliers of substances and copies of relevant Safety Data Sheets in accordance with Annex II to Regulation (EC) No 1907/2006 for substances or mixtures. Concentration limits shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006 for substances and mixtures.

Whilst materials are banned based on their hazard statements / risk phrases, derogations may be made for some substances (provided they are not listed as substances of very high concern, as shown above). Stakeholders were asked to provide an indication of substances and materials for which derogations may be required within the bed mattress product group. A preliminary list is provided in Table 34.

Table 34. Preliminary list of substances and materials which may be considered for derogation within the "bed mattresses" product group

Substance	Use	Relevant hazard statements/risk phrase(s)*	Comments
Antimony trioxide	Flame retardant (synergist)	H351 – Suspected of causing cancer	Reliant on flame retardant criteria
Boric acid	Flame retardant	H360D – May impair fertility, may damage unborn child	Reliant on flame retardant criteria
Natural rubber	Common filling	H317 – May cause allergic skin reaction	Does not come into contact with skin due to covering
Nickel	Stainless steel, may be included in springs	H351 - Limited evidence of a carcinogenic effect H317 - May cause sensitization by skin contact H372 - Toxic: danger of serious damage to health by prolonged exposure through inhalation	Requires clarification if present in mattresses. Derogation required if so, and no route into body

** Taken from the European Inventory of Existing Commercial chemical Substances database*

Antimony trioxide (ATO) and boric acid are both used in flame retardant systems. Feedback from stakeholders suggested that both substances, and whether they should be considered for derogation in the case of ATO..

The European Inventory of Existing Commercial Chemical Substances indicates that ATO[a] can be classified as a substance harmful and with limited evidence of carcinogenic effect (R40, category 3 carcinogen). Toxic effects due to chronic exposure to the substance are also reported. Hazards seems primarily associated to inhalation exposure during manufacture. Even if derogation can be asked for substances classified as CMR category 3, this does not imply that the derogation will be provided in practice. Enough concern is given by the hazard profile of ATO. The replacement of a substance with a less hazardous material is recognized as one of the key principles of inherent safety which aims to reducing the possible sources of risks. Moreover, workplace safety is an element to be considered since Ecolabel focuses on the whole life cycle of products, as expressed in article 6(3) of the Ecolabel Regulation. The use of ATO is justified by the fact that it enhances the effectiveness of flame retardants and decreases the amounts of flame retardants necessary to obtain the required level of safety. However, a request for derogation can be examined only if supporting robust information is given to demonstrate that the use of ATO is significantly widespread within the product group and that the use of safer, more environmentally friendly options is not technically possible at the moment.

At present boric acid is on the SVHC candidate list and therefore cannot be derogated.[b]

Natural latex is a commonly used filling material, present in many latex blends used for mattresses. The risk phrase associated with this material is related to allergic skin reactions on contact with the skin. It is suggested that derogation is made due to the ongoing and widespread use of natural latex in mattresses, and as there are barriers present between the skin and latex mattress core.

The hazard statements associated with nickel are related to the pure metal rather than stainless steel. No hazard statement is associated with stainless steel, and its use in toys is allowed by EU[a] . A

a http://esis.jrc.ec.europa.eu/doc/existing-chemicals/risk_assessment/SUMMARY/datsum415.pdf
b http://echa.europa.eu/web/guest/candidate-list-table, accessed 11/01/2012

recommended derogation under similar circumstances is also under discussion in the development of EU Ecolabel criteria for imaging equipment.[b] Therefore, if confirmed that stainless steel is found in these products, it is suggested that nickel is derogated for this specific use.

However, stakeholders should be aware that, far from expressing binding statements, this is only a preliminary discussion about the materials and substances which may be considered for derogation. Request for derogation should be presented according to article 6.7 of the EU Ecolabel regulation and will be assessed case by case. Request for derogation should come with quantitative information providing solid evidence that alternatives do not exist that at the same time:

1. are safer with respect to the inherent hazards properties of chemicals
2. ensure an adequate level of protection of human health and the environment
3. are present in a sufficient number of products

It was noted that trace quantities of substances which have these risk phrases are likely to be present in mattresses. For example, biocides used in cotton production may not be completely removed by processing, so may be present in very low concentrations. The example product group above allows for one of these substances to be up to 0.1% of the weight of the final product. In the case of mattresses, a midrange pocket sprung double mattress may weigh about 50kg.[c] This would allow for up to 50 g of a substance per mattress. Therefore, within this revision it may be more appropriate to limit the weight to 0.01% of the component(s) / material(s) in which the particular hazardous substance is found. This would limit the concentration within a particular material rather than the mattress as a whole. Using the example above, a biocide present in cotton but banned due to risk phrases could only be present in x% of the total weight of cotton and not in x% of the total weight of mattress. Discussion with stakeholders is necessary in order to understand if 0.1% is the most appropriate value for the weight threshold and to shape the definition of "component/material".

Possibly, this criterion will be used also to replace some of the existing criteria on hazardous substances, bringing flame retardants, biocides, phthalates and other substances under a single criterion. This would have the benefit of simplifying the criteria document, although it may make it more difficult to distinguish between different uses and properties of substances. Stakeholders are invited to suggest what existing criteria could be absorbed within this horizontal criterion for hazardous substances and what specific uses/properties should be rather be handled separately.

Further feedback from stakeholders on this horizontal issue is welcome.

Summary for discussion

The inclusion of a new criterion on hazardous substances is necessary in order to align the product group to the EU Ecolabel legislation (EC/66/2010). It is proposed that the technical wording used as base for discussion in other product groups is taken and adapted here.

This bans substances based on a list of hazard statements / risk phrases (see appendix III). Derogation can be required in exceptional circumstances where inclusion would prevent take up of the EU Ecolabel or shift the environmental burden to other life cycle phases or impacts (Article 6(7) of the EU Ecolabel regulation).

Request for derogation will be assessed case by case and should come with quantitative information providing solid evidence that alternatives do not exist that at the same time:

---

a Directive 2009/48/EC Safety in toys

b http://susproc.jrc.ec.europa.eu/imaging-equipment/docs/Ecolabel%20Criterion%20Derogations%20Hazardous%20Substances.pdf

c http://www.johnlewis.com/231119190/Product.aspx, accessed 14/12/2011

1. are safer with respect to the inherent hazards properties of chemicals;
2. ensure an adequate level of protection of human health and the environment;
3. are present in a sufficient number of products

Stakeholders preliminarily suggested a list of substances which could be considered for derogation (antimony trioxide, boric acid, natural rubber and nickel). Additional material is required to evaluate some of them. Further input is also required to find out if further substances may need derogations, based on the listed hazard statements / risk phrases and on the definition of SVHC substance.

It was also noted that it is unavoidable that trace amounts of substances which have these relevant hazard phrases may be present. Therefore it is proposed that a substance falls under this criterion only if this is present for more than 0.1% of the weight of the component/material in which it is found. However, discussion with stakeholders is necessary in order to understand if 0.1% is the most appropriate value for the weight threshold and to shape the definition of "component".

This criterion may also be used to merge some of the other criteria together. Stakeholders are invited to suggest what existing criteria could be absorbed within this horizontal criterion for hazardous substances and what specific uses/properties should be rather be handled separately.

Further feedback from stakeholders on this horizontal issue is welcome.

Use of flame retardants

2b) Revision of criterion 9: Use of flame retardants

Existing criterion: Flame retardants used in the entire mattress:
Only reactive flame retardants are permissible: therefore all additive flame retardant containing mattresses are non-permissible, by default.

If any of the risk phrases specified below are associated with the flame retardant prior to application, these must not apply once it is in its applied, reacted form:
R40 (limited evidence of a carcinogenic effect), **R45** (may cause cancer), **R46** (may cause heritable genetic damage), **R49** (may cause cancer by inhalation), **R50** (very toxic to aquatic organisms), **R51** (toxic to aquatic organisms), **R52** (harmful to aquatic organisms), **R53** (may cause long-term adverse effects in the aquatic environment), **R60** (may impair fertility), **R61** (may cause harm to the unborn child), **R62** (possible risk of impaired fertility), **R63** (possible risk of harm to the unborn child), **R68** (possible risk of irreversible effects)

No testing is required, confirmed by a declaration that no additive flame retardants are present and a declaration of which reactive flame retardants are present.

Whilst the existing criterion refers to the whole mattress, the discussion below will be focused more on foam materials used as mattress fillings (i.e. latex, PUR) which fall under specific fire regulations. Different textile materials are used in ticking, wadding and other fillings, and have different properties to the foams (for example wool is known to be inherently flame retardant[a], though flame retardants may be added for some uses[b]). The textiles product group criteria are subject to an ongoing revision and the

[a] Wool for interior textiles, IWTO

[b] PRIORITISATION OF FLAME RETARDANTS FOR ENVIRONMENTAL RISK ASSESSMENT, Environment Agency (UK), 2003

outputs of this process will be taken on board with respect to the use of textiles in mattresses. Therefore it may be appropriate to define separate criteria for the textiles present and the fillings, based on the findings of each of these revisions. This is aligned with some of the comments received from the stakeholders, even if no common agreement on this issue was gathered.

The term 'flame retardant' refers to a substance or substances which limit(s) or reduce(s) the spread of fire, and does not refer to a specific class of substances. Inclusion in products is generally a result of fire safety concerns; therefore flame retardants are present in products such as plastics in electronics, carpets and upholstered furniture including mattresses.

The use of flame retardants in mattresses and other products is fundamentally linked to the safety regulations across Europe. A good outline of current standards can be found[a], but in summary most European countries state that for domestic purposes the ignitability of mattresses by cigarette must meet EN standards such as EN 1021 and 597. The UK market has more stringent standards and must meet BS 7177: 2008, specifying resistance to other ignition sources such as matches. Mattresses used in non-domestic situations are often differentiated, and have higher standards to pass. Again within the EU Ecolabel market the UK's are the most stringent, specifying "resistance to higher sources of ignition". In addition to the performance of the mattress, the filling materials themselves may be subject to fire safety legislation; this is particularly applicable to foam fillings.[b] It is therefore important that the EU Ecolabel criteria ensure that these standards can be met, whilst ensuring high health and environmental standards are maintained, ensured that this will not exclude a significant portion of the market.

The use of flame retardants in products in general has been subject to a large amount of discussion, both within the context of the EU Ecolabel and more broadly. Halogenated flame retardants (brominated and chlorinated) have perhaps being received the most attention, beginning with PCBs in the 1970s. This debate has been driven by two different aspects of the properties of these substances. On one hand they perform an important fire safety role by limiting the damage caused by fires. On the other, there are legitimate concerns over the health and environmental impacts of adding these substances to products. For example, they can be harmful or toxic, or may bio-accumulate: this is of particular concern in applications where leaching is a possibility. These concerns have led to restrictions on their use, for example in Europe a ban on penta- and octa-brominated di-phenyl ethers was introduced in 2003.[c]

The inclusion of fire safety issues in the LCA of products containing flame retardants was explored in literature. Although mattresses were not directly investigated, a study on upholstered sofas containing PUR foam may provide useful indications.[d] The aim of the study was to compare the environmental consequences of using or not using flame retardants, including taking into account the impact of having an accidental fire. The study shows that the impact of pollutants emissions from accidental fires may be very significant. Emission profiles with and without the use of flame retardants were weighted by the probability of having an accidental fire. It turned out that a sofa with no flame retardants emits higher quantities of poly-aromatic hydrocarbons when the occurrence of accidental fires is considered. Sofas with flame retardants instead emit larger amounts of halogenated species. The actual substances emitted are a result of the condition of the combustion process and of the chemicals which are burnt. However, other aspects of the problem are not covered by the study. For instance, higher blood concentrations of flame retardants are expected as a consequence of prolonged exposure, which is the typical case for bed mattresses. [e,a] Whilst the study does not provide firm conclusions for mattresses (or

a REGULATORY ISSUES AND FLAME RETARDANT USAGE IN UPHOLSTERED FURNITURE IN EUROPE E. Guillaume, C. Chivas, A. Sainrat LNE – CEMATE – Fire Behaviour Division Research, Studies Fire Safety Engineering Activities, France, 2008
b Fire safety of furniture and furnishings in the contract and non-domestic sectors, FIRA, 2010
c Directive 2003/11/EC relating to restrictions on the marketing and use of certain dangerous substances and preparations
d Fire safety of upholstered furniture,A Life-Cycle Assessment, SP Swedish National Testing and Research Institute, 2003
e Polybrominated Diphenyl Ethers, Hydroxylated Polybrominated Diphenyl Ethers, and Measures of Thyroid Function in Second Trimester Pregnant Women in California Ami R. Zota, June-Soo Park, Yunzhu Wang, Myrto Petreas, R.Thomas Zoeller, and Tracey J. Woodruff, Environmental Science & Technology 2011 45 (18), 7896-7905

indeed sofas), it demonstrates that many factors need to be considered, and that further methodological development are necessary. Moreover, it also suggests that a broader view than simply banning flame retardants through substance risk phrases may be considered to take into account also for derivative substances produced on combustion.

The ongoing concerns mean it is important that flame retardants are considered within the present EU Ecolabel revision. In addition to this, feedback since the last revision of the mattress criteria indicated that the existing criteria on flame retardants had limited the number of applicants. Therefore, two main issues were identified within the existing criterion related to flame retardants:

1. The existing criterion on flame retardants may need some changes to reflect better EU Ecolabel regulation, legislative framework, technical feasibility and market acceptance.
2. The existing criterion for flame retardants appears to severely limit the prospect of awarding the EU Ecolabel within this product group.

It should be noted, however, that the Austrian and German environmental labelling schemes have an outright ban on all flame retardant substances.

Stakeholder feedback provided very useful information in this area. Overall, it is indicated that the criteria related to flame retardants was a major factor in contributing to the limited number of applications for this product group, and that a revision would be welcomed. More specific inputs are provided below:

- The distinction between additive and reactive flame retardants is not meaningful in this context, and is open to interpretation leading to uncertainty as to how these substances are classified. This uncertainty is one of the factor limiting manufacturers from applying for the EU Ecolabel. In addition to this, it was said that the environmental and health impacts are not necessarily linked to the additive or reactive nature of a substance.
- Furthermore it was claimed that, if the criterion is assumed to fully exclude any flame retardant substance which is not completely chemically bonded to the mattress materials, it could be impossible for most of the products to meet both fire regulations across the EU and the existing EU Ecolabel criteria. General product safety legislation which applies to all products is defined by Directive 2001/95/EE; this acts as a baseline for the safety of products to ensure high level safety and health of consumers. This is a broad-based legislative framework covering product safety in general terms across the EU. Product producers must ensure that their products entering the market are safe and only pose minimal risk to the users. Serious risks associated with the product must be identified. However, further specific legislation, either at an EU or territory based level may apply further conditions on certain product or product groups, for instance for fire safety regulations. This appears particularly critical into the UK (roughly accounting for 12-13% of the EU-27 mattresses market) due to the stricter national legislation. The variations in fire regulations across the EU also add to the difficulty of defining this criterion.
- Some materials meet the necessary standards themselves without the need for the addition of other substances; for example wool. However, these are generally present in high end mattresses, which have a mixture of materials present, some being intrinsically resistant to fire and others not. It is also very unlikely that these materials would completely replace PUR or latex in the wider market.
- No information on the specific flame retardants present was provided, and it was stated that manufacturers may not know as materials are bought to meet a specification. However it was clear that flame retardants are required in some mattress types and compositions to meet fire regulations in some Member States, for example in France, Ireland, Portugal, Spain and particularly the UK. This adds further to the uncertainty caused by the definitions of flame retardants as additive or reactive.

---

aEskenazi B, Fenster L, Castorina R, Marks AR, Sjödin A, et al. 2011 A Comparison of PBDE Serum Concentrations in Mexican and Mexican-American Children Living in California. Environ Health Perspect 119(10): doi:10.1289/ehp.1002874

A recent study published by Defra examined the issue of flame retardants in mattresses in detail with respect to the EU Ecolabel.[a] The conclusions from this study agreed with the feedback above: that it was impossible to meet existing safety regulations if all additive type flame retardants were banned. The study indicates that at present flame retardant systems primarily use a chlorinated phosphorus system.[b] These satisfy the risk phrase based criteria, but use additive substances as part of the system. Therefore the current criteria are impossible to meet for standard types of mattress on the market. Although this could be mostly applicable to the UK, it appears generally true also for mattresses used in other countries.

The existing technologies for foams already avoid the use of brominated flame retardants, for which most concerns are raised. However the study concludes that a blanket ban on halogenated (bromine- and/or chlorine-containing) or specifically brominated flame retardants would not be appropriate, nor is excluding additive flame retardants. A risk phrase approach could be taken. This would potentially permit some existing chlorine phosphorus based systems, however information from industry is required to understand if specific derogations would be needed if this approach was taken.

It was also indicated that alternative flame retardant systems are becoming available which again meet the risk phrase criteria, for example tris(2-chloro-1-methylethyl)phosphate (TCPP) or melamine and its derivatives. These chemicals are expected to pose a lower overall hazard when compared to other flame retardants.[c,d] These are additive flame retardants and are excluded by the existing criterion. However, there are uncertainties about their performance, both as flame retardants and environmentally. Studies for phosphorus-based flame retardants were found; however, these were not applicable to mattresses or similar products.[e]

It would be important to receive from the stakeholders further clarification and information on the use of flame retardants in bed mattresses, in particular to understand better what are the chemicals used, both in the fillings and in the cover, what the most sustainable/acceptable options, and the relative market shares.

Moreover, it should also be noted that overarching bans on substances or materials which have certain hazards will also be implemented (see issue 2a above) as a result of the new EU Ecolabel legislation (Articles 6.6 and 6.7). The prohibited hazards cover and extend beyond those currently banned in the existing flame retardants criteria[f], though derogations may be required for some specific substances.

In light of difficulties with the existing criterion, as well the broader context of this issue, it is suggested that a similar approach to the criteria already in place for other EU Ecolabel product groups is followed. This would also provide some continuity between EU Ecolabel product groups. Two preliminarily proposals are made, which can be considered as a base of further discussion with the stakeholders:

1. Remove the criterion related to flame retardants and rely on the introduction of criteria limiting the use of hazardous substances and materials (see Section 2b). This would ban substances based on the associated risk phrases. All the risk phrases reported in the existing criterion are included in this proposal. To the knowledge of the authors, this would effectively eliminate the use of brominated flame retardants, but it would allow some additive flame retardants. Derogations may be required in accordance with Article 6.7 of the EU Ecolabel regulation if it can be demonstrated that

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

b For examples see http://www.cefic-efra.com/Objects/2/Files/HalogenatedPhosphateEstersFactSheet.pdf

c European Union Risk Assessment Report TRIS(2-CHLORO-1-METHYLETHYL) PHOSPHATE (TCPP), European Chemicals Agency, 2008

d Melamine - www.inchem.org/documents/sids/sids/108781.pdf, UNEP Publications

e THE ECOLOGICAL FOOTPRINT OF FLAME RETARDANTS OVER THEIR LIFE CYCLE – A CASE STUDY ON THE ENVIRONMENTAL PROFILE OF NEW PHOSPHORUS BASED FLAME RETARDANTS, Marzi T., Beard A., Flame Retardants Conference, Feb. 2006, London

f Relevant phrases are listed in Appendix III, R46 does not appear, however this refers to mutagenic properties therefore is banned as it falls under CMR classification.

alternatives do not exist that at the same time: are safer with respect to the inherent hazards properties of chemicals; ensure an adequate level of protection of human health and the environment; are present in a sufficient number of products. Further information on this matter is thus required from industry. This is the approach taken by the 2011 revisions of some EU Ecolabel criteria.[a]

2. Maintain the existing criterion, but reword it to allow the use of flame retardant systems with additive components, and revise the list of non-permissible risk phrases. As in the case above, derogations may be required with the hazardous materials and substances criteria to allow for particular flame retardant systems. This has been the approach taken within most product groups affected by this issue, though these may not have had a recent revision.

It should be noted that both of the proposals do not make a distinction between flame retardants used as filling materials or as cover. If technical differences instead exist that should be taken on board, stakeholders are kindly invited to provide their feedback and to share their experience on this field.

Other options were proposed by stakeholders, e.g. defining minimum safety requirement or prescribing emission test on the products, but their implementation is not considered the most streamlined and feasible approach to the flame retardants issue.

Summary for discussion

The existing flame retardants criterion appears to contribute significantly to the relatively low uptake of the EU Ecolabel within this product group. Moreover, the criterion is considered unclear and the number of products which could meet these requirements is unknown but believed to be small. Therefore, the need to change the criterion is apparent. Two suggestions are proposed for discussion:

1. Remove the criterion related to flame retardants and rely on the introduction of criteria limiting the use of hazardous substances and materials. This would ban substances based on associated risk phrases (all present in the existing criteria).

2. Maintain the existing criterion, but reword it to allow flame retardant systems with additive components, and revise the list of non-permissible risk phrases.

Derogations can be required in both the case in accordance with the EU Ecolabel regulation.

Feedback on these proposals is expected. Stakeholders are moreover invited to share technical information which can be used to understand better what are the chemicals used as flame retardants in bed mattresses, both in the fillings and in the cover, what the most sustainable/acceptable options, and the relative market shares. Alternative criteria proposals with relative rationale are also welcomed.

a 2011/330/EU (notebook computers) and 2011/337/EU (desktop computers)

Use of biocides

2c) Revision of criteria 6.1 & 10: Use of biocides

Existing criteria:

Textiles (6.1)
Chlorophenols (their salts and esters), PCB and organo-tin compounds shall not be used during transportation or storage of mattresses and semi-manufactured mattresses.
Declaration of non-use: Verification by standard test may be required by extraction (as appropriate) and analysis by gas-liquid chromatography with an electron capture detector. The limit value is 0.05 ppm.

Biocides in the final product (10)
Only biocidal products containing biocidal active substances defined in relevant EU Directive 98/8/EC are allowed (specifically Annexes I, IA and IB), and only those specified for use in bed mattresses (Annex V of Directive 98/8/EC).
This is confirmed by declaration of non-use, or providing a list of biocides used.

Research was unable to identify a significant market for domestic mattresses with biocides. Only one example was found which directly advertises the biocidal properties to help prevent infestations of bed bugs.[a] Therefore this appears to be a niche market at present, as also confirmed by stakeholders. However, two issues were raised:

- Some residual biocidal material may be present from processing, particularly in textiles.
- Healthcare mattresses may use biocides for hygienic purposes.

It should be also observed that the existing criteria refer to a piece of legislation which is going to be transferred to the REACH system.

The first of these issues is of relevance for the EU Ecolabel criteria for bed mattresses and also related to the revision of the EU Ecolabel criteria for textiles, as trace biocides are likely to arise from this source. Due to the lack of prominence of these substances within domestic mattresses, the existing criteria could be kept. In this way, the criteria would rely on a "white-list" approach. However this is going to expire and to be transferred to the REACH system. This could make preferable to remove the current criteria and to rule biocides through the introduction of a generic criterion on hazardous substances (see issue 2a above). It should be noted that this criterion will be introduced anyway, influencing the use of biocides due to the restriction of substances which have certain hazards. Moreover, provisions may be made for substances appearing in trace quantities, such as remnant biocides from cotton production. An upper limit of 0.01% by weight was suggested by stakeholders, even if alignment with the EU Ecolabel revision of textiles would be however necessary. For the sake of comparison, biocidal products are generally banned within Blue Angel. However, this is not considered necessary here because of the introduction of the horizontal criterion on hazardous substances.

The second of these issues can be confirmed through an analysis of the market, where various products containing biocides can be identified in the health sector.[b,c] It should be however noted that medical devices are excluded from the EU Ecolabel legislation.[d] Thus, in the case of GPP criteria for bed mattresses further investigation is needed into how to address this criteria area, though not all the mattresses publically purchased could be affected by this issue.

[a] http://www.sealy.co.uk/bugshield-collection-information.html, accessed 19/12/2011
[b] http://www.stm-healthcare.co.uk/index.php/products/mattresses-comprehensive-ranges.html accessed 19/12/2011
[c] http://www.parkhouse-hc.com/products/bariatric/permaflex-bariatric-mattress_92.html, accessed 19/12/2011
[d] Directive 93/42/EEC of 14 June 1993

Summary for discussion

This analysis indicates that biocides are not a large issue within this product group for the EU Ecolabel. The existing criteria, based on a "white-list" approach, could be kept and in case adapted to reflect the legislation changes or it could be removed. Whatever the choice, a generic criterion on hazardous substances will be introduced (see issue 2a above) which will also influence the use of biocides. Moreover, provisions may be made for substances appearing in trace quantities. Trace limits of 0.01% by weight of mattress component are suggested by stakeholders. However, this should also be aligned with the ongoing revision of the textiles criteria.

The situation is different for GPP, as biocides appear to be used in medical mattresses for hygienic reasons. Therefore this needs to be taken into consideration when defining these criteria, with further details required on the specific substances used.

Feedback on these proposals is expected. In case of disagreement, stakeholders are kindly invited to submit alternative options with relative rationales.

4.2.2.1 Use of Phthalates

2d) NEW area of discussion: Use of phthalates

Outline:
At present no EU Ecolabel mattress criteria directly limit the use of phthalates. However, changes may be required to criteria so that they better reflect the legislative framework, EU Ecolabel regulation, technical feasibility and market acceptance.

Phthalates are a group of chemicals commonly used as a plasticiser to enhance the properties of plastics. Their use has been subject to significant health and environmental concerns. Within this product group the use of phthalates in mattresses appears to be limited to the use as a plasticiser in PVC outer coverings, which have been used for some baby and are used for medical mattresses.

Stakeholder feedback confirmed that the use of phthalates was limited to the uses described above. Some additional points raised include:

- Main use of phthalates is in PVC covers for mattresses.
- A full ban within the GPP scheme would present difficulties for mattresses used in hospitals and care homes, therefore this should not be included in GPP criteria.

Phthalates (as well as other materials) with specific risk phrases will be banned from these products (see issue 2a). The phthalate of main concern appears to be DEHP which is listed as a substance of very high concern[a] and therefore cannot be present in products which have the EU Ecolabel. Substitution of DEHP is possible, typically with other phthalates such as DINP, which seem to pose less concerns for human health. Indeed, there is great variation of risks associated of different chemicals that fall within this group. Therefore, existing EU Ecolabel criteria for bed mattresses allow the use of phthalates in these products.

However, other health concerns with phthalates mean that they have been more rigorously treated in other product groups within the EU Ecolabel, the US Green Seal and Austrian Ecolabel. For example the

[a] http://echa.europa.eu/web/guest/candidate-list-table, accessed 14/12/2011

ban of phthalates within the EC Ecolabel footwear product group is based both on specific compounds and on risk-phrases associated with tem:

"Only phthalates that at the time of application have been risk assessed and have not been classified with the phrases (or combinations thereof): R60, R61, R62, R50, R51, R52, R53, R50/53, R51/53, R52/53, in accordance with Directive 67/548/EEC, may be used in the product (if applicable). Additionally DNOP (di-n-octyl phthalate), DINP (di-isononyl phthalate), DIDP (di-isodecyl phthalate) are not permitted in the product"

The phthalates listed above, as well as DEHP, BBP and DBP are also specifically banned from toys which may enter children's mouths due to evidence they may be endocrine disruptors.[a,b] As these may be present in PVC baby mattresses it may be appropriate to apply a similar ban for the EU Ecolabel within this product group. In the case of development of GPP criteria for healthcare or medical mattresses, such a ban may not be appropriate as it would unduly affect the ability of the product to perform its function.

Summary for discussion

Phthalates are an area of large concern, and their use is becoming increasingly restricted. To the knowledge of the authors they are not used extensively in domestic mattresses, but are more common in publically procured mattresses in association with PVC, they may also be present in baby mattresses

The introduction of an overarching ban on hazardous substances to the EU Ecolabel (see issue 2a above) will prevent the use of certain phthalates (specifically DEHP), however it may also be appropriate to have a more extensive ban, covering BBP and DBP, to match legislation for baby toys.

A similar ban for may be not appropriate for GPP given the function required of these mattress, and the need for PVC coverings.

Stakeholders are kindly invited to provide their feedback on these actions.

[a] http://europa.eu/legislation_summaries/consumers/consumer_safety/l32033_en.htm, accessed 14/12/2011

[b] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/99/829&format=HTML&aged=1&language=EN&guiLanguage=en, accessed 14/12/2011

4.2.3 Other issues of discussion

Further issues were identified during the revision of the document criteria and the stakeholders consultation. Stakeholders are kindly invited to provide their feedback on the following points and on all the issues which were so far not addressed in this framework:

1. Increasing the consumer awareness on the EU Ecolabel

This issue is considered one of the overarching reasons for the low market uptake of the EU Ecolabel for this product group. It does not seem possible to address completely this point within the present revision process. However, also producers could participate to the promotion of the EU Ecolabel scheme by better and more frequently informing consumers on the advantages associated with the EU Ecolabel.

2. EMS / CSR criteria

This is considered an important issue to demonstrate the responsibility of mattresses producers on environmental and social topics. It could be thus proposed to add to the existing criteria some further prescription about the implementation of Environmental Management Systems (e.g. EMAS or ISO 14001) and/or Corporate Social Responsibility schemes (e.g. SO 26000) in the production facility.

3. Alignment with the EU Ecolabel criteria for textiles

The revision of the EU Ecolabel criteria for textiles is closely related to this revision. The results of the revision on textiles will have bearing on bed mattresses (particularly flame retardants, biocides, organic materials and hazardous materials and substances criteria). Criteria related to textiles could thus change, with the possibility of becoming stricter. It is important to understand if this could create a new barrier for the mattresses producers willing to apply for the EU Ecolabel. In this case, it would extremely important to understand from the stakeholders what are considered the most sensitive parameters which could affect negatively the uptake of the EU Ecolabel.

4**. Simplification and consistency of the criteria**

In addition to the issues discussed above, another element which could prevent manufacturers from applying for the EU Ecolabel is the complexity of the existing criteria document, which is apparently coupled with presence of some inconsistencies. This could be improved by revising not only criteria content but also criteria formulation and design. Some issues to be addressed further were found out through an insight of the existing criteria document. These are reported in Table 35. Some of the issues are directly related to the material presented before while others appear of marginal importance. However, brief discussion on these points is considered necessary in order to deliver a consistently revised criteria document.

Table 35. Further points of discussion related to the within the "bed mattresses" product group

Criteria area	Issue	Points of discussion	Outcome
1. Latex	The following criteria need only be met if latex contributes to more than 5 % of the total weight of the mattress.	Blue Angel does not set any threshold. The existing 5% threshold could be maintained or it should be decreased	
	1.1. Extractable heavy metals	This criterion could be considered within the horizontal criteria on hazard substances.	
	1.2. Formaldehyde	This criterion could be considered within the horizontal criteria on hazard substances.	
	1.3. Volatile organic compounds (VOCs)	This criterion could be considered within the horizontal criteria on	

		hazard substances.	
	1.4. Dyes, pigments, flame retardants and auxiliary chemicals	This criterion deals only with dyes and pigments. The terms flame retardants and auxiliary chemicals should be removed In the Austrian Ecolabel, Azo dyes are banned also if they may release 4,4'-Methylen-bis-(2-chloranilin) (101-14-4). It is to be understood if this substance be included in the list of banned aromatic amines The criteria are the same as Commission Decision 2009/567/EC of 9 July 2009 for textile products and could be updated. This criterion could be considered within the horizontal criteria on hazard substances.	
	1.5. Metal complex dyes	This criterion could be merged to point 1.4. Same comments apply.	
	1.6. Chlorophenols 1.7. Butadiene 1.8. Nitrosamines	This criterion could be considered within the horizontal criteria on hazard substances. This is particularly true for Nitrosamine, which is carcinogenic. Blue Angel sets a limit also for the concentration of Carbon disulphide < 20 µg/m³. This prescription could be taken on board.	
PUR	The following criteria need only be met if PUR foam contributes to more than 5 % of the total weight of the mattress.	Blue Angel does not set any threshold. The existing 5% threshold could be maintained or decreased	
	2.1. Extractable heavy metals	As 1.1 – Latex. Criteria for Latex and Foam could be merged in a single group	
	2.2. Formaldehyde	As 1.2 – Latex. Criteria for Latex and Foam could be merged in a single group	
	2.3. Volatile organic compounds (VOCs)	As 1.3 – Latex. Criteria for Latex and Foam could be merged in a single group	
	2.4. Dyes, pigments, flame retardants and auxiliary chemicals	As 1.4 – Latex. Criteria for Latex and Foam could be merged in a single group	
	2.5. Metal complex dyes	As 1.5 – Latex. Criteria for Latex and Foam could be merged in a single group	
	2.6. Organic tin	In the EU Ecolabel it is states that mono-, di- and tri-organic tin compounds are banned. Blue Angel does not allow the use of any organic form of tin (tin bonded to a carbon atom). A wider ban could be be	

		prescribed	
	2.7. Blowing agents	The EU Ecolabel prescribe that halogenated organic compounds shall not be used as blowing agents, or auxiliary blowing agents (See Discussion point number 1c in Section 4.2.1). Blue Angel also ban the use of halogenated organic compounds (e.g. chloro-organic carriers in textiles) and this could be considered within the horizontal criterion on hazardous substances.	
Wire and springs	Wires and springs – Only applicable if PUR foam contributes to more than 5% of the total weight of the mattress	This refers wrongly to PUR and the wording is thus to be changed. Blue Angel does not set any threshold. The existing 5% threshold could be maintained or decreased The Austrian Ecolabel also prescribes that springs made of plastics must be free of halogenated organic compounds. It is to be understood if this should be declared explicitly or if the proposed new prescriptions on hazardous substances can sufficiently take this aspect on board	
	3.1. Degreasing		
	3.2. Galvanisation		
4. Coconut fibres	If rubberised, latex used must comply with criteria for latex foam	This criterion could be merged with Latex	
5. Wooden material	5.1. Sustainable forest management If degreasing and/or cleaning of wire and/or springs is carried out with organic solvents, use shall be made of a closed cleaning/degreasing system.	This sentence appears wrong and thus it should be deleted.	
	5.2. Formaldehyde emission from untreated raw wood-based materials		
6. Textiles (fibres and fabric)	Textiles used to cover the mattress shall meet the following criteria for dyes and other chemical products as well as for fitness for use (textiles which have been awarded the Community Ecolabel are in compliance with these criteria)	The link to textiles should be ensured. However, it is also important to understand if and where bariers would be created. Some substances could be included within the horizontal approach based on H statements / R phrases Prescriptions on dyes and pigments are given as for latex foam, with the exception of metal complex dyes, where limit emissions to water are assigned. A reference to latex could be made to simplify the criteria Differently from the EU Ecolabel, Blue	

		Angel also does not allow the use of the following substances: - Azo dyes releasing 4,4'-methylene-bis-(2-chloroaniline) (101-14-4) - Metal complex dyes based on cadmium, mercury, lead - Disperse Yellow 3 C.I. 11 855 within the sensitising dyes. It should be understood if these substances should be included in the list of banned substances	
	6.1. Biocides		
	6.2. Auxiliary chemicals		
	6.3. Detergent, fabric softeners and complexing agents		
	6.4. Bleaching agents		
	6.5. Impurities in dyes		
	6.6. Impurities in pigments		
	6.7. Chrome mordant dyeing		
	6.8. Metal complex dyes	The same criteria order of Latex should be followed. Criterion on metal complex dyes should be thus moved after the criterion on potentially sensing dyes (6.11).	
	6.9. Azo dyes		
	6.10. Dyes that are carcinogenic, mutagenic or toxic to reproduction		
	6.11. Potentially sensitising dyes		
	6.12. Colour fastness to perspiration (acid, alkaline)		
	6.13. Colour fastness to web rubbing		
	6.14. Colour fastness to dry rubbing		
7. Glues	Glues containing organic solvents are not permissible. Glues shall not be used which at time of application which are classified as carcinogenic (R45, R49, R40), harmful to the reproductive system (R46, R40), genetically harmful (R60-R63), toxic (R23-R28). The corresponding list of Hazard Statements is also provided.	R40 refers to cancer. Risk phrases need to be checked and updated. The same for reference to directives. For instance, here the reference is to Directive 1999/45/EC while before to Directive 67/548/EEC. Reference should be better made to Regulation (EC) No 1272/2008 all along the document.	
8. VOC and SVOCs on the entire mattress			
9. Flame retardants used in the entire mattress		The existing criterion is currently under discussion (See Discussion point number 2b in Section 4.2.2). However, if no change were applied to the criterion, the term "excluding" within the sentence "Flame retardants which are only physically mixed into the mattress materials or coatings are excluded" can be misinterpreted.	

10. Biocides in the final product			
11. Durability			
12. Packaging requirements	Packaging shall be made from recyclable material, with plastic type marked according to ISO 11469. Specified text referring to the EU Ecolabel must appear.	Packaging do not seem to be a major environmental issue and thus it could be discussed if this criterion is really necessary or if it can be deleted	
13. Information appearing on the Ecolabel	Box 2 of the Ecolabel shall contain specific text related: – 'Minimises indoor air pollution' – 'Hazardous substances restricted' – 'Durable and high quality'	Durable and high quality could be moved at the top of the list Air pollution and hazardous substances could be merged in one point A third point could relate on other environmental issue, which are currently not covered by the existing criteria	

Appendices

Appendix I: Summary of existing EU Ecolabel criteria

Appendix II: Comparison of environmental labelling schemes for Mattresses

Appendix III: Hazardous Substance, Risk Phrases and Hazard Statements

Appendix V: Mattresses production in EU-27, value and volume (2005-2009)

Appendix VI: Mattresses trade in EU-27, value and volume (2005-2009)

Appendix VII: Comparison of trade and production values across EU27 by mattress type (2010)

Appendix I: Summary of existing EU Ecolabel criteria

This summary is provided as a guide to the existing criteria, the full criteria document (2009/598/EC: Commission Decision of 9 July 2009) should be consulted for a complete outline

1. Latex Foam – Only applicable if latex is greater than 5% of mattress weight. Concentrations must be below values stated.

Criterion number	Applicable to	Criteria	Compliance
1.1	**Extractable heavy metals**	Limits on concentrations of: Copper <2 ppm Chromium, Nickel <1 ppm Arsenic, Lead, Antimony, Cobalt <0.5 ppm Cadmium <0.1 ppm Mercury <0.02 ppm	**Testing by atomic emission spectroscopy with inductively coupled plasma or with hydride or cold vapour technique**
1.2	**Formaldehyde**	Extractable formaldehyde <20 ppm or <0.005 mg/m^3 (dependent on testing method)	**EN ISO 14184-1 or chamber testing according to ENV 13419-1, with EN ISO 16000-3 or VDI 3484-1 for air sampling and analysis**
1.3	**VOCs**	VOCs <0.5 mg/m^3	**Chamber testing or DIN ISO 16000-6 for air sampling and analysis**
1.4	**Dyes, pigments, flame retardants and auxiliary chemicals**	As Commission Decision 2009/567/EC of 9 July 2009 for textile products. (a) Limits on metal ion impurities in dyes (colour matter with fibre affinity). Exclusion made for metals which are integral part of the dye molecule. (b) Limits on metal ion impurities in pigments(insoluble colour matter without fibre affinity) (c) Chrome mordant dyeing is not allowed (d) Azo-dyes which may cleave any one of a selection of aromatic amines are banned (e) A list of specific dyes which are classed as carcinogens, mutagenic or toxic to reproduction. Limits are also placed on dyes or dye preparations which contain greater than 0.1% by weight of substances which have specified risk phrases associated with them. (f) Potentially sensitizing dyes (listed) are not allowed.	**Declaration of non-use or compliance with relevant EU document**
1.5	**Metal complex dyes**	Metal complex dyes based on copper, lead, chromium or nickel shall not be used.	**Declaration of non-use**
1.6	**Chlorophenols**	Chlorophenols (salts and esters) <0.1 ppm mono, di-chlorinated phenols (salts and esters) <1 ppm	**Test through gas chromatography of an extracted sample**

1.7	**Butadiene**	Concentration of butadiene <1 ppm	**Tested through gas chromatography**
1.8	**Nitrosamines**	Nitrosamines <0.0005 mg/m^3	**Tested through chamber test**

2. Polyurethane Foam – Only applicable if PUR foam is greater than 5% of mattress weight.

Criterion number	Applicable to	Criteria	Compliance
2.1	**Extractable heavy metals**	As 1.1 – Latex	**As 1.1 – Latex**
2.2	**Formaldehyde**	As 1.2 – Latex	**As 1.2 – Latex**
2.3	**VOCs**	As 1.3 – Latex	**As 1.3 – Latex**
2.4	**Dyes, pigments, flame retardants and auxiliary chemicals**	As 1.4 – Latex	**As 1.4 – Latex**
2.5	**Metal complex dyes**	As 1.5 – Latex	**As 1.5 – Latex**
2.6	**Organic tin**	Mono and di-organic, tri-organic tin compounds shall not be used.	**Declaration of non-use**
2.7	**Blowing agents**	Halogenated organic compounds shall not be used as blowing agents, or auxiliary blowing agents.	**Declaration of non-use**

3. Wires and springs – Only applicable if PUR foam contributes to more than 5% of the total weight of the mattress.

Criterion number	Applicable to	Criteria	Compliance
3.1	**Degreasing**	A closed system is required when degreasing wire or springs.	**Self-declaration**
3.2	**Galvanisation**	Wire and springs must not be coated with a galvanic metallic layer	**Self-declaration**

4. Coconut Fibres – Only applicable if coconut fibres contributes to more than 5% of the total weight of the mattress

Criterion number	Applicable to	Criteria	Compliance
4	**Coconut fibres**	If rubberised, latex used must comply with criteria for latex foam	**As points 1(1) to 1(8)**

5. Wooden Material

Criterion number	Applicable to	Criteria	Compliance
5.1	**Sustainable forest management**	Sustainable forest management: a) All virgin solid wood shall originate from forests which are sustainably managed (Sustainable Forest Management and UNCED Forest Principles) b) 60% of virgin solid wood shall originate from forests with certified third party forest certification schemes c) Wood not certified must not originate from • disputed land rights or primary old growth forests • illegal harvesting • uncertified high conservation value forests.	**The applicant shall indicate types, quantities and origins of the wood used** **Certified sources – control chain of custody is required as proof of source** **Non-certified sources – species, quantity and origin of timber must be provided.**
5.2	**Formaldehyde emissions from untreated raw wood.**	Formaldehyde emissions from untreated raw wood-based materials. Particle board – emissions of formaldehyde shall not exceed 50% of the threshold value that would allow it to be classified as E1 according to EN 312-1. Fibreboard – emissions of formaldehyde shall not exceed 50% of the threshold value that would allow it to be classified as A1 according to EN 622-1. Class A will be accepted if fibreboards represent less than 50% of wood or wood material in product.	**Evidence that wood based materials comply with EN 312-1** **Evidence that wood based materials comply with EN 13986**

6. Textiles (fibres and fabric) – must meet following criteria for dyes and other chemical products, as well as fitness for use

Criterion number	Applicable to	Criteria	Compliance
6.1	**Biocides**	Chlorophenols (their salts and esters), PCB and organo-tin compounds shall not be used during transportation or storage of mattresses and semi-manufactured mattresses	**Declaration o f non-use. Verification by standard test may be required**
6.2	**Auxiliary chemicals**	Alkylphenolethoxylates (APEOs), linear alkylbenzene sulfonates (LAS), bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC), distearyl dimethyl ammonium chloride (DSDMAC), di(hardened tallow) dimethyl ammonium chloride (DHTDMAC), ethylene diamine tetra acetate (EDTA), and diethylene triamine penta acetate (DTPA) shall not be used in any of the preparations or	**Declaration of non-use**

		formulations used	
6.3	**Detergents, fabric softeners and complexing agents**	95% by weight of detergents, fabric softeners and complexing agents used at each wet processing site shall be "sufficiently degradable" or eliminable in wastewater treatment plants (see criterion related to auxiliaries and finishing agents for fibres and yarns). This is with the exception of surfactants in detergents at each wet processing site, which shall be "ultimately aerobically biodegradable" (see Regulation (EC) No 648/2004)	**Appropriate documentation (safety data sheets, test reports and/or declarations, indicating the test methods and results)**
6.4	**Bleaching agents**	Only for natural fibres, chlorine agents are excluded for bleaching yarns, fabrics and end products.	**Declaration of non-use**
6.5	**Impurities in dyes**	As 1.4 Latex	**As 1.4 Latex**
6.6	**Impurities in pigments**	As 1.4 Latex	**As 1.4 Latex**
6.7	**Chrome mordant dyeing**	As 1.4 Latex	**As 1.4 Latex**
6.8	**Metal complex dyes**	If metal complex dyes based on copper, chromium or nickel are used: – In case of cellulose dyeing, where metal complex dyes are part of the dye recipe, less than 20 % of each of those metal complex dyes applied (input to the process) shall be discharged to waste water treatment (whether on-site or off-site). – In case of all other dyeing processes, where metal complex dyes are part of the dye recipe, less than 7 % of each of those metal complex dyes applied (input to the process) shall be discharged to waste water treatment (whether on-site or off-site). – The emissions to water after treatment shall not exceed: Cu 75 mg/kg (fibre, yarn or fabric); Cr 50 mg/kg; Ni 75 mg/kg.	**Declaration of non-use or documentation and test reports using the following test methods: ISO 8288 for Cu, Ni; EN 1233 for Cr.**
6.9	**Azo dyes**	As 1.4 Latex	**As 1.4 Latex**
6.10	**Dyes that are carcinogenic, mutagenic or toxic to reproduction**	As 1.4 Latex	**As 1.4 Latex**
6.11	**Potentially sensing dyes**	As 1.4 Latex	**As 1.4 Latex**
6.12	**Colour fastness to**	The colour fastness to perspiration (acid/alkaline) must meet level 3-4. A level	**Testing according to EN:ISO 105 E04**

	perspiration (acid/alkaline)	of 3 is allowable when they are dark (standard depth > 1/1), and are made of regenerated wool or more than 20% silk. This does not apply to white products, or products which are neither dyed nor printed.	
6.13	**Colour fastness to wet rubbing**	Colour fastness to wet rubbing shall be at least 2-3. A level of 2 is allowable for indigo dyed denim. This does not apply to white products, or products which are neither dyed nor printed.	**Testing according to EN:ISO 105 X12**
6.14	**Colour fastness to dry rubbing**	The colour fastness to dry rubbing must be at least level 4. Level 3-4 is allowable for indigo dyed denim. This does not apply to white products, or products which are neither dyed nor printed.	**Testing according to EN:ISO 105 X12**

7. Glues

Criterion number	Applicable to	Criteria	Compliance
7	**Glues**	Glues containing organic solvents are not permissible. Glues shall not be used which at time of application which are classified as carcinogenic (R45, R49, R40), harmful to the reproductive system (R46, R40), genetically harmful (R60-R63), toxic (R23-R28). The corresponding list of Hazard Statements is also provided.	**Declaration that the glues used comply with this criterion, together with supporting documentation**.

8. VOCs and SVOCs on the entire mattress

Criterion number	Applicable to	Criteria	Compliance
8	**VOCs and SVOCs**	VOC emissions from entire mattress shall not exceed specified limits (for formaldehyde, other aldehydes, total organic compounds). This is made in analogy with the 'health risk assessment process for emissions of volatile organic compounds (VOC) from building products' developed in 2005 by the AgBB.	**Chamber testing to be performed according to EN 13419-1, EN13419-2 and ISO 16000-6 (VOCs) standards**

9. Flame retardants used in the entire mattress

Criterion number	Applicable to	Criteria	Compliance
9	**Flame retardants**	Only reactive flame retardants are permissible (i.e. additive flame retardants are non-permissible). If a flame retardant has any of the R-phrases specified in directive 67/548/EEC (see below), these must not apply once the flame retardant is in its applied form. **R40** (limited evidence of a carcinogenic effect), **R45** (may cause cancer), **R46** (may	**Declaration that no additive flame retardants are present** **Declaration of which reactive flame retardants**

		cause heritable genetic damage), **R49** (may cause cancer by inhalation), **R50** (very toxic to aquatic organisms), **R51** (toxic to aquatic organisms), **R52** (harmful to aquatic organisms), **R53** (may cause long-term adverse effects in the aquatic environment), **R60** (may impair fertility), **R61** (may cause harm to the unborn child), **R62** (possible risk of impaired fertility), **R63** (possible risk of harm to the unborn child), **R68** (possible risk of irreversible effects) The corresponding list of Hazard Statements is also provided.	**have been used, and their conformity with the criterion**

10. Biocides in the final product

Criterion number	Applicable to	Criteria	Compliance
10	**Biocides in the final product**	Only biocidal products containing biocidal active substances defined in relevant EU Directives are allowed.	**Declaration of non-use**

11. Durability

Criterion number	Applicable to	Criteria	Compliance
11	**Durability of mattress**	The lifetime of a household mattress is expected to be 10 years; this will vary depending on application. Adult mattress – Loss of height <15%, loss of firmness <20% Baby mattress – Loss of height <15%, loss of firmness <20%	**Test report verifying these criteria are met using EN1957 (100 vs. 30 000 cycles)**

12. Packaging requirements

Criterion number	Applicable to	Criteria	Compliance
12	**Packaging**	Packaging shall be made from recyclable material, with plastic type marked according to ISO 11469. Specified text referring to the EU Ecolabel must appear	**Declaration of compliance, along with sample of product packaging and information supplied**

13. Information appearing on the Ecolabel

Criterion number	Applicable to	Criteria	Compliance
10	**Information appearing on the Ecolabel**	Box 2 of the Ecolabel shall contain specific text related: – 'Minimises indoor air pollution' – 'Hazardous substances restricted' – 'Durable and high quality'	**Declaration of compliance, along with sample of packaging with label**

Appendix II: Comparison of environmental labelling schemes for Mattresses

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
Scope	A surface to sleep or rest upon for indoor use. The products consist of : - a cloth cover filled with materials, - the material filling (e.g. latex foam, PUR foam and springs); - wooden bed bases that support the mattress. The product group includes spring mattresses (upholstered base of springs, topped with fillings, and mattresses fitted with removable and/or washable covers) Inflatable mattresses and water mattresses are excluded.	A surface to sleep or rest on consisting of a strong cloth cover filled with material that can be placed on a bed frame. The product group also Includes: - mattresses with built-in frame, i.e. padded mattress surrounded by filling material with a flexible core framework on which can be placed on a bed frame or free standing - mattresses with removable and / or washable covers - filler material for bed mattresses and latex foam, polyurethane foam and Springs Inflatable mattresses and water mattresses are excluded.	A surface to sleep or rest on consisting of a strong cloth cover filled with material that can be placed on a bed frame. The product group also Includes: - mattresses with an integrated frame, i.e. upholstered bed bases with a flexible core surrounded by filling material which may be put on a bed frame or designed for free standing - head rest pillows where they form part of the mattress and are made of the same materials. Inflatable mattresses and water mattresses are excluded.
Materials			
Hazardous Substances	-	A horizontal ban/limitation of substances based on CLP and REACH directives is prescribed.	The materials used for the manufacture of a mattress must not contain as integral elements any substances or preparations which are toxic (T), very toxic (T+), carcinogenic, mutagenic, toxic to reproduction, teratogenic
Latex/PUR Foam	Only if foam is more than 5% of mattress weight	As in the EU Ecolabel	No weight thresholds
	Limit on concentration of heavy metals: Antimony < 0.5 ppm Arsenic < 0.5 ppm Lead < 0.5 ppm Cadmium < 0.1 ppm	As in the EU Ecolabel	-

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
	Chromium < 1.0 ppm Cobalt < 0.5 ppm Copper < 2.0 ppm Nickel < 1.0 ppm Mercury < 0.02 ppm		
	Limit on Formaldehyde content:-20 ppm (EN ISO 14184-1) or 0.005 mg/m^3 (Chamber test)	As in the EU Ecolabel	-
	Limit on VOCs content: 0.5 mg/m^3	As in the EU Ecolabel	-
	Dyes and pigments: - limits in impurities in dyes - limits in impurities in pigments - ban on chrome mordant dyeing - ban on azo dyes which may release specific aromatic amines - ban on CMR dyes - ban on sensitizing dyes - ban on metal complex dyes based on copper, lead, chromium or nickel	As in the EU Ecolabel with respect to: - limits in impurities in dyes - limits in impurities in pigments - ban of chrome mordant dyeing - ban of CMR dyes - ban of sensitizing dyes - ban on metal complex dyes based on copper, lead, chromium or nickel Azo dyes banned also if they may release 4,4'-Methylen-bis-(2-chloranilin) (101-14-4),	-
Latex Foam	Only if foam is more than 5% of mattress weight	As in the EU Ecolabel	No weight thresholds
	Chlorophenols < 0,1 ppm, except mono- and di-chlorinated phenols (salts and esters) which shall not exceed 1 ppm	As in the EU Ecolabel	Chlorophenols (including salts and esters) < 1 ppm
	Butadiene < 1 ppm	As in the EU Ecolabel	As in the EU Ecolabel
	Nitrosamines < 0.0005 mg/m^3	As in the EU Ecolabel	Nitrosamines < 0.001 mg/m^3
	-	-	Carbon disulphide < 20 $\mu g/m^3$
PUR Foam	Only if foam is more than 5% of mattress weight	As in the EU Ecolabel	No weight thresholds

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
	No Mono and di-organic, tri-organic tin compounds	As in the EU Ecolabel	Tin in organic form (tin bonded to a carbon atom) shall not be used
	Halogenated organic compounds shall not be used as blowing agents or as auxiliary blowing agents.	Same as in the EU Ecolabel	Partially fluorinated hydrocarbons (HFCs), perfluorinated hydrocarbons (PFCs), partially halogenated chlorofluorocarbons (H-CFC), chlorofluorocarbons (CFCs) or methylene chloride shall not be used as physical blowing agent or auxiliary blowing agent
Wires & Springs	Only if foam is more than 5% of mattress weight	No weight thresholds	No weight thresholds
	Degreasing of wire & springs by organic solvents must use a closed loop system	In addition to EU Ecolabel criteria, it is prescribed that springs made of plastics must be free of halogenated organic compounds	Closed cleaning/degreasing system shall be used for cleaning and/or degreasing wires and/or elastic springs with organic solvents
	The surface of springs shall not be covered with a galvanic metallic layer		As in the EU Ecolabel
Coconut Fibres	Only if more than 5% of weight	As in the EU Ecolabel	No weight thresholds
	If rubberised, must comply with the criteria applicable to latex foam	As in the EU Ecolabel	Same criteria applying to latex foam must be observed
Wooden material	No weight thresholds	As in the EU Ecolabel	Same as in the EU Ecolabel
	100% of virgin wood from sustainable forestry management 60% certified If not certified from legal sources	100% of wood from legal sources 50% from sustainable forestry management	Wood not from primeval (boreal and tropical) forests

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
	Emissions of formaldehyde from particleboard < 50 % of the E1 threshold value (EN 312-1) Emissions of formaldehyde from fibreboard < 50 % of the class A quality value (EN 622-1). However fibreboards classified as Class A will be accepted if they do not represent more than 50 % of the total wood and wood-based materials used in the product.	As in the EU Ecolabel	Wood-based materials to be marked with the RAL-UZ 76 Environmental Label or they must not exceed in their raw state, i.e. prior to machining or coating, a formaldehyde steady state concentration of 0.1 ppm in the test chamber.
Textiles	No weight thresholds	As in the EU Ecolabel	Same as in the EU Ecolabel
	Biocides: Chlorophenols (their salts and esters), PCB and organo-tin compounds shall not be used during transportation or storage of mattresses and semi-manufactured mattresses	Biocides: Fabrics from natural plant fibers, wool and other animal fibers as Oeko-Tex Standard 100 – class II. Baby mattresses as Oeko-Tex - Class I	Biocides: The requirements for pesticides of „Öko-Tex Standard 100", product category II, must be observed for cover fabrics made of vegetable natural fibres, wool and other animal fibres. Compliance with EU Ecolabel is considered an alternative compliance verification.
	APEOs, LAS, DTDMA, DSDMAC, DHTDMAC, EDTA and DTPA shall not be used in any of the preparations or formulations used	-	-
	95% by weight of detergents, fabric softeners and complexing agents used at each wet processing site shall be "sufficiently degradable" or eliminable in wastewater treatment plants. This is with the exception of surfactants in detergents at each wet processing site, which shall be	-	-

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
	"ultimately aerobically biodegradable"		
	Only for natural fibres, chlorine agents are excluded for bleaching yarns, fabrics and end products.	-	-
	Prescriptions on dyes and pigments as for latex foam, with the exception of metal complex dyes, where limit emissions to water are assigned	As for latex/PUR foams	Dyes & pigments: a list of substances which canot be used is provided (azo dyes; dyes that are carcinogenic, teratogenic or toxic to reproduction; potentially sensitizing dyes, heavy metal-containing dyes) Compliance with EU Ecolabel is considered an alternative compliance verification.
	The colour fastness to perspiration (acid/alkaline) must meet level 3-4. A level of 3 is allowable when they are dark (standard depth > 1/1), and are made of regenerated wool or more than 20% silk. This does not apply to white products, or products which are neither dyed nor printed.	As in the EU Ecolabel	-
	Colour fastness to wet rubbing shall be at least 2-3. A level of 2 is allowable for indigo dyed denim. This does not apply to white products, or products which are neither dyed nor printed.	As in the EU Ecolabel	-
	The colour fastness to dry rubbing must be at least level 4. Level 3-4 is allowable for indigo dyed denim. This does not apply to white products, or products which are neither dyed nor printed.	As in the EU Ecolabel	-
	-	No mothproofing agents may be used for the	No mothproofing agents may be used for the protection of cover

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
		protection of cover fabrics and the underlying upholstery made of natural textiles (wool and other animal fibres).	fabrics and the underlying upholstery made of natural textiles (wool and other animal fibres).
Glues	No organic solvents which are: - Carcinogenic - Harmful to reproduction systems - Genetically harmful - Toxic	Adhesives containing organic solvents may not be used, depending on general criterion on hazardous substances	-
Packaging	Packaging must be made of recyclable materials & plastics marked	-	-
Flame Retardants	Only reactive FRs allowed. If a flame retardant has any of the R-phrases specified in directive 67/548/EEC, these must not apply once the flame retardant is in its applied form	Use of flame retardants is banned	Use of flame retardants is banned
Biocides	Authorized those in Annex I, IA and IB to Directive 98/8/EC and those where the active substance is authorised for use in bed mattresses according to Annex V to Directive 98/8/EC		No fungicides or insecticides are allowed, except for fungicides exclusively used for pot preservation of aqueous adhesives as well as adhesives based on aqueous dispersions.
Halogenated organic compounds	Halogenated organic compounds shall not be used as blowing agents, or auxiliary blowing agents.	Springs made of plastics must be free of halogenated organic compounds	No halogenated organic compounds (e.g. chloroorganic carriers in textiles) may be added to mattresses, including the materials used for the manufacture (textiles, foams, wood-based materials, adhesives etc)
<u>Manufacture</u>			
EMS	-	A waste management systems is required in the production facility	-

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
		EMAS registration or ISO 14001 certification are required in the production facility	
<u>Use</u>			
VOCs and SVOCs of whole product	Formaldehyde after 7 & 28 days < 60 µg/m^3 (< 0.05 ppm). Other aldehydes after 7 & 28 days < 60 µg/m 3 (< 0.05 ppm) Total Organic Compounds (retention range: C6-C16): < 500 µg/m 3 (after 7 days) < 200 µg/m 3 (after 28 days) Total Organic Compounds (retention range above C16) < 100 µg/m 3 (after 7 days) < 40 µg/m 3 (after 28 days)	As in the EU Ecolabel	As in the EU Ecolabel , plus: C-substances After 3 days < 10 µg/m³ (total value) After 7 days < 1 µg/m³ (per single value) After 28 days < 1 µg/m³ (per single value) Total VOC without LCI < 100 µg/m³ (after 7 days) < 40 µg/m³ (after 28 days) R-Value < 1 (after 7 days) < 1 (after 28 days)
Fitness for use	Durability 10 years. Max loss of height: 15% Max loss firmness: 20%	Strength and durability: a) Loss of height < 14 mm b) loss of strength < 20% Serviceability according to ÖNORM A 1610-6, ÖNORM A 1610-1, ÖNORM A 1605-6, ÖNORM EN 1334, ÖNORM EN 1725 and EN 1957	Strength and durability: a) Loss of Height < 15 mm. b) Loss of Firmness < 20%. Serviceability according to DIN EN 1334 (Methods of measurement and recommended tolerances), DIN EN 1725 (Safety requirements and test methods) as well as DIN EN 1957 (Test methods for the determination of functional characteristics) Quality and durability: the ash content of the base material is to be determined. For polyurethane foam the ash content must be < 1%. For latex foam it must be < 6%

Issue	EU Ecolabel Jul 2009	Austrian Ecolabel UZ55 - Jan 2011	Blue Angel UZ 119 - Apr 2010
End-of-life			
Disposal of bed mattresses	-	Mattresses can be disposed through the municipal solid waste collection system. Nevertheless, a bonus can be given if old mattresses are given back when a new one is purchased	-
Other			
Consumer Info	Box 2 of the Ecolabel shall contain specific text related: - 'Minimises indoor air pollution' - 'Hazardous substances restricted' - 'Durable and high quality'	-	Manufacturer Model name Product description, including information on material structure Hardness value Suitability for adjustable spring bases Information on the overall durability (loss of height and firmness) Information on the product's wearing resistance Cleaning and care instructions

Appendix III: Hazardous Substance, Risk Phrases and Hazard Statements

Hazard statement	Associated risk phrase(s)
H300 Fatal if swallowed	**R28**
H301 Toxic if swallowed	**R25**
H304 May be fatal if swallowed and enters airways	**R65**
H310 Fatal in contact with skin	**R65**
H311 Toxic in contact with skin	**R65**
H330 Fatal if inhaled	**R23; R26**
H331 Toxic if inhaled	**R23**
H340 May cause genetic defects	**R23**
H341 Suspected of causing genetic defects	**R68**
H350 May cause cancer	**R45**
H350i May cause cancer by inhalation	**R49**
H351 Suspected of causing cancer	**R40**
H360F May damage fertility	**R60**
H360D May damage the unborn child	**R61**
H360FD May damage fertility. May damage the unborn child	**R60-61**
H360Fd May damage fertility. Suspected of damaging the unborn child	**R60-63**
H360Df May damage the unborn child. Suspected of damaging fertility	**R61-62**
H361f Suspected of damaging fertility	**R62**
H361d Suspected of damaging the unborn child	**R63**
H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.	**R62-63**
H362 May cause harm to breast-fed children	**R64**
H370 Causes damage to organs	**R39/23; R39/24; R39/25; R39/26; R39/27; R39/28**
H371 May cause damage to organs	**R68/20; R68/21; R68/22**
H372 Causes damage to organs through prolonged or repeated exposure	**R48/25; R48/24; R48/23**
H373 May cause damage to organs through prolonged or repeated exposure	**R48/20; R48/21; R48/22**
H400 Very toxic to aquatic life	**R50**
H410 Very toxic to aquatic life with long-lasting effects	**R50-53**
H411 Toxic to aquatic life with long-lasting effects	**R51-53**
H412 Harmful to aquatic life with long-lasting effects	**R52-53**
H413 May cause long-lasting harmful effects to aquatic life	**R53**
EUH059 Hazardous to the ozone layer	**R59**
EUH029 Contact with water liberates toxic gas	**R29**
EUH031 Contact with acids liberates toxic gas	**R31**
EUH032 Contact with acids liberates very toxic gas	**R32**
EUH070 Toxic by eye contact	**R39-41**
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled	**R42**
H317: May cause allergic skin reaction	**R43**

Appendix IV: Stakeholder questionnaire

Existing definition of bed mattresses

In the existing EU Ecolabel criteria the product code assigned to bed mattresses is 014. The product group of bed mattresses is defined as "products that provide a surface to sleep or rest upon for indoor use". These products consist of a cloth cover that is filled with materials which include latex foam, polyurethane foam and springs. The mattress may be supported by a bed structure in the form of a wooden base.

Products which are specifically identified as being included are spring mattresses, defined as upholstered bed bases consisting of springs, topped with fillings, as well as mattresses fitted with removable and/or washable covers.

Products specifically excluded include inflatable mattresses and water mattresses. Mattresses which fall under the medical equipment category, according to Council Directive 93/42/EEC, are also excluded. This encompasses devices specifically designed to specifically to provide medical benefit.

Proposal number: 1 **Definition of bed mattress product group**

Problem:

The existing definition of the bed mattress product group (described above) may not be completely appropriate nor inclusive of all mattress types available on the market. The definition above appears to be appropriate for sprung, non-sprung and certain 'special feature' mattresses. However other mattress types may exist and should be included.

The GPP scope must also be appropriate for mattresses obtained through public procurement mechanisms, which may have different compositions, construction and uses compared to mattresses purchased for private use. In particular, mattresses for hospitals may make up a substantial proportion of publically procured mattresses. Therefore it is essential that consideration is given to whether such mattresses fall within the definition of 'medical equipment' and are therefore excluded or whether they can be included within the scope of the GPP criteria.

It is important that the scope is unambiguous as well as representative of the market as a whole.

Questions for stakeholders:

1a: Is the definition still appropriate and suitable for this product category, or you would suggest any modification?

1b: Are there any mattress types which are excluded by this definition which should now be included?

1c: Are differences in definition and scope necessary for the EU Ecolabel and GPP? How would you address this issue?

Issues with existing criteria

Several issues have been identified with the existing EU Ecolabel criteria which may discourage or prevent uptake. Each is described below in more detail.

Proposal number: 2 **Criterion number: 5.1 - Certification of wood**

Existing criterion: Wood – Sustainable forest management:
All virgin wood used in the product should conform to the following criteria:

d) All virgin solid wood should be from forests which are sustainably managed (i.e. sustainable forest management).

e) 60% of virgin solid wood from forests with certified third party forest certification schemes.

f) Wood not certified must not originate from:

- disputed land rights or primary old growth forests
- illegal harvesting
- uncertified high conservation value forests.

Declarations must be produced to confirm origin.

Problem:
The development of EU Ecolabel criteria for other product groups (specifically copying and graphic paper) have led to the implementation of a stricter criterion. This specifies that 100% of virgin fibres must be sourced from forests which are part of a third party certification scheme for sustainable management such as FSC, PEFC or equivalent. This indicates that the current level of 60% for mattresses is not stringent enough, and should be revised upwards. This may have particular bearing on 'Scandinavian' type mattresses which have a high wood content.

Questions for stakeholders:
2a: What proportion of wood in mattresses (approximately) arises from third party certified sustainable forests?

2b: Is it realistic to increase the proportion of certified wood in mattresses to greater than 60%? Up to what extent is this considered feasible?

2c: Are existing criteria sufficient to allow 'Scandinavian' type mattresses to apply?

Proposal number: 3 **Criterion number: 9 - Flame retardants**

Existing criterion: Flame retardants used in the entire mattress:
Only reactive flame retardants are permissible: therefore all additive flame retardant containing mattresses are non-permissible, by default.

If any of the specified risk phrases are associated with the flame retardant prior to application, these must not apply once it is in its applied, reacted form.

No testing is required, confirmed by a declaration that no additive flame retardants are present and a declaration of which reactive flame retardants are present.

Problem:
Two issues exist related to flame retardants -

1) Changes are required to existing criteria on flame retardants so that they better reflect the legislative framework, EU Ecolabel regulation, technical feasibility and market acceptance.

2) The existing criteria for flame retardants appear to severely limit the prospect of awarding the EU Ecolabel within this product group. This is particularly true for additive flame retardants, which may

not have risk phrases associated with them, but are not permissible due to the blanket ban on additive flame retardants. However, both the Austrian and German mattress criteria specify zero use of flame retardants.

Therefore this criterion needs to be amended to reflect these factors.

Questions for stakeholders:
3a: Is this criterion preventing manufacturers from applying for the EU Ecolabel?

3b: Is the distinction between 'reactive' and 'additive' flame retardants meaningful?

3c: Are the limitations on hazardous substances sufficient to restrict 'additive' flame retardants?

3d: Would separate criteria for the mattress casing (textiles) and filling (latex, PUR) be more appropriate?

3e: What other criteria might be used to restrict the use of flame retardants?

Proposal number: 4 **Criterion numbers: 6.1 & 10 - Biocides**

Existing criteria:

Textiles (6.1)
Chlorophenols (their salts and esters), PCB and organo-tin compounds shall not be used during transportation or storage of mattresses and semi-manufactured mattresses.

Declaration of non-use: Verification by standard test may be required by extraction (as appropriate) and analysis by gas-liquid chromatography with an electron capture detector. The limit value is 0.05 ppm.

Biocides in the final product (10)
Only biocidal products containing biocidal active substances defined in relevant EU Directive 98/8/EC are allowed (specifically Annexes I, IA and IB), and only those specified for use in bed mattresses (Annex V of Directive 98/8/EC).

This is confirmed by declaration of non-use, or providing a list of biocides used.

Problem:
Changes are likely to occur to existing criteria on biocides so that they better reflect the legislative framework, EU Ecolabel regulation, technical feasibility and market acceptance.

(Note: regulations for textiles are being revised in parallel elsewhere)

Questions for stakeholders:
4a: Which biocides are present in mattresses?

4b: If they are present, in which components/materials are they present?

4c: Should biocides be allowed or banned in mattresses?

Proposal number: 5	Criterion number: 2.7 - Emissions for foam production (blowing agents)

Existing criterion:
Halogenated organic compounds shall not be used as blowing, or auxiliary blowing agents.

Declaration of non-use in production processing required.

Problem:
Improvements in production processes, particularly for foam, mean that existing criteria may be out of date - specifically with reference to emissions during production. Therefore better alignment with Best Available Techniques may be necessary, for example the production of latex foam in ESBR plants. Based on evidence from the corresponding BAT Reference Document[a] these may go beyond a simple ban on certain substances, but also include limits of emissions of other substances.

Comparison with the more recent Blue Angel criteria indicates that this label does not entirely ban halogenated compounds, perhaps indicating that a complete ban on halogenated hydrocarbons may be too stringent?

Questions for stakeholders
5a: Which blowing agents are used in foam production?

5b: Is a complete ban on halogenated blowing agents appropriate?

5c: To what proportion and types of mattresses could tighter limits apply?

5d: Would taking other emissions into account unfairly penalize certain mattress types?

[a] European Commission Reference Document, Best Available Techniques in the Production of Polymers, August 2007

New/additional criteria

The tables below summarises proposed additional criteria that are currently not reflected in the existing Ecolabel bed mattress criteria. These may be applicable to all or certain components of mattresses.

Proposal number: 6	**Impact of waste treatment**

Outline:
At end of life, mattresses are typically sent to landfill. However, mattresses account for a large proportion of the total waste sent to landfill (10% by volume according to one study for the South East of England), and this represents a large quantity of material which is not recovered.

Criterion 11, durability of mattresses, is loosely linked to this topic**.** The lifetime of a household mattress is expected to be 10 years (or equivalent for different applications). This is measured by loss of height (<15%) and firmness (<20%) after a standard test. A test certificate must be provided to confirm these criteria are met, according to text method EN1957, with comparison of firmness and height after 100 and 30,000 cycles.

Knowledge gaps:
What other waste treatment options (e.g. recycling) are available and appropriate? Does mattress type and composition affect this? What could be done to enable these treatments? Would increasing the lifespan of the mattress be an appropriate way to reduce waste?

Questions for stakeholders:
6a: What are the barriers to increased recycling/recovery of fibre and materials from bed mattresses?

6b: Which materials could already be recycled? How does this vary depending on mattress types?

6c: How can product design/manufacture allow for decrease waste production and greater recycling/recovery of fibre and materials?

6d: What other end-of-life options could be considered for bed mattresses?

Proposal number: 7	**Restricting the use of phthalates**

Outline:
At present no EU Ecolabel mattress criteria directly limit the use of phthalates. However, changes may be required to criteria so that they better reflect the legislative framework, EU Ecolabel regulation, technical feasibility and market acceptance.

Knowledge gaps:
The use of phthalates in mattresses has not been fully characterised, but they are typically used as plasticisers in PVC. Preliminary research indicates that they are specifically used in PVC for children's mattresses, but this may extend to cover other types. Confirmation is required.

Questions for stakeholders:
7a: Are phthalates still present in mattress covers? Which phthalates are most common in this use?

7b: Which type or component of mattresses contains phthalates? Which materials are they specifically present in?

7c: What are the alternatives?

7d: What would be the impact on EU Ecolabel licensing of having a complete ban in the criteria?

Proposal number: 8 **Energy requirements – Lifecycle analysis**

Outline:

The production of bed mattresses is energy intensive. Reducing the fossil energy demand will also lower the carbon intensity of their production. Carbon impacts are also linked to the fuel mix and production efficiency of a country, making the location of manufacture important.

Knowledge gaps:

Understanding the key stages of the manufacture and disposal of a mattress is important in determining where the largest impacts occur; this is best achieved through a lifecycle assessment (LCA) approach. This process will help us to understand:

- which stages/components are the most energy/co_2 intensive
- where these high impact manufacturing phases take place (both within and beyond the EU 27)
- what factors other than energy need to be considered.

A better understanding will be provided by the environmental information which will be gathered via the LCA technique during the technical analysis. This will be conducted once the initial phase of the revision process is underway. Input from stakeholders is welcome now, however.

Questions for stakeholders:

8a: Have the energy requirements of mattress manufacture been assessed? What studies on energy and other LCA issues can be regarded as relevant?

8b: Could a stringent minimisation of energy requirements have a negative effect on other impacts, such as restricting choice of materials, or specify manufacturing processes?

Proposal number: 9 **Use of alternative materials based on renewable sources**

Outline:

Renewable-based materials may be used to substitute for the commonly-used materials based on petrochemicals, for instance in foam production. However, the benefits due to the use of renewable feedstock (e.g. natural oils such as castor, soya bean and sunflower) are not universally apparent. For instance substituting arable produce to produce bio-plastic precursors could have negative impacts on local ecosystems, biodiversity and food production.

Knowledge gaps:

Technical, economic and social feasibility of using these materials. Evidence of existing or potential uses of these materials in mattresses.

Impact on other assessment criteria if these materials are included.

Environmental benefits of replacing other fillings.

Questions for stakeholders:

9a: Which common materials used in mattresses are, or could be, sensibly replaced by renewable-based ones?

9b: How would the sustainability of mattresses be affected by the use of these materials? Would they generate sound benefits?

9c: Are additional criteria modifications (such as the incorporation of other substances) required for their use?

Proposal number:10 **Appropriate use of 'natural' and 'synthetic' materials**

Outline:

Certain materials used in mattresses are currently based on either natural materials or on synthetic analogues of naturally occurring materials, e.g. latex foam.

The use of natural materials may seem to be more environmentally friendly: however, evidence suggests that this is not true in all cases. For instance, extending rubber tree plantations to produce natural latex could have negative impacts on local ecosystems, biodiversity and food production.

Inclusion of criteria which encourage the appropriate use of both natural and synthetic materials may be required to ensure the use of the most environmentally friendly option is used, whether it is natural or synthetic. If 'natural' products are specified, similar requirements to those for sustainable forestry products could be adopted, in which third party proof is required to meet the criterion.

Knowledge gaps:

Which materials present in mattresses have synthetic, semi-synthetic or naturally produced alternatives.

The environmental benefits of the different options, and how comparison can be made.

The impact on increasing demands for these materials (particularly natural-based materials).

Questions for stakeholders:

10a: Which common materials used in mattresses currently have a 'natural' or a 'synthetic' origin? In what proportion?

10b: Are there differences associated with mattress type and position in the market?

10c: How could the material supply-chain be managed to minimise environmental and social impacts?

Proposal number: 11 **Organic vs conventionally produced materials**

Outline:

Organically produced materials may provide suitable and environmentally beneficial alternatives to certain conventionally produced (non-organic) materials in a mattress. It may be appropriate to specify the inclusion of organically produced materials or substances.

Knowledge gaps:

What materials in mattresses could be substituted with organically produced alternatives, such as cotton or wool based coverings.

Sound evidence of the benefits of organic over conventionally produced materials – what are these benefits?

Questions for stakeholders:

11a: Are any components of mattresses organically produced or suitable for organic production?

11b: Due to the materials involved, is this evaluation more appropriate for inclusion in the revision of criteria for textiles? This will be taken into consideration as part of the revision process.

Proposal number:12 **Limiting the use of hazardous materials and substances**

Outline:

Recent changes to EU Ecolabel legislation (EC/66/2010) have placed further restrictions on the use of hazardous materials and substances. These changes are addressed in Article 6(6):

"The EU Ecolabel may not be awarded to goods containing substances or preparations/mixtures meeting the criteria for classification as toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction (CMR), in accordance with Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (2) OJ L 353, 31.12.2008, p.1.(2), nor to goods containing substances referred to in Article 57 of Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency"

Hazardous materials and substances can be classified through the risk phrases (provided in Appendix 2).

Derogations of specific substances are allowable in exceptional circumstances where inclusion would prevent take up of the EU Ecolabel or shift the environmental burden to other life cycle phases or impacts.

Knowledge gaps:

The impact that this will have on mattresses eligible for the EU Ecolabel.

What types of mattress could be affected more than others, and how.

Questions for stakeholders:

12a: Are hazard statements/risk phrases applicable to any existing substances which are widely used in bed mattresses?

12b: Are there any substances which would be wholly restricted by this list and require substitution with substances that would produce other negative environmental impacts?

12c: What substances/risk phrases/hazard statements should be the subject of derogation, and why?

Additional discussion points

Proposal number: 13	**Low uptake of EU Ecolabel under existing criteria**

As stated above, the uptake of the EU Ecolabel for mattresses is considerably lower than for many other product groups. It is important that the reasons for this are understood, and the revised criteria take these factors into account.

Knowledge gaps:
The specific reasons for low uptake of this product group when compared to others in the EU Ecolabel scheme. Are they specifically related to the criteria or to other factors?

Industry awareness of the EU Ecolabel.

13a: Prior to this process, were you or your organisation aware of the EU Ecolabel for mattresses? Were you aware of other Ecolabel schemes for this product?

13b: Please answer the relevant question below, depending on your previous involvement with the EU Ecolabel:

1) If your organisation had previously applied for the EU Ecolabel: What were your reasons for applying? Would stricter criteria influence this decision?

2) If your organisation has considered applying or had previously enquired about applying for the EU Ecolabel: What were your reasons for considering applying? What stage did you reach? What prevented you taking the application further? How would revision of the criteria influence this?

3) If your organisation has not considered applying for the EU Ecolabel: Are there reasons for not considering applying? How did the existing criteria influence this decision? Did you apply for other schemes? Why?

Other points

Proposal number: 14	**Additional comments/feedback**

Additional feedback from stakeholders is welcomed on issues not highlighted above. Therefore scope is provided for comments about the existing criteria, and how they could be improved within the scope of EU Ecolabel.

Comments will be collated, and common issues identified, to provide further evidence during the revision process.

14a: Additional comments and feedback

Appendix V: Mattresses production in EU-27, value and volume (2005-2009)

Production, Sold volume in thousand units / Value in EUR millions (2009)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		Total	
	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)
Austria	224	21.31	59	11.17	587	72.50	67	6.46	151	11.06	1 088	122
Belgium	484	57.32	:C	:C	1 389	87.05	904	73.78	:C	:C	2 777	218
Bulgaria	120	1.36	:C	:C	47	2.69	295	16.11	18	0.51	480	21
Cyprus	-	-	-	-	-	-	-	0.00	-	0.00	-	0
Czech Republic	:C	1.82	254	17.62	42	5.13	21	1.33	:C	21.26	317	47
Denmark	2	0.57	13	0.36	667	81.08	154	18.81	93	1.69	929	103
Estonia	29	:C	:C	:C	:C	:C	62	4.41	34	0.60	125	5
Finland	122	14.44	13	1.25	441	19.03	167	16.72	4	0.05	747	51
France	2 294	222.06	1 346	159.34	2 736	225.97	964	173.20	:C	:C	7 340	781
Germany	5 014	221.86	76	10.03	3 551	318.43	3 283	225.45	254	11.65	12 178	787
Greece	:C	:C	:C	:C	-	-	254	33.15	26	7.25	280	40
Hungary	56	3.68	11	1.41	83	3.26	14	2.42	:C	:C	164	11
Ireland	149	10.23	-	-	:C	:C	231	43.19	:C	:C	380	53
Italy	4 860	255.88	3 972	229.08	480	65.91	2 543	232.18	3 597	178.57	15 452	962
Latvia	:C	:C	-	-	-	-	14	2.14	:C	:C	14	2
Lithuania	7	0.16	-	0.01	89	1.05	126	7.55	303	6.10	525	15
Luxembourg	-	-	-	-	-	-	-	0.00	-	0.00	-	0
Malta	-	-	-	-	-	-	-	0.00	-	0.00	-	0
Netherlands	125	39.54	:E	5.63	20	:C	179	59.29	:E	:E	324	104
Poland	:C	19.79	:C	:C	3 242	154.25	2 746	146.64	1 690	26.15	7 678	347
Portugal	:C	:C	2	0.90	:C	:C	740	52.90	97	13.76	839	68
Romania	:C	:C	:C	:C	-	-	386	21.41	:C	:C	386	21
Slovakia	:C	:C	:C	:C	:C	:C	:C	:C	64	3.61	64	4
Slovenia	:C	:C	:C	:C	-	-	:C	:C	:C	:C	-	-
Spain	2 194	174.46	143	32.31	428	46.48	1 506	196.09	485	65.69	4,756	515
Sweden	972	89.10	21	2.99	942	29.86	124	22.87	154	7.96	2,213	153
United Kingdom	2 320	177.56	CE	8.85	1 372	40.92	4 277	376.42	698	13.06	8,667	617
EU27	**20 530**	**1 311**	**6 388**	**481**	**16 454**	**1 154**	**19 145**	**1 733**	**8 593**	**369**	**71 1 10**	**5 047**

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Source: Eurostat, PRODCOM

Production, Sold volume in thousand units / Value in EUR millions (2008)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER			
	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)
Austria	248	21.35	53	9.83	543	67.29	87	6.07	120	9.32	1 051	113.86
Belgium	491	59.70	:C	:C	1 614	98.56	711	72.94	:C	:C	2 816	231.21
Bulgaria	71	1.26	:C	:C	102	5.08	232	15.84	20	0.44	425	22.61
Cyprus	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	-
Czech Republic	:C	-	466	28.26	66	7.45	32	1.94	384	18.92	948	56.56
Denmark	3	0.71	69	0.80	685	92.25	217	26.48	125	2.34	1 099	122.59
Estonia	35	1.40	:C	0.28	41	1.06	79	5.91	63	1.34	218	9.99
Finland	94	11.94	13	1.24	371	15.81	164	16.13	7	0.08	649	45.20
France	2 664	216.13	1 525	173.57	2 720	216.39	1 013	170.04	:C	1.24	7 922	777.37
Germany	5 206	207.61	129	16.08	3 577	325.88	3 356	214.44	:C	13.16	12 268	777.17
Greece	:C	-	:C	:C	-	-	285	33.01	61	11.98	346	45.00
Hungary	59	4.41	17	1.77	67	3.58	18	2.59	:C	:C	161	12.34
Ireland	176	12.14	-	0.00	:C	:C	329	47.69	:C	:C	505	59.83
Italy	4 966	255.80	4 444	232.07	487	63.08	2 774	233.80	3 583	184.64	16 254	969.38
Latvia	:C	-	-	0.00	-	0.00	18	1.89	:C	:C	18	1.89
Lithuania	-	0.02	-	0.01	121	3.72	125	10.26	280	-	526	14.01
Luxembourg	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	-
Malta	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	-
Netherlands	170	52.58	:E	7.64	28	4.27	221	63.02	:C	:C	419	127.51
Poland	:C	:C	16	-	3 205	115.94	2 401	150.45	1 492	51.22	7 114	317.62
Portugal	:C	:C	3	1.08	:C	:C	836	58.76	76	11.27	915	71.12
Romania	:C	:C	-	0.00	:C	:C	589	31.50	:C	:C	589	31.50
Slovakia	:C	:C	:C	:C	:C	:C	:C	:C	65	3.61	65	3.61
Slovenia	-	0.00	:C	:C	-	0.00	:C	:C	:C	:C	-	-
Spain	2 267	206.76	209	44.53	471	33.60	1 913	248.92	563	56.44	5 423	590.25
Sweden	916	104.18	27	3.79	835	26.83	108	24.30	156	7.59	2 042	166.68
United Kingdom	2 143	190.47	:E	3.18	:E	64.88	4 038	395.27	659	12.75	6 840	666.55
EU27	**21 063**	**1 379**	**7 460**	**566**	**17 038**	**1 160**	**19 673**	**1 852**	**8 130**	**407**	**73 364**	**5 366**

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Source: Eurostat, PRODCOM

Production, Sold volume in thousand units / Value in EUR millions (2007)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER			
	Volume (1000 units)	**Value (M€)**	Volume (1000 units)	**Value (M€)**	Volume (1000 units)	**Value (M€)**	Volume (1000 units)	**Value (M€)**	Volume (1000 units)	**Value (M€)**	Volume (1000 units)	**Value (M€)**
Austria	242	20.59	90	14.59	446	55.55	108	9.68	97	8.13	983	109
Belgium	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C
Bulgaria	330	3.07	:C	:C	11	0.65	272	13.74	14	0.17	627	18
Cyprus	-	-	-	-	-	-	-	-	-	-	-	-
Czech Republic	:C	:C	406	22.17	60	4.15	44	2.08	:C	25.28	509	54
Denmark	7	1.84	19	0.58	947	108.19	185	23.61	150	3.13	1 308	137
Estonia	14	0.48	52	1.38	185	4.47	70	4.96	149	2.21	470	14
Finland	52	8.25	16	1.41	341	14.48	222	22.12	18	0.90	650	47
France	2 533	227.06	1 754	181.90	2 359	166.73	1 166	170.55	23	1.28	7 835	748
Germany	5 465	211.01	199	23.29	3 357	309.94	3 651	219.90	:C	13.78	12 673	778
Greece	:C	:C	:C	:C	-	-	398	39.56	40	6.51	438	46
Hungary	60	3.60	16	1.55	19	1.08	29	3.68	:C	:C	124	10
Ireland	163	12.05	-	-	:C	:C	380	63.75	:C	:C	542	76
Italy	4 194	151.47	4 234	186.32	228	44.81	2 612	215.95	2 744	115.39	14 013	714
Latvia	:C	:C	-	-	-	-	:C	:C	:C	:C	:C	:C
Lithuania	0	0.02	0	0.01	134	3.21	140	10.55	292	:C	566	14
Luxembourg	-	-	-	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	201	44.67	50	12.23	32	5.76	180	51.13	-	-	463	114
Poland	1 781	20.41	17	:C	2 737	75.13	2 928	190.41	2 095	60.52	9 558	346
Portugal	-	-	5	1.38	:C	:C	869	59.30	67	12.47	940	73
Romania	:C	:C	-	-	:C	:C	497	31.59	-	-	497	32
Slovakia	:C	:C	:C	:C	:C	:C	:C	:C	71	3.60	71	4
Slovenia	:C	:C	:C	:C	-	-	:C	:C	:C	:C	:C	:C
Spain	2 942	251.88	234	56.88	494	39.33	2 465	313.01	600	58.86	6 735	720
Sweden	1 068	120.49	:C	:C	838	26.74	130	29.94	214	10.40	2 250	188
United Kingdom	2 148	248.22	22	7.66	856	31.80	4 243	442.40	1 582	28.43	8 851	759
EU27	**21 200**	**1 325**	**7 114**	**511**	**13 044**	**892**	**20 589**	**1 917**	**8 156**	**351**	**70 103**	**4 997**

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Source: Eurostat, PRODCOM

Production, Sold volume in thousand units / Value in EUR millions (2006)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER			
	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)	Volume (1000 units)	Value (M€)
Austria	264	19.96	74	13.46	392	51.03	105	10.00	83	7.24	919	102
Belgium	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C
Bulgaria	47	0.86	:C	:C	7	0.28	173	9.23	45	1.37	272	12
Cyprus	-	-	-	-	-	-	-	-	-	-	-	-
Czech Republic	:C	:C	:C	:C	:C	:C	85	4.81	:C	:C	85	5
Denmark	259	25.08	17	0.58	916	101.36	414	42.12	171	4.46	1 777	174
Estonia	170	:C	:C	:C	26	2.46	186	4.00	181	2.45	563	9
Finland	106	10.41	5	0.34	373	15.28	303	28.30	:E	0.15	786	54
France	2 320	215.45	1 626	173.24	2 480	153.46	1 166	158.98	:C	:C	7,592	701
Germany	5 250	211.65	253	33.61	2 829	262.46	3 966	249.97	381	17.07	12 678	775
Greece	:C	:C	41	6.59	:C	:C	354	35.45	14	1.34	409	43
Hungary	78	4.46	7	0.77	13	0.78	45	4.05	:C	:C	143	10
Ireland	225	15.16	-	-	:C	:C	347	57.12	:C	:C	572	72
Italy	3 303	128.27	5 250	184.26	137	27.09	4 385	274.15	2 053	88.52	15 128	702
Latvia	:C	:C	-	-	-	-	:C	:C	:C	:C	-	-
Lithuania	2	0.12	0	0.02	114	2.33	127	8.73	345	8.14	588	19
Luxembourg	-	-	-	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	156	40.90	48	11.95	28	4.86	195	53.58	:C	:C	428	111
Poland	1 236	10.88	14	1.13	3 436	80.63	2 393	117.82	1 461	41.17	8 540	252
Portugal	:C	:C	4	1.18	:C	:C	858	56.43	68	13.89	931	71
Romania	:C	:C	-	-	:C	:C	443	24.86	5	:C	449	25
Slovakia	:C	:C	:C	:C	:C	:C	:C	:C	:C	2.78	:C	3
Slovenia	:C	:C	:C	:C	-	-	:C	:C	:C	:C	:C	:C
Spain	3 332	254.95	283	69.42	384	37.13	2 751	320.92	600	55.30	7 349	738
Sweden	263	74.89	:C	:C	:C	:C	134	19.90	231	11.80	628	107
United Kingdom	2 318	258.74	27	5.42	746	28.26	4 646	473.49	1 333	29.72	9 070	796
EU27	**19 329**	**1 271**	**7 650**	**501**	**11 882**	**767**	**23 075**	**1 953**	**6 970**	**285 40**	**68 906**	**4 780**

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Source: Eurostat, PRODCOM

Production, Sold volume in thousand units / Value in EUR millions (2005)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER			
	Volume (1000 units)	**Value (M€)**	**Volume (1000 units)**	**Value (M€)**	**Volume (1000 units)**	**Value (M€)**	**Volume (1000 units)**	**Value (M€)**	**Volume (1000 units)**	**Value (M€)**	**Volume (1000 units)**	**Value (M€)**
Austria	258	18.68	86	15.78	359	43.52	103	8.65	66	6.29	872	93
Belgium	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C	:C
Bulgaria	66	0.92	:C	:C	7	0.21	144	7.81	50	1.39	267	10
Cyprus	-	-	-	-	-	-	-	-	-	-	-	-
Czech Republic	:C	:C	:C	:C	:C	:C	79	:C	:C	:C	79	:C
Denmark	121	12.81	22	0.67	19 450	163.23	475	51.08	203	4.68	20 270	232
Estonia	27	:C	1	0.04	:C	:C	64	3.82	161	1.44	253	5
Finland	57	8.79	91	4.49	234	7.68	250	24.41	99	4.83	730	50
France	2 298	213.06	1 433	157.55	2,599	152.89	1 161	153.25	:C	:C	7 491	677
Germany	4 606	189.28	351	47.66	2,343	211.72	4 211	269.92	429	23.12	11 939	742
Greece	:C	:C	:C	:C	:C	:C	351	33.68	26	3.02	377	37
Hungary	81	4.13	12	1.33	6	0.29	51	4.51	10	1.15	160	11
Ireland	265	19.57	-	-	:C	:C	199	39.28	:C	:C	464	59
Italy	4 519	152.45	4 514	157.24	2,599	41.20	4 711	293.56	1 766	54.27	18 108	699
Latvia	-	-	-	-	:C	:C	:C	:C	:C	:C	-	-
Lithuania	5	0.31	0	0.01	94	0.70	97	6.31	287	6.10	482	13
Luxembourg	-	-	-	-	-	-	-	-	-	-	-	-
Malta	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	151	38.66	39	9.82	:C	2.41	188	52.10	:C	:C	378	103
Poland	:C	:C	120	2.01	2,101	38.37	1 646	39.68	1 007	:C	4 874	80
Portugal	7	0.47	6	1.64	:C	:C	957	61.74	52	13.86	1 023	78
Romania	4	0.19	-	-	:C	:C	433	20.18	:C	:C	437	20
Slovakia	181	1.81	:C	:C	:C	:C	:C	:C	:C	1.90	181	4
Slovenia	:C	:C	:C	:C	-	-	:C	:C	:C	:C	-	-
Spain	3 579	235.42	498	82.82	104	13.27	2 684	292.78	442	35.26	7 307	660
Sweden	877	78.98	:C	:C	825	24.01	146	19.07	309	16.66	2 157	139
United Kingdom	2 466	267.88	9	3.40	781	24.99	4 713	464.23	944	26.61	8 915	787
EU27	**19 566**	**1 243**	**7 181**	**484**	**31 503**	**724**	**22 662**	**1 846**	**5 852**	**200**	**86 764**	**4 499**

(:C)= Confidential, (:CE)= Confidential Estimated, (:E)=Estimated

Source: Eurostat, PRODCOM

Appendix VI: Mattresses trade in EU-27, value and volume (2005-2009)

Trade value, EUR millions (2009)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Total Imports	Total Exports	Net exports
Austria	21.17	28.55	8.06	3.11	26.54	34.52	13.05	3.78	9.44	15.04	78.26	85.00	6.73
Belgium	16.73	35.96	4.79	12.13	21.65	82.55	10.58	51.97	7.89	10.92	61.63	193.53	131.90
Bulgaria	0.25	0.06	1.98	1.26	0.33	0.28	0.42	1.13	0.72	0.64	3.69	3.37	-0.32
Cyprus	0.20	-	0.55	0.00	0.56	0.00	1.21	0.17	1.39	0.01	3.91	0.18	-3.72
Czech Republic	4.69	2.41	4.30	0.21	8.30	4.88	5.84	5.58	4.65	1.08	27.77	14.16	-13.62
Denmark	11.41	12.79	9.08	2.84	7.32	82.63	12.71	6.44	14.37	3.45	54.89	108.16	53.27
Estonia	0.14	0.70	0.08	0.94	0.32	3.40	1.27	9.22	0.72	0.68	2.53	14.95	12.42
Finland	3.45	0.02	0.70	0.02	5.08	0.28	10.47	0.33	2.73	0.19	22.42	0.85	-21.58
France	26.59	16.83	23.11	10.44	55.87	11.41	15.63	9.94	44.64	39.10	165.84	87.73	-78.12
Germany	32.55	82.82	11.41	7.52	147.72	49.36	19.02	20.91	44.03	30.06	254.73	190.68	-64.05
Greece	2.62	0.01	2.73	0.99	5.05	0.17	4.36	0.54	2.73	0.29	17.49	2.00	-15.48
Hungary	0.64	5.84	2.55	0.00	2.66	0.14	2.94	1.27	1.77	0.46	10.57	7.71	-2.85
Ireland	1.40	13.56	0.26	0.26	1.54	0.31	3.92	0.02	4.37	0.71	11.49	14.86	3.37
Italy	7.31	21.10	10.11	89.83	22.37	9.24	6.02	7.44	19.73	37.32	65.54	164.92	99.38
Latvia	0.13	0.24	0.72	0.05	0.24	0.01	0.98	0.16	0.50	0.28	2.57	0.73	-1.84
Lithuania	0.39	0.05	0.06	0.09	3.80	1.30	0.94	2.55	0.85	10.53	6.03	14.53	8.49
Luxembourg	2.62	0.00	1.92	0.00	1.25	0.02	1.53	0.00	2.78	0.03	10.10	0.06	-10.03
Malta	0.11	-	0.19	-	0.19	-	0.31	0.01	0.49	0.01	1.30	0.02	-1.28
Netherlands	27.62	9.48	9.14	0.90	56.08	50.63	25.32	9.34	16.70	11.12	134.86	81.48	-53.39
Poland	3.55	19.52	0.81	19.78	2.32	175.70	1.07	39.97	3.45	69.14	11.21	324.11	312.90
Portugal	0.54	2.32	2.41	0.75	4.64	0.11	6.72	32.02	6.22	6.78	20.52	41.97	21.44
Romania	0.53	0.04	1.11	0.00	1.49	0.02	1.12	0.88	2.16	0.53	6.40	1.48	-4.93
Slovakia	2.58	2.69	2.78	-	2.39	0.19	1.85	0.53	6.16	4.27	15.76	7.69	-8.07
Slovenia	8.53	7.53	5.36	7.46	10.89	7.29	3.11	2.69	1.01	3.80	28.90	28.77	-0.13
Spain	23.91	5.42	9.31	3.50	12.95	8.94	15.68	8.48	19.23	7.39	81.08	33.73	-47.35
Sweden	18.27	24.70	3.40	1.13	12.99	19.24	21.80	12.61	18.31	9.12	74.77	66.81	-7.96
United Kingdom	11.10	6.49	2.29	1.25	22.90	5.44	33.83	12.77	19.88	6.36	89.98	32.30	-57.68
EU27	**229.02**	**299.14**	**119.22**	**164.48**	**437.42**	**548.05**	**221.68**	**240.77**	**256.90**	**269.32**	**1 264.24**	**1 521.75**	**257.51**

Source: COMEXT

Trade volume, tonnes (2009)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Net export
Austria	6 316	4 979	1 742	457	3 791	2 921	3 970	530	1 214	1 424	17 033	10 312	-6 721
Belgium	4 359	7 166	883	1 405	2 981	11 509	2 137	8 775	1 558	1 800	11 918	30 655	18 738
Bulgaria	88	45	303	261	48	61	165	413	225	1 035	830	1 816	986
Cyprus	56	-	57	1	115	0	398	48	340	1	964	50	-915
Czech Republic	2 067	1 329	893	35	1 532	943	1 875	2 346	875	120	7 242	4 773	-2 469
Denmark	3 373	3 747	1 534	388	911	6 386	2 748	1 017	1 976	699	10 541	12 238	1 697
Estonia	57	279	15	238	97	442	479	2 586	107	120	754	3 666	2 912
Finland	1 119	3	93	1	779	20	2 600	37	328	10	4 918	70	-4 847
France	6 199	3 606	4 544	1 388	9 132	1 381	4 565	930	7 142	8 696	31 582	16 001	-15 581
Germany	5 403	25 514	2 090	1 299	30 199	8 657	4 541	4 791	4 723	3 568	46 956	43 829	-3 127
Greece	498	5	456	62	689	74	1 040	142	521	67	3 204	350	-2 855
Hungary	306	1 897	520	0	546	35	962	214	354	81	2 689	2 228	-461
Ireland	488	1 023	37	9	172	16	1 327	5	1 260	41	3 284	1 095	-2 190
Italy	2 510	5 011	2 210	18 861	3 995	1 443	1 525	1 792	2 055	7 098	12 295	34 206	21 911
Latvia	36	270	92	8	37	4	283	29	88	66	536	377	-158
Lithuania	173	18	10	13	517	358	205	648	167	2 327	1 073	3 363	2 289
Luxembourg	277	1	147	0	104	2	144	0	143	2	815	6	-810
Malta	48	-	22	-	19	-	74	3	105	13	268	16	-253
Netherlands	7 620	1 269	1 646	81	8 530	8 520	5 695	1, 51	4 077	1 328	27 568	12 249	-15 318
Poland	1 707	11 903	208	4 961	397	46 453	239	12 777	827	19 963	3 378	96 056	92 678
Portugal	179	633	390	102	743	19	1 307	16 999	885	1 422	3 504	19 175	15 670
Romania	137	10	166	1	289	1	540	1 098	583	148	1 715	1 259	-456
Slovakia	361	323	485	1	524	16	529	76	569	528	2 468	945	-1 523
Slovenia	3 719	3 141	975	1 029	2 056	953	938	822	171	796	7 859	6 741	-1,118
Spain	6 959	1 921	1 764	421	4 953	1 759	6 076	1 665	109 448	1 087	129 198	6 853	-122 346
Sweden	7 332	6 092	721	143	2 307	2 410	7 691	968	3 370	671	21 422	10 283	-11 138
United Kingdom	3 780	993	655	227	3 991	507	11 567	2 683	5 013	820	25 006	5 230	-19 776
EU27	**65 164**	**81 179**	**22 657**	**31 391**	**79 453**	**94 890**	**63 622**	**62 447**	**148 123**	**53 931**	**379 018**	**323 838**	**-55 180**

Source: COMEXT

Trade value, EUR millions (2008)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Net export
Austria	23.91	32.28	7.85	2.74	28.17	31.04	10.61	3.33	8.13	16.41	78.67	85.79	7.13
Belgium	17.99	36.97	5.70	14.44	23.66	103.19	8.26	46.84	5.15	8.88	60.75	210.33	149.58
Bulgaria	0.29	0.39	2.13	1.09	0.35	0.24	0.54	0.78	0.85	0.26	4.16	2.76	-1.40
Cyprus	0.56	-	0.77	-	1.06	0.00	0.52	0.36	1.19	0.02	4.11	0.38	-3.73
Czech Republic	5.23	3.12	3.83	0.16	9.38	13.66	6.15	5.47	4.96	1.64	29.54	24.05	-5.49
Denmark	13.70	10.71	8.64	2.67	12.22	97.90	12.15	6.32	18.60	4.73	65.31	122.33	57.02
Estonia	0.37	0.30	0.07	0.66	0.16	4.22	2.48	9.64	1.70	1.19	4.78	16.01	11.23
Finland	4.51	0.06	1.14	0.02	9.13	0.45	12.17	1.23	5.42	0.26	32.37	2.02	-30.35
France	27.51	18.14	27.00	10.74	53.50	11.46	12.95	13.29	46.82	48.28	167.78	101.91	-65.87
Germany	24.37	99.21	58.24	15.83	75.96	43.21	15.71	21.25	50.71	26.00	224.99	205.49	-19.50
Greece	2.70	0.32	2.21	0.86	9.32	0.09	1.65	0.65	3.47	0.26	19.35	2.19	-17.16
Hungary	1.04	6.11	3.05	-	3.48	-	3.55	2.53	2.69	0.83	13.81	9.47	-4.34
Ireland	0.94	15.16	0.27	1.38	0.98	0.14	3.57	0.02	5.76	0.61	11.52	17.30	5.78
Italy	7.57	24.89	11.54	96.06	27.16	9.90	2.91	9.23	16.01	40.72	65.18	180.80	115.62
Latvia	0.14	0.02	1.07	0.03	0.49	0.04	2.02	0.64	0.77	0.13	4.49	0.86	-3.62
Lithuania	0.51	0.10	0.09	0.07	3.14	2.24	2.08	2.57	1.12	6.31	6.93	11.28	4.35
Luxembourg	2.43	0.02	1.96	0.02	1.30	0.02	1.37	0.00	2.76	0.01	9.82	0.07	-9.74
Malta	0.13	-	0.23	0.00	0.19	-	0.27	-	0.40	0.01	1.22	0.01	-1.21
Netherlands	34.87	12.76	9.08	0.55	80.14	51.54	13.02	6.76	12.61	30.69	149.72	102.30	-47.42
Poland	2.64	23.46	1.07	20.40	2.20	119.37	0.65	72.22	3.85	104.93	10.41	340.39	329.98
Portugal	0.88	1.47	3.24	1.30	5.72	0.12	5.35	33.79	3.70	6.80	18.89	43.48	24.59
Romania	0.68	0.04	1.06	-	2.37	0.04	1.34	1.14	2.93	0.78	8.38	2.00	-6.38
Slovakia	1.43	2.79	10.59	0.01	3.02	0.11	1.58	0.93	5.75	4.55	22.36	8.39	-13.97
Slovenia	6.38	5.32	12.40	18.58	1.58	0.22	3.37	3.19	1.28	2.22	25.01	29.53	4.52
Spain	26.16	4.37	12.78	3.96	19.10	8.58	20.41	7.51	27.79	10.25	106.23	34.67	-71.56
Sweden	41.88	31.68	10.23	1.77	25.70	21.05	8.08	19.61	10.44	12.03	96.33	86.14	-10.19
United Kingdom	15.29	7.30	6.18	1.62	40.28	5.14	25.26	10.16	20.35	6.92	107.37	31.14	-76.23
EU27	**264.11**	**336.98**	**202.40**	**195.00**	**439.78**	**523.93**	**177.97**	**279.45**	**265.21**	**335.73**	**1 349.47**	**1 671.09**	**321.62**

Source: COMEXT

Trade volume, tonnes (2008)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import volume	**Export volume**	Import volume	**Export volume**	Import volume	**Export volume**	Import volume	**Export volume**	Import volume	**Export volume**	Import volume	**Export volume**	Net export
Austria	7 682	6 547	1 753	396	4 094	2 693	4 052	547	908	1,490	18,489	11,673	-6,816
Belgium	4 395	6 347	1 011	1 898	3 277	14 595	1 377	7 489	1 110	1 627	11 170	31 956	20 786
Bulgaria	91	350	310	270	65	52	266	258	215	39	946	969	23
Cyprus	98	-	77	-	204	-	152	84	281	3	811	89	-723
Czech Republic	2 197	1 477	678	19	1 657	2 186	1 842	2 184	814	57	7 187	5 922	-1 265
Denmark	3 841	3 082	1 325	317	1 534	7 628	1 699	1 061	2 489	828	10 889	12 916	2 027
Estonia	161	124	22	139	26	575	743	2 867	407	159	1 359	3 864	2 505
Finland	1 229	9	180	1	1 637	37	2 777	125	410	20	6 233	192	-6 041
France	5 346	4 110	5 211	1 569	8 541	1 807	4 179	1 449	7 940	11 337	31 218	20 273	-10 945
Germany	3 563	30 027	16 451	3 329	12 420	7 647	3 674	5 636	6 833	2 715	42 941	49 354	6 413
Greece	464	4	316	64	1 493	29	311	122	854	64	3 438	283	-3 155
Hungary	391	1 940	535	-	681	-	1 088	401	407	140	3 103	2 480	-623
Ireland	191	964	21	34	113	5	1 129	4	1 575	33	3 029	1 039	-1 991
Italy	2 154	5 958	2 268	-	4 931	1 597	689	2 251	1 332	7 620	11 374	42 004	30 631
Latvia	32	2	178	7	132	5	404	86	129	28	876	128	-748
Lithuania	159	15	12	9	445	514	437	587	196	1 558	1 248	2 683	1 436
Luxembourg	266	-	169	-	116	-	150	0	218	1	918	9	-910
Malta	30	-	32	-	19	-	92	-	84	2	256	2	-255
Netherlands	8 988	1 563	1 624	43	11 310	7 741	2 691	763	2 691	3 765	27 305	13 874	-13 431
Poland	1 472	11 775	237	-	331	23 858	176	18 725	621	26 872	2 837	84 496	81 659
Portugal	1 135	372	445	128	1 001	11	951	20 596	450	1 351	3 980	22 458	18 478
Romania	179	18	164	-	487	12	507	185	1 035	181	2 372	397	-1 975
Slovakia	395	521	7 971	1	545	38	441	129	971	469	10 323	1 158	-9 166
Slovenia	3 246	2 665	2 200	3 036	231	29	1 001	1 051	153	412	6 830	7 193	363
Spain	6 042	1 480	2 478	354	3 443	1 621	7 463	1 363	6 585	1 545	26 012	6 364	-19 647
Sweden	14 182	6 778	1 992	271	4 138	2 738	888	1 199	1 524	689	22 724	11 676	-11 049
United Kingdom	5 191	716	1 442	325	7 644	488	5 547	2 030	4 715	665	24 539	4 224	-20 315
EU27	**73 119**	**86 847**	**49 102**	**40 053**	**70 515**	**75 911**	**44 726**	**71 190**	**44 946**	**63 672**	**282 408**	**337 673**	**55 266**

Source: COMEXT

Trade value, EUR millions (2007)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Net exports
Austria	28.90	39.64	12.49	4.25	23.81	36.01	6.16	2.54	7.39	14.63	78.75	97.06	18.31
Belgium	18.61	36.54	5.92	15.75	19.73	99.60	8.56	45.29	5.57	8.44	58.41	205.63	147.22
Bulgaria	0.17	0.81	1.81	2.13	0.25	0.83	0.63	0.31	0.72	0.29	3.59	4.38	0.79
Cyprus	0.57	-	0.89	-	0.60	-	0.74	0.58	1.12	0.57	3.93	1.14	-2.79
Czech Republic	3.96	2.73	2.76	0.19	7.94	6.52	4.72	5.04	3.82	2.94	23.21	17.42	-5.79
Denmark	16.69	10.08	8.67	3.84	12.29	114.83	14.31	7.13	19.96	6.00	71.91	141.88	69.98
Estonia	0.26	0.22	0.16	0.55	0.12	3.06	3.85	10.15	0.71	1.12	5.10	15.10	10.01
Finland	3.39	0.06	1.02	0.01	9.93	0.33	13.28	1.23	6.97	0.22	34.59	1.86	-32.73
France	28.17	22.90	20.24	10.63	49.63	12.33	12.09	12.81	47.20	39.76	157.32	98.43	-58.90
Germany	25.25	104.04	41.98	15.60	64.10	33.02	22.18	22.34	52.76	27.75	206.26	202.75	-3.51
Greece	2.58	0.01	1.31	0.95	6.39	0.09	1.22	0.94	2.56	0.34	14.06	2.33	-11.74
Hungary	1.02	4.30	1.36	0.00	3.07	0.14	4.05	0.53	2.78	0.71	12.28	5.68	-6.60
Ireland	1.46	17.44	0.33	1.55	0.67	0.27	3.55	0.11	7.12	1.06	13.14	20.43	7.30
Italy	4.75	34.29	13.07	93.43	31.23	10.27	2.87	14.67	10.33	41.92	62.25	194.58	132.33
Latvia	0.23	0.00	0.64	0.02	1.36	0.00	1.72	0.40	0.97	0.11	4.91	0.54	-4.37
Lithuania	0.60	0.04	0.12	-	1.91	1.37	2.05	2.77	0.92	6.10	5.61	10.27	4.67
Luxembourg	2.23	0.01	1.95	0.01	1.31	0.01	1.43	0.05	2.07	0.01	8.99	0.08	-8.91
Malta	0.23	-	0.26	-	0.35	-	0.51	0.00	0.27	0.00	1.62	0.00	-1.61
Netherlands	28.20	12.64	8.11	0.52	67.68	51.15	10.99	6.01	13.25	32.89	128.22	103.20	-25.02
Poland	2.46	20.00	0.71	15.85	0.98	69.62	0.50	31.19	3.26	115.58	7.92	252.25	244.32
Portugal	1.03	0.72	2.54	1.74	4.31	0.16	4.20	37.43	3.10	3.84	15.18	43.89	28.70
Romania	0.94	0.03	0.69	-	1.74	0.04	1.39	0.58	2.62	1.17	7.39	1.82	-5.57
Slovakia	1.11	5.45	13.83	0.08	2.06	0.24	1.02	0.80	4.64	4.28	22.66	10.84	-11.82
Slovenia	1.61	0.85	8.04	15.81	1.07	0.16	2.79	2.73	1.77	2.10	15.27	21.65	6.38
Spain	36.01	6.15	17.52	4.36	15.48	15.84	20.97	6.62	25.11	8.63	115.10	41.59	-73.50
Sweden	43.33	34.06	8.91	1.72	26.99	22.98	9.25	22.06	10.80	14.42	99.27	95.24	-4.03
United Kingdom	18.77	6.12	10.36	2.25	41.36	5.06	20.28	11.47	18.49	6.90	109.27	31.79	-77.48
EU27	**272.52**	**359.13**	**185.69**	**191.23**	**396.37**	**483.95**	**175.33**	**245.76**	**256.30**	**341.77**	**1 286.21**	**1 621.85**	**335.64**

Source: COMEXT

Trade volume, tonnes (2007)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import volume	**Export volume**	**Import volume**	**Export volume**	**Import volume**	**Export volume**	**Import volume**	**Export volume**	**Import volume**	**Export volume**	**Import volume**	**Export volume**	**Net export**
Austria	10 543	8 642	4 728	709	3 749	3 844	913	438	892	1 379	20 824	15 010	-5 813
Belgium	4 806	6 342	1 019	2 091	3 294	15 098	1 538	7 377	1 155	1 211	11 811	32 118	20 308
Bulgaria	121	785	288	708	64	160	286	118	240	58	999	1 829	830
Cyprus	72	-	95	-	130	-	223	142	270	37	790	178	-612
Czech Republic	1 876	2 194	532	26	1 603	1 239	1 427	2 128	569	235	6 007	5 821	-186
Denmark	4 578	2 992	1 350	428	1 282	9 175	1 887	1 342	2 902	1 051	11 999	14 988	2 990
Estonia	95	83	32	114	20	393	973	3 418	185	150	1 304	4 158	2 854
Finland	877	10	160	0	1 819	39	2 738	130	586	16	6 181	195	-5 986
France	6 400	5 218	4 024	1 448	8 385	1 999	3 886	1 441	8 456	9 961	31 152	20 067	-11 084
Germany	4 526	30 508	11 171	3 327	10 335	5 931	6 190	6 958	6 643	3 813	38 865	50 537	11 673
Greece	582	4	353	49	2 668	18	417	162	829	79	4 848	312	-4 535
Hungary	317	1 485	332	0	715	60	1 330	67	515	97	3 209	1 709	-1 500
Ireland	285	1 227	45	42	91	9	1 419	16	1 891	113	3 732	1 407	-2 325
Italy	828	9 621	2 544	23 441	6 339	1 741	634	3 385	768	9 926	11 112	48 114	37 002
Latvia	63	1	118	4	407	1	446	73	145	23	1 179	101	-1 078
Lithuania	341	12	17	-	247	398	494	705	168	1 415	1 267	2 530	1 262
Luxembourg	239	1	160	2	128	1	154	1	149	0	829	5	-825
Malta	46	-	89	-	32	-	81	0	50	0	298	1	-298
Netherlands	7 600	1 592	1 558	46	10 106	7 757	2 223	505	2 901	4 102	24 388	14 003	-10 385
Poland	1 304	11 536	143	2 049	142	15 940	120	9 019	620	31 363	2 329	69 906	67 577
Portugal	493	391	437	195	830	30	1 078	22 172	411	965	3 249	23 753	20 503
Romania	412	12	174	-	414	8	619	156	1 057	284	2 675	461	-2 215
Slovakia	343	679	2 684	-	286	5	284	180	811	491	4 408	1 355	-3 054
Slovenia	978	356	1 329	2 962	148	15	889	1 034	378	438	3 721	4 805	1 084
Spain	9 530	2 102	3 569	496	2 771	3 009	7 331	1 473	6 309	1 641	29 510	8 720	-20 790
Sweden	14 581	6 877	1 837	264	4 399	2 886	966	1 279	1 461	787	23 244	12 092	-11 152
United Kingdom	8 217	758	2 124	392	6 805	344	3 653	2 149	3 864	639	24 663	4 282	-20 381
EU27	**80 053**	**93 426**	**40 909**	**38 792**	**67 209**	**70 098**	**42 197**	**65 868**	**44 226**	**70 273**	**274 593**	**338 457**	**63 864**

Source: COMEXT

Trade value, EUR millions (2006)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Net Exports
Austria	24.67	32.22	6.59	5.70	17.74	36.04	4.50	1.50	9.57	12.01	63.08	87.47	24.39
Belgium	17.63	31.19	5.10	13.94	17.93	94.31	7.76	39.74	4.20	7.67	52.62	186.86	134.23
Bulgaria	0.40	0.56	1.16	1.23	0.09	0.15	0.47	0.13	0.76	0.21	2.88	2.27	-0.61
Cyprus	0.36	0.02	0.46	0.01	0.06	0.02	0.59	0.48	1.37	0.18	2.83	0.70	-2.13
Czech Republic	3.03	2.97	1.44	0.28	5.94	4.47	3.90	6.54	3.59	4.52	17.89	18.77	0.88
Denmark	20.65	10.27	7.90	4.84	10.45	104.89	20.48	8.05	16.40	4.44	75.88	132.49	56.61
Estonia	0.23	0.05	0.11	0.42	0.09	2.40	1.97	9.97	0.63	1.04	3.04	13.87	10.84
Finland	3.17	0.14	1.11	0.01	8.11	0.21	12.63	0.78	6.53	0.19	31.56	1.34	-30.22
France	27.04	20.96	16.10	9.40	44.82	11.39	9.79	12.73	43.67	24.87	141.42	79.36	-62.05
Germany	25.02	97.06	42.49	19.59	59.70	20.78	17.83	20.11	48.01	24.11	193.07	181.64	-11.43
Greece	1.81	0.01	1.89	0.96	5.46	0.02	1.01	0.67	1.59	0.21	11.76	1.87	-9.89
Hungary	1.09	1.80	0.61	0.00	3.78	0.26	3.28	0.08	2.23	0.25	11.00	2.39	-8.60
Ireland	1.14	15.64	0.48	1.36	0.55	0.19	2.22	0.34	5.28	1.48	9.66	19.00	9.34
Italy	4.86	23.89	6.48	85.10	22.24	9.22	1.94	12.55	9.56	33.83	45.08	164.59	119.50
Latvia	0.62	0.00	0.50	0.01	1.02	0.00	1.34	0.28	0.57	0.06	4.04	0.35	-3.70
Lithuania	0.47	0.94	0.55	0.01	0.89	1.04	1.32	2.72	0.50	6.10	3.73	10.81	7.07
Luxembourg	2.16	0.00	1.67	0.00	1.03	0.04	1.30	0.01	2.13	0.01	8.30	0.06	-8.24
Malta	0.35	0.00	0.12	0.01	0.33	0.00	0.20	0.00	0.29	0.01	1.30	0.02	-1.28
Netherlands	26.60	12.63	8.05	0.94	60.84	41.60	7.81	7.89	9.99	19.28	113.28	82.34	-30.95
Poland	1.48	11.52	0.41	6.99	2.32	47.03	0.41	23.44	1.88	90.01	6.50	179.00	172.50
Portugal	0.80	0.64	1.77	2.06	3.01	0.09	4.52	33.70	3.13	3.18	13.22	39.67	26.45
Romania	0.52	0.02	0.21	0.00	0.44	0.02	0.98	0.12	3.06	3.58	5.20	3.74	-1.46
Slovakia	1.22	3.60	7.92	-	1.94	0.14	0.53	0.74	3.02	2.91	14.63	7.39	-7.23
Slovenia	1.56	1.03	6.96	11.94	0.83	0.19	2.53	3.19	1.43	2.35	13.31	18.70	5.39
Spain	31.38	7.20	18.72	4.00	9.02	4.77	24.26	6.20	24.47	10.01	107.84	32.19	-75.65
Sweden	32.05	36.31	7.27	1.50	24.19	21.44	8.32	16.88	7.59	12.09	79.41	88.21	8.80
United Kingdom	21.40	5.02	7.30	0.76	36.05	5.12	11.19	8.30	15.68	7.49	91.61	26.70	-64.92
EU27	**251.69**	**315.70**	**153.37**	**171.07**	**338.87**	**405.82**	**153.08**	**217.12**	**227.14**	**272.10**	**1 124.15**	**1 381.82**	**257.67**

Source: COMEXT

Trade volume, tonnes (2006)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Net export
Austria	10 899	7 878	2 532	992	3 062	3 478	673	213	1 803	1 323	18 969	13 884	-5 085
Belgium	4 950	5 653	858	1 861	2 979	14 528	1 265	6 174	841	1 214	10 893	29 430	18 537
Bulgaria	224	488	216	400	17	27	248	54	278	52	983	1 021	37
Cyprus	42	5	51	4	18	-	181	129	347	17	638	154	-484
Czech Republic	1 535	2 193	283	67	1 169	1 010	1 218	2 097	616	418	4 819	5 785	966
Denmark	5 052	2 685	1 123	625	1 027	8 300	2 494	1 516	1 925	863	11 621	13 988	2 367
Estonia	62	4	36	93	17	421	693	3 635	212	163	1 020	4 316	3 296
Finland	805	29	204	1	1 618	20	2 669	97	637	17	5 933	164	-5 769
France	7 729	5 166	3 410	1 588	7 883	2 014	3 347	1 974	7 745	5 970	30 115	16 711	-13 404
Germany	4 179	26 704	13 361	3 950	9 471	3 563	5 303	5 937	6 977	3 253	39 291	43 407	4 116
Greece	335	3	324	90	840	1	232	153	309	61	2 040	308	-1 733
Hungary	521	538	142	0	893	132	1 228	22	659	73	3 443	766	-2 677
Ireland	149	1 374	45	40	40	6	1 119	134	1 456	121	2 809	1 675	-1 133
Italy	1 111	5 984	1 181	23 317	4 350	1 649	471	3 429	753	8 344	7 866	42 722	34 856
Latvia	218	-	105	3	333	0	295	63	109	10	1 059	75	-983
Lithuania	324	802	99	1	197	327	314	747	110	1 493	1 043	3 370	2 327
Luxembourg	244	1	135	0	104	3	142	1	173	0	799	5	-794
Malta	55	-	25	1	45	0	51	0	82	1	257	2	-255
Netherlands	7 303	1 811	1 518	86	9 078	7 096	1 259	583	2 340	2 637	21 498	12 213	-9 284
Poland	809	7 573	102	1 275	455	11 220	99	7 352	364	24 780	1 828	52 201	50 373
Portugal	252	334	299	189	630	18	1 115	19 202	415	1 035	2 711	20 779	18 068
Romania	223	37	38	-	141	3	530	36	1 467	952	2 398	1 027	-1 371
Slovakia	247	1 045	1 972	1	471	26	148	182	392	432	3 230	1 685	-1 545
Slovenia	1 215	802	1 102	2 479	115	16	897	997	321	526	3 650	4 820	1 170
Spain	6 818	2 550	4 661	744	1 670	1 239	28 968	2 014	6 496	1 640	48 612	8 186	-40 427
Sweden	10 318	8 665	1 417	213	3 984	2 810	895	1 071	1 046	655	17 659	13 413	-4 246
United Kingdom	7 667	693	960	131	5 581	371	1 810	1 636	2 924	621	18 942	3 450	-15 491
EU27	**73 285**	**83 014**	**36 196**	**38 151**	**56 188**	**58 276**	**57 661**	**59 447**	**40 794**	**56 668**	**264 124**	**295 556**	**31 432**

Source: COMEXT

Trade value, EUR millions (2005)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Import value	Export value	Net Exports
Austria	22.15	26.74	8.03	3.34	19.69	22.12	3.85	1.46	8.99	7.60	62.71	61.26	-1.45
Belgium	16.54	32.97	5.30	16.10	20.47	95.63	6.10	35.39	4.59	7.94	52.99	188.02	135.02
Bulgaria	0.18	0.59	0.61	7.30	0.06	0.03	0.35	0.07	0.45	0.08	1.65	8.06	6.41
Cyprus	0.55	-	0.17	-	0.07	-	0.59	0.55	0.96	0.06	2.34	0.62	-1.72
Czech Republic	2.42	8.14	0.44	0.35	3.52	5.87	3.16	4.75	4.38	4.05	13.93	23.14	9.22
Denmark	16.63	15.08	6.00	3.73	7.63	114.77	17.55	8.84	15.50	5.65	63.32	148.07	84.76
Estonia	0.18	0.05	0.12	0.36	0.15	2.03	1.55	8.16	0.32	0.51	2.32	11.11	8.79
Finland	3.62	0.28	0.66	0.01	4.00	0.19	13.34	0.72	3.74	0.20	25.35	1.41	-23.94
France	29.59	21.11	14.02	8.25	42.40	15.40	7.82	11.89	39.81	9.08	133.64	65.72	-67.92
Germany	30.40	98.15	38.13	19.62	48.12	22.92	23.66	24.82	46.21	19.40	186.52	184.90	-1.62
Greece	1.61	0.01	1.20	0.65	3.16	0.00	0.73	0.63	1.30	0.17	7.99	1.46	-6.53
Hungary	1.05	0.04	0.14	0.00	3.13	0.03	2.40	0.17	2.30	0.15	9.02	0.38	-8.64
Ireland	1.28	15.00	0.48	0.98	0.46	1.89	1.18	0.75	3.43	0.32	6.83	18.94	12.11
Italy	3.63	15.13	3.88	75.06	20.85	7.41	1.84	9.64	7.62	30.51	37.82	137.75	99.93
Latvia	0.21	0.00	0.22	0.00	0.94	0.00	0.67	0.14	0.78	0.01	2.82	0.16	-2.66
Lithuania	0.43	2.77	0.03	0.00	0.81	1.72	0.59	1.54	0.48	4.33	2.34	10.37	8.02
Luxembourg	2.07	0.01	1.85	0.00	1.43	0.19	1.19	0.01	1.59	0.02	8.13	0.22	-7.92
Malta	0.24	-	0.12	0.00	0.19	-	0.27	0.00	0.51	0.03	1.33	0.03	-1.29
Netherlands	22.77	12.30	4.39	0.97	59.11	34.26	8.27	5.83	8.63	13.08	103.17	66.44	-36.73
Poland	1.39	8.59	0.42	0.46	4.00	27.26	0.52	33.71	1.82	58.59	8.15	128.62	120.47
Portugal	0.60	1.19	0.49	1.20	2.61	0.31	1.86	27.51	2.06	2.12	7.62	32.33	24.70
Romania	0.44	0.01	0.18	0.00	0.24	0.02	0.81	0.05	2.38	4.76	4.04	4.84	0.80
Slovakia	0.38	2.10	9.73	-	1.67	0.62	0.50	0.67	1.59	2.02	13.87	5.41	-8.46
Slovenia	1.29	0.75	5.21	9.31	0.42	0.20	2.33	4.44	1.05	1.19	10.29	15.89	5.60
Spain	26.03	6.50	19.70	8.53	15.07	4.38	22.71	5.55	24.44	9.91	107.95	34.87	-73.08
Sweden	24.76	32.25	3.07	1.16	18.59	22.23	11.42	13.81	9.21	11.84	67.05	81.29	14.24
United Kingdom	26.23	4.33	5.57	0.46	28.81	4.14	10.89	7.05	11.71	10.93	83.21	26.93	-56.28
EU27	**236.70**	**304.09**	**130.16**	**157.85**	**307.58**	**383.61**	**146.15**	**208.15**	**205.83**	**204.53**	**1 026.41**	**1 258.24**	**231.82**

Source: COMEXT

Trade volume, tonnes (2005)

Country	SUPPORTS		LATEX		PUR		SPRING		OTHER		TOTAL		
	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Import volume	Export volume	Total Imports	Total Exports	Net export
Austria	8 945	7 543	2 058	563	3 151	2 025	735	207	1 771	877	16 661	11 215	-5 446
Belgium	4 049	5 770	983	2 302	3 572	15 434	1 001	5 780	1 014	1 242	10 619	30 527	19 908
Bulgaria	107	549	95	2 872	22	8	244	21	209	22	676	3 473	2 796
Cyprus	133	-	30	-	15	-	187	151	269	19	634	170	-464
Czech Republic	1 266	5 051	86	106	789	1 337	1 144	1 690	908	488	4 193	8 672	4 480
Denmark	4 189	2 477	826	494	711	9 081	2 534	1 740	1 789	694	10 048	14 487	4 439
Estonia	66	32	26	63	32	328	512	2 928	82	87	718	3 437	2 720
Finland	865	58	119	0	695	19	2 749	115	363	18	4 791	210	-4 581
France	8 191	5 224	3 259	1 544	8 034	2 636	2 951	1 920	8 126	1 731	30 560	13 054	-17 506
Germany	8 265	27 618	12 462	3 861	7 550	3 931	7 253	8 182	5 712	2 238	41 242	45 830	4 588
Greece	368	4	255	46	589	-	209	156	217	49	1 638	255	-1 383
Hungary	509	10	45	1	807	6	946	80	888	56	3 195	154	-3 041
Ireland	228	1 395	44	33	68	110	522	197	882	24	1 745	1 759	14
Italy	907	3 270	826	20 629	4 451	1 395	434	2 841	653	6 549	7 270	34 683	27 413
Latvia	156	-	48	2	334	0	176	46	125	2	838	49	-789
Lithuania	300	2 306	8	1	146	421	189	504	103	1 087	746	4 319	3 574
Luxembourg	233	1	148	0	157	20	111	1	139	1	788	22	-765
Malta	54	-	21	-	27	-	79	-	131	1	313	1	-312
Netherlands	7 724	1 682	1 074	95	9 152	6 904	1 479	449	2 151	2 297	21 579	11 427	-10 152
Poland	669	7 780	105	111	760	6 290	218	11 254	317	16 104	2 069	41 539	39 470
Portugal	208	548	80	111	574	20	435	14 859	257	652	1 553	16 190	14 637
Romania	317	18	39	-	90	2	358	16	1 521	1 346	2 324	1 382	-943
Slovakia	192	845	2 238	1	415	218	245	159	216	239	3 306	1 462	-1 844
Slovenia	1 004	464	702	1 726	48	20	757	1 483	293	334	2 804	4 025	1 222
Spain	5 835	2 812	4 395	1 077	3 516	782	8 153	1 800	6 137	2 000	28 036	8 471	-19 565
Sweden	7 265	7 607	675	197	3 429	3 079	1 551	1 330	1 248	746	14 168	12 959	-1 209
United Kingdom	8 689	469	973	44	4 700	213	2 435	1 607	2 990	873	19 788	3 206	-16 583
EU27	**70 734**	**83 532**	**31 619**	**35 875**	**53 832**	**54 279**	**37 608**	**59 517**	**38 507**	**39 775**	**232 299**	**272 978**	**40 678**

Source: COMEXT

Appendix VII: Comparison of trade and production values across EU-27 by mattress type (2010)

Percentage of value represented by trade; SUPPORTS, 2010

Country	Total production value (EUR millions)	Total import value (EUR millions)	Total export value (EUR millions)
Austria	19.03	24.49	13.48
Belgium	53.91	28.27	3.55
Bulgaria	5.71	0.24	1.61
Cyprus	0	0.4	0.22
Czech Republic	1.85	4.4	4.32
Denmark	1.7	9.94	9.95
Estonia	1.86	0.12	0.1
Finland	13.59	3.63	1.09
France	221.47	34.18	20.36
Germany	231.25	39.35	10.74
Greece	-	2.62	2.15
Hungary	3.02	1.16	2.33
Ireland	7.23	1.41	0.18
Italy	164.03	9.85	10.42
Latvia	-	0.19	0.15
Lithuania	0.59	0.26	0.12
Luxembourg	0	2.7	2.01
Malta	0	0.15	0.15
Netherlands	30.58	37.45	7.39
Poland	0.01	4.34	2.22
Portugal	-	1.47	2.15
Romania	-	0.65	0.72
Slovakia	-	1.79	2.93
Slovenia	165.67	10.02	1.12
Spain	92.59	24.52	8.39
Sweden	38.6	13.04	2.49
United Kingdom	174.78	14.36	1.81
EU27 TOTAL	**1 227**	**271**	**112**

Percentage of value represented by trade; LATEX, 2010

Country	Total production value (EUR millions)	Total import value (EUR millions)	Total export value (EUR millions)
Austria	9.3	26.65	8.35
Belgium	-	18.39	13.33
Bulgaria	-	0.92	0.36
Cyprus	0	0.86	1.08
Czech Republic	17.99	8.82	5.94
Denmark	0.7	8.2	11.78
Estonia	0.44	1.82	1.1
Finland	0.58	5.21	8.9
France	160.53	63.33	19.29
Germany	11.74	147.97	21.63
Greece	-	3.89	4
Hungary	1.17	2.88	2.97
Ireland	0	1.61	3.84
Italy	189.35	21.19	6.53
Latvia	-	1.43	0.94
Lithuania	0	3.71	0.88
Luxembourg	0	1.34	1.65
Malta	0	0.24	0.25
Netherlands	4.74	51.35	29.61
Poland	11.15	2.58	0.74
Portugal	0	3.69	7.08
Romania	-	3.84	1.33
Slovakia	-	3.87	1.88
Slovenia	22.04	15.76	2.81
Spain	-	15.03	11.83
Sweden	7.95	20.16	35.43
United Kingdom	7.41	21.11	34.39
EU27 TOTAL	**445**	**456**	**238**

Percentage of value represented by trade; PUR, 2010

Country	Total production value (EUR millions)	Total import value (EUR millions)	Total export value (EUR millions)
Austria	74.07	8.87	25.26
Belgium	89.36	6.6	41.31
Bulgaria	1.99	0.58	0.12
Cyprus	-	1.62	0.01
Czech Republic	5.03	3.05	2.71
Denmark	98.42	15.72	12.51
Estonia	-	1.08	1.05
Finland	18.14	3.14	0.02
France	203.83	62.59	15.97
Germany	331.11	44.84	88.61
Greece	-	3.86	0.06
Hungary	3.95	0.88	7.29
Ireland	:C	4.9	11.4
Italy	48.82	20.99	17.4
Latvia	-	0.42	0.32
Lithuania	0.84	1.05	2.91
Luxembourg	-	2.76	0.01
Malta	-	0.35	0
Netherlands	3.67	16.73	8.9
Poland	171	2.74	26.31
Portugal	1.13	3.4	1.46
Romania	-	1.95	0.02
Slovakia	:C	3.41	2.63
Slovenia	-	1.04	9.92
Spain	47.85	23.54	6.7
Sweden	:C	21.67	29.27
United Kingdom	45.19	24.05	6.49
EU27 TOTAL	**1 144**	**282**	**319**

Percentage of value represented by trade; SPRING, 2010

Country	Total production value (EUR millions)	Total import value (EUR millions)	Total export value (EUR millions)
Austria	5.23	5.77	31.98
Belgium	75.96	13.48	80.51
Bulgaria	4.43	1.53	0.16
Cyprus	0	-	0.07
Czech Republic	1.05	0.26	4.71
Denmark	19.63	3.64	100.1
Estonia	4.17	0.78	2.83
Finland	17.92	0.01	0.37
France	197.64	20.25	5.87
Germany	220.51	6.49	45.02
Greece	30.31	2.66	0.12
Hungary	2.13	0.01	0.42
Ireland	34.46	0.01	0.27
Italy	193.88	92.69	7.01
Latvia	1.84	0.14	0.2
Lithuania	5.55	0.04	0.77
Luxembourg	0	0	0.02
Malta	0	-	0
Netherlands	131.31	0.65	53.88
Poland	50.47	21.5	230.95
Portugal	20.61	4.47	0.32
Romania	-	0	0.02
Slovakia	-	0.01	0.25
Slovenia	193.29	0.86	16.75
Spain	37.55	4.11	9.97
Sweden	56.63	0.93	17.89
United Kingdom	408.21	1.18	8.54
EU27 TOTAL	**1 713**	**181**	**619**

Percentage of value represented by trade; OTHER, 2010

Country	Total production value (EUR millions)	Total import value (EUR millions)	Total export value (EUR millions)
Austria	10.97	3.25	20.92
Belgium	-	49.91	11.55
Bulgaria	-	1.66	0.26
Cyprus	0	0.51	-
Czech Republic	22.34	4.21	1.39
Denmark	0.13	6.14	4.39
Estonia	0.57	7.38	0.84
Finland	0.04	0.55	0.16
France	-	10.14	21.81
Germany	11.84	24.97	29.35
Greece	7.03	0.66	0.54
Hungary	-	2.17	0.06
Ireland	-	0.01	0.81
Italy	163.62	8.2	50.36
Latvia	-	0.45	0.44
Lithuania	7.86	2.34	9.73
Luxembourg	0	0	0.01
Malta	0	0	-
Netherlands	31.66	9.08	18.98
Poland	18.15	38.61	86.17
Portugal	-	30.05	7.97
Romania	4.22	1.18	0.38
Slovakia	-	0.59	4.93
Slovenia	57.05	1.96	2.68
Spain	13.76	11.55	8.21
Sweden	-	13.21	7.59
United Kingdom	22.64	13.58	8.21
EU27 TOTAL	**372**	**242**	**298**