

Thermal Insulation – Green Public Procurement Product Sheet

Green Public Procurement (GPP) is a voluntary instrument. This Product Sheet provides a summary of the GPP criteria developed for the thermal insulation product group. The accompanying Background Report provides full details on the reasons for selecting these criteria and references for further information.

The format for the purchasing recommendations comes in the form of two sets of criteria:

- The **core criteria** are those suitable for use by any contracting authority across the Member States and address the key environmental impacts for the product in question. They are designed to be used with minimum additional verification effort or cost increases.
- The **comprehensive criteria** are for those procurers wishing to purchase the best products available on the market. These may require additional verification effort or a slight increase in cost compared to other products with the same functionality.

Within the core and comprehensive criteria, the guidance follows the various stages of a public procurement procedure and explains how best to integrate environmental criteria at each stage:

- **Subject matter.** It means the title of the tender, i.e. a short description of the product, works or service to be procured.
- **Technical Specifications.** Provide a clear, accurate and full description of the requirement and standard to which goods, works or services should conform. Description of the minimal technical specifications which all bids need to comply with. Set specific environmental criteria, including hurdles and levels that need to be met for specific products.
- **Selection Criteria.** It is based in the capacity / ability of the bidders to perform the contract. Assist in the identification of appropriate suppliers, for example to ensure adequately trained personnel or relevant environmental policies and procedures are in place.
- **Award Criteria.** The award criteria on the basis of which the contracting authority will compare the offers and base its award. Award criteria are not pass/fail criteria, meaning that offers of products that do not comply with the criteria may still be considered for the final decision, depending on their score on the other award criteria.
- **Contract Performance Clause -** Specify the conditions that must be met in the execution of the contract, for example as to how the goods or services are to be supplied, including information or instructions on the products to be provided by the supplier.

It should be noted that the contractor is bound by the existing legal framework.

Where the verification for the criteria states that other appropriate means of proof can be used, this could include a technical dossier from the manufacturer, a test report from a recognised body, or other relevant evidence. The contracting authority will have to satisfy itself on a case by case basis, from a technical/legal perspective, whether the submitted proof can be considered appropriate.

1. Definition and Scope

For the purpose of defining these green public procurement criteria, thermal insulation is defined as material used to keep buildings cooler in summer and warmer in winter by reducing the flow of heat through the exterior surfaces of the building.¹ It has six main applications, which are defined in more detail in the Background Report linked to this Product Sheet:

1. Cavity wall insulation.
2. Solid wall insulation.
3. Loft insulation.
4. Floor insulation.
5. Roof insulation.
6. Insulation for pipe work and ducts.

Existing ecolabels tend to define insulation products according to the material they are made from. There are four main categories of material:

- Inorganic mineral fibre.
- Organic fuel derived.
- Organic plant/ animal derived.
- Other.

The existing ecolabels do not currently cover insulation for pipework and ducts or foil-type insulation products. As such, the criteria listed within this document only apply to materials falling into categories 1-5 above.

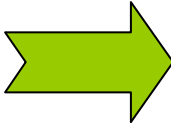
Most thermal insulation products are covered by the Construction Products Directive (see 6.2), defined in harmonised European standards and assessed by test methods indicated in these standards. Construction products covered by the CPD have to be CE marked. CE marking is accompanied by specific technical information about specific performance of these products.

2. Key Environmental Impacts

During the life cycle of thermal insulation, hazardous materials are a key environmental impact, especially in the chemical makeup of blowing agents. This can impact on air and water quality, as well as human health, with many of the substances identified as carcinogenic or irritant to those with breathing disorders. The hazardous properties of these substances make many of them unsuitable for landfill in non-hazardous sites. Some can be recycled thus reducing the impact on the environment.

Energy consumption is another key impact, especially during manufacture and transportation. However, the reduction in energy use in buildings, by choosing highly efficient insulation, with good thermal resistance is vitally important and must be the first consideration. This will reduce energy consumption in the in-use phase by lessening the need for fuel for space heating, balancing out the embodied energy within the insulation materials. Once the desired thermal resistance has been decided there is still scope to consider the environmental impacts of the various insulation materials that satisfy that main requirement. It is at that stage that the impacts summarised in the schematic below should be considered.

¹ Allen, E. (1999) Fundamentals of Building Construction Materials and Methods. 3rd ed. *John Wiley & Sons*.

Key Environmental Impacts	GPP Approach
<ul style="list-style-type: none"> • Energy consumption, especially in manufacturing and transportation. • Energy consumption in the building as a result of less efficient insulation. • Pollution of air, land and water due to the use of hazardous materials e.g. blowing agents. • Use / extraction of raw materials. • Production of hazardous waste. • Generation of waste material, including hazardous wastes and packaging and its disposal. 	 <ul style="list-style-type: none"> • Purchase most energy efficient insulation. • Purchase insulation appropriate for a situation to ensure maximum benefit. • Purchase insulation that restricts the use of hazardous materials. • Promote effective maintenance of insulation to extend its useful life. • Promote end of life management e.g. take back schemes / re-use / recycling. • Purchase products designed to be easily dismantled and recycled. • Promote the use of environmentally sound materials. • Promote use of recycled materials in insulation and packaging, either directly or in the case of packaging through participation in an accredited recycling scheme.

Please note that the order of impacts does not necessarily translate to the order of their importance.

3. GPP Criteria for Thermal Insulation

3.1. Core GPP Criteria for Thermal Insulation

SUBJECT MATTER
Purchase of energy efficient and environmentally sound thermal insulation products.
TECHNICAL SPECIFICATIONS
<p>1. Based on the required building performance within the framework of the EPBD, the thermal conductivity of the thermal insulation product must be less than 0.044W/mK.</p> <p>Verification: Where the listed criteria for a product are included in a relevant harmonised European standard, under the Construction Products Directive (89/10/EEC), for CE marking, the supplier must provide <u>the information accompanying the required CE marking</u> to demonstrate compliance with the listed criteria.</p> <p>Where the listed criteria for a product are <u>not included in the accompanying information to CE marking</u> under the Construction Products Directive (89/10/EEC), products holding a relevant Type 1 ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof or a signed declaration will also be accepted.</p>

2. The product will not release or leach out any substances above existing limit values set in the following regulations:
- Substances regulated in the EU through the Regulation 842/2006/EC on fluorinated gases.
 - Any substances or preparations that are classified according to Directive 1999/45/EC and 67/548/CEE as carcinogenic (R40, R45, R49), harmful to the reproductive system (R60, R61, R62, R63), mutagenic (R46, R68), toxic (R23, R24, R25, R26, R27, R28, R51), allergenic when inhaled (R42), cause heritable genetic damage (R46), danger of serious damage to health by prolonged exposure (R48), possible risks of irreversible effects (R68) shall not be released.
 - Any substances or preparations that are classified according to CLP Regulation (EC) 1272/2008² as carcinogenic (H350-351), harmful to the reproductive system (H360-361), mutagenic (H340-341), toxic (H300- H301, H310-H311, H330-H331, H411), allergenic when inhaled (H334), cause heritable genetic damage (H340), danger of serious damage to health by prolonged exposure (H372-373), possible risks of irreversible effects (H371) shall not be released.

Verification: The bidder must provide appropriate proof that this criterion is met.

AWARD CRITERIA

Additional points will be awarded for:

- The wood based materials (e.g. cork, cellulose) used in the manufacture of thermal insulation stemming from forests that are sustainably managed so as to implement the principles and measures aimed at ensuring sustainable and legal forest management, on condition that these criteria characterise and are relevant for the product. In Europe, these principles and measures shall at least correspond to those of the Pan-European Operational Level Guidelines for Sustainable Forest Management, as endorsed by the Lisbon Ministerial Conference on the Protection of Forests in Europe (2 to 4 June 1998). Outside Europe they shall at least correspond to the UNCED Forest Principles (Rio de Janeiro, June 1992) and, where applicable, to the criteria or guidelines for sustainable forest management as adopted under the respective international and regional initiatives (ITTO, Montreal Process, Tarapoto Process, UNEP/FAO Dry-Zone Africa Initiative).

Verification: The sustainable and legal origin of timber/wood fibres can be demonstrated with a chain-of-custody tracing system being in place. These voluntary systems may be 3rd-party certified, often as part of ISO 9000 and/or ISO 14000 or EMAS management system.

Certificates of chain of custody for timber/wood fibres certified as FSC^[2], PEFC^[3] or any other equivalent means of proof will also be accepted as proof of compliance. If timber/wood fibre stems from a country that has signed a Voluntary Partnership Agreement (VPA) with the EU, the FLEGT license may serve as proof of legality^[4]. Other means of proof that will be accepted includes a relevant and valid CITES certificate or other equivalent and verifiable means such as the application of a "due diligence" system. For the non-certified virgin material bidders shall indicate the types (species), quantities and origins of the timber/wood fibres, together with a declaration of their legality. As such the timber/wood fibres shall be able to be traced throughout the whole production chain from the forest to the product.

² <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:en:PDF>, pg 1352

^[2] FSC (Forest Stewardship Council): <http://www.fsc.org/en>

^[3] PEFC (Programme for the Endorsement of Forest Certification): <http://www.pefc.org/internet/html>

^[4] The FLEGT (Forest Law Enforcement Governance and Trade) action plan was adopted by the EU in 2003. The Action Plan outlines a series of measures to address illegal logging in developing countries. The Plan defines a timber licensing system to guarantee the legality of imported wood products. In order to obtain the license, Voluntary Partnership Agreements (VPAs) have to be signed between timber-producing countries and the EU. Timber products, which have been legally produced in VPA partner countries, will be licensed for the legality of production; more information at: <http://ec.europa.eu/environment/forests/flegt.htm>

CONTRACT PERFORMANCE CLAUSES

1. The bidder must provide information on:

- Manufacturer and date of manufacture/ batch no.
- Product R-values and respective H phrases at time of manufacture.
- The material that the product is manufactured from.
- Weight and thickness.
- Percentage recycled content³: for materials, the percentage of each material must be clearly labelled by mass and volume.
- Maximum storage time or install-by date.
- Time after installation at which the product will have re-lofted to its nominal thickness.
- Transportation and installation instructions.
- Written storage instructions.

Verification: Where the listed criteria for a product are included in a relevant harmonised European standard, under the Construction Products Directive (89/10/EEC), for CE marking, the supplier must provide the information accompanying the required CE marking to demonstrate compliance with the listed criteria.

Where the listed criteria for a product are not included in the accompanying information to CE marking under the Construction Products Directive (89/10/EEC), products holding a relevant Type 1 ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof or a signed declaration will also be accepted.

³ Using the ISO 14021 definition of recycled content.

3.2. Comprehensive GPP Criteria for Thermal Insulation

SUBJECT MATTER
Purchase of energy efficient and environmentally sound thermal insulation products.

TECHNICAL SPECIFICATIONS

1. Based on the required building performance within the framework of the EPBD, the thermal conductivity of the thermal insulation product must be less than 0.044W/mK.

Verification: Where the listed criteria for a product are included in a relevant harmonised European standard, under the Construction Products Directive (89/10/EEC), for CE marking, the supplier must provide the information accompanying the required CE marking to demonstrate compliance with the listed criteria.

Where the listed criteria for a product are not included in the accompanying information to CE marking under the Construction Products Directive (89/10/EEC), products holding a relevant Type 1 ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof or a signed declaration will also be accepted.

1. The product will not release or leach out any substances above existing limit values set in the following regulations:

- a) Substances regulated in the EU through the Regulation 842/2006/ EC on fluorinated gases.
- b) Any substances or preparations that are classified according to Directive 1999/45/EC and 67/548/CEE as carcinogenic (R40, R45, R49), harmful to the reproductive system (R60, R61, R62, R63), mutagenic (R46, R68), toxic (R23, R24, R25, R26, R27, R28, R51), allergenic when inhaled (R42), cause heritable genetic damage (R46), danger of serious damage to health by prolonged exposure (R48), possible risks of irreversible effects (R68), harmful by inhalation (R20), harmful in contact with skin (R21) shall not be released.
- c) Any substances or preparations that are classified according to CLP Regulation (EC) 1272/2008⁴ as carcinogenic (H350-351), harmful to the reproductive system (H360-361), mutagenic (H340-341), toxic (H300- H301, H310-H311, H330-H331, H411), allergenic when inhaled (H334), cause heritable genetic damage (H340), danger of serious damage to health by prolonged exposure (H372-373), possible risks of irreversible effects (H371) shall not be released.

Verification: The bidder must provide appropriate proof that this criterion is met.

AWARD CRITERIA

Additional points will be awarded for:

1. The wood based materials (e.g. cork, cellulose) used in the manufacture of thermal insulation stemming from forests that are sustainably managed so as to implement the principles and measures aimed at ensuring sustainable and legal forest management, on condition that these criteria characterise and are relevant for the product. In Europe, these principles and measures shall at least correspond to those of the Pan-European Operational Level Guidelines for Sustainable Forest Management, as endorsed by the Lisbon Ministerial Conference on the Protection of Forests in Europe (2 to 4 June 1998). Outside Europe they shall at least correspond to the UNCED Forest Principles (Rio de Janeiro, June 1992) and, where applicable, to the criteria or guidelines for sustainable forest management as adopted under the

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:en:PDF>, pg 1352

respective international and regional initiatives (ITTO, Montreal Process, Tarapoto Process, UNEP/FAO Dry-Zone Africa Initiative).

Verification: The sustainable and legal origin of timber/wood fibres can be demonstrated with a chain-of-custody tracing system being in place. These voluntary systems may be 3rd-party certified, often as part of ISO 9000 and/or ISO 14000 or EMAS management system.

Certificates of chain of custody for timber/wood fibres certified as FSC^[2], PEFC^[3] or any other equivalent means of proof will also be accepted as proof of compliance. If timber/wood fibre stems from a country that has signed a Voluntary Partnership Agreement (VPA) with the EU, the FLEGT license may serve as proof of legality^[4]. Other means of proof that will be accepted includes a relevant and valid CITES certificate or other equivalent and verifiable means such as the application of a "due diligence" system. For the non-certified virgin material bidders shall indicate the types (species), quantities and origins of the timber/wood fibres, together with a declaration of their legality. As such the timber/wood fibres shall be able to be traced throughout the whole production chain from the forest to the product.

2. In cases where GPP includes the installation of a product, installers provide a minimum of 20-year warranty. In cases where GPP is only covering the purchase of products (without installation work; i.e. buying products "on stock"), the manufacturer provides a minimum of 20-year warranty for the product provided it has been installed according to their technical guidance.

Verification: The bidder must provide appropriate proof that this criterion is met.

3. Additional points will be awarded in proportion to the percentage of recycled content⁵ within the insulation product when comparing the same materials, whilst not causing an increase in the thickness of material required to provide the same level of insulation. Use of recycled content products shall also not jeopardise the function or thermal properties of the insulation product (nor the amount of materials needed for the overall building).

Verification: The bidder must provide appropriate proof that this criterion is met. Guidance on suitable levels of recycled content can be found at http://www.wrap.org.uk/downloads/Standard_table-June_081.f405764b.5001.pdf

4. Additional points will be awarded to insulation products that use blowing agents with lower global warming potential (GWP), where the blowing agents being compared result in the same levels of thermal efficiency of the insulation over the product's lifecycle.

Verification: The bidder must provide appropriate proof that this criterion is met.

^[2] FSC (Forest Stewardship Council): <http://www.fsc.org/en>

^[3] PEFC (Programme for the Endorsement of Forest Certification): <http://www.pefc.org/internet/html>

^[4] The FLEGT (Forest Law Enforcement Governance and Trade) action plan was adopted by the EU in 2003. The Action Plan outlines a series of measures to address illegal logging in developing countries. The Plan defines a timber licensing system to guarantee the legality of imported wood products. In order to obtain the license, Voluntary Partnership Agreements (VPAs) have to be signed between timber-producing countries and the EU. Timber products, which have been legally produced in VPA partner countries, will be licensed for the legality of production; more information at: <http://ec.europa.eu/environment/forests/flegt.htm>

⁵ Using the ISO 14021 definition of recycled content: the proportion, by mass, of recycled material in a product. Only pre-consumer and post-consumer materials shall be considered as recycled content, consistent with the following usage of the terms:

- **Pre-consumer material:** Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.
- **Post-consumer material:** Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. (<http://www.greenspec.co.uk/html/materials/recycledcontent.html>)

CONTRACT PERFORMANCE CLAUSES

1. The bidder must provide information on:

- Manufacturer and date of manufacture/ batch no.
- Product R-values at time of manufacture.
- The material that the product is manufactured from.
- Weight and thickness.
- Percentage recycled content⁶: for materials, the percentage of each material must be clearly labelled by mass and volume.
- Maximum storage time or install-by date.
- Time after installation at which the product will have re-lofted to its nominal thickness.
- Transportation and installation instructions.
- Written storage instructions.

Verification: Where the listed criteria for a product are included in a relevant harmonised European standard, under the Construction Products Directive (89/10/EEC), for CE marking, the supplier must provide the information accompanying the required CE marking to demonstrate compliance with the listed criteria.

Where the listed criteria for a product are not included in the accompanying information to CE marking under the Construction Products Directive (89/10/EEC), products holding a relevant Type 1 Ecolabel fulfilling the listed criteria will be deemed to comply. Other appropriate means of proof or a signed declaration will also be accepted.

⁶ Using the ISO 14021 definition of recycled content.

3.3. Insulation materials: Explanatory notes

1. Award Criteria: Contracting authorities will have to indicate in the contract notice and tender documents how many additional points will be awarded for each award criterion. Environmental award criteria should, altogether, account for at least 10 to 15 % of the total points.
2. Contracting authorities should pay regard to the local conditions of the building works for which insulation is required, such as geography, climate and building dimensions so that the correct level and type of insulation is used.
3. Packaging:

Article 3 of the Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, defines packaging as being:

- All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging.

The extent to which packaging is an important environmental consideration for a product depends on a number of variables including product lifetime and packaging material. For example, for a short lived product, packaging is more likely to be important than it is for a long lived product. Similarly, packaging is less likely to be significant in life cycle terms for an energy using product.

Where the contracting authority views packaging as a significant issue they may wish to seek information from potential suppliers to confirm they have taken into account the environmental impact of their packaging option and that the supplier is consistent with the contracting authority's policies.

4. Cost Considerations

As energy prices and landfill costs rise, manufacturers and building users are turning their attention to insulation materials as a solution to their rising bills. Table 1 outlines some costs for different types of insulation product. Please note that this table does not contain cost data for all insulation materials as it is quoted from a secondary source. It should also be noted that these costs are indicative and are subject to market fluctuations.

Table 1. Comparison of prices for a variety of insulation products.⁷

Type of insulation	Thermal performance (W/mK)	^(a) Price/ m ²
Expanded polystyrene	0.033	50mm Board €3.14 100mm Board €6.28 65mm Cavity Fill €4.40 (including labour for installation)
Rock mineral wool	0.034-0.036	€4.40-€7.80
Cellulose	0.033	€10.06
Flax Isovlax	50mm: 0.035	50mm €5.52 100mm €9.48
Sheep's wool	0.037	50mm €5.98 100mm €11.94
Flexible melamine foam	0.035	50mm €37.71
Cork	0.037	None given
Isonat Hemp and recycled cotton fibre batts	0.039	50mm €5.23 100mm €10.43

^(a) Currency figures converted from UK pounds to Euros using <http://www.xe.com> on 07/07/08.

Although EPS has lower purchase costs than most other materials for very similar thermal performance, it has higher embodied energy in manufacture. For example, Table 2 in the Technical Background Report shows that EPS has four times the embodied energy of manufacture compared to rock mineral wool. Similarly, although 100mm thick sheep's wool is approximately twice as expensive as 100mm EPS board for comparable thermal performances it has a fraction (~4%) of the embodied energy of manufacture. Consumers must consider the purchase and installation costs against the durability of the material and the thermal efficiency required for the building, so that it is in proportion. In other words, a greater thermal efficiency could be purchased and installed at greater cost, but might not be required for the intended purpose of the building, taking its location and climate into account.

In life-cycle terms the cost of a building incorporates the following aspects⁸:

- Cost of controlling atmospheric emissions.
- Cost of resources during the extraction and production of the product. For example, the cost of energy, transport, packaging, waste and emissions.
- Cost of waste treatment and disposal.
- Cost of eco-taxes.
- Cost of pollution rehabilitation measures.
- Cost of environmental management.
- Cost of utilities, for example, water, electricity and gas.

Some of these costs, typically those from the production stages, are passed on to the final user in the price of the insulation product. Consumers must consider this cost against the increased heating and ventilation costs that they would experience if the insulation were not installed. This should consider any incentive schemes that are available from government or utility companies. For example, in the UK the Energy Saving Trust (EST) has calculated likely savings in this area for a gas centrally-heated semi-detached house with three bedrooms, where the insulation is installed by a professional and a discount is obtained on the price of the insulation materials from the local energy supplier.

⁷ Roaf, S. et al. (2007) Ecohouse: a Design Guide. 3rd ed. Architectural Press.

⁸ Boussabaine and Kirkham (2004) Whole Life-cycle costing: Risk and risk responses. *Blackwell Publishing*.

highlights some of the outputs from the EST study.

Table 2 Savings from Insulation

Product	Annual Savings per Year*	Installed Cost*	Payback Period
Cavity Wall Insulation ⁹	Around €132	Around €300**	Around 2 years
Internal Wall Insulation ¹⁰	Around €438	€6600 - €10200***	Around 15 to 23 years
External Wall Insulation ¹¹	Around €462	€12600 - €17400***	Around 27 to 37 years
Floor Insulation ¹²	Around €60	Around €120****	Around 2 years****

Notes:

*All savings and costs in Euros converted from Pounds Sterling using an exchange rate of 1 Pound Sterling = 1.20037 EUR

**The installed cost includes the subsidy available from the major energy suppliers under the [Carbon Emissions Reduction Target](#) (CERT); the typical unsubsidised installed cost is around 600 EUR.

***Internal / External: The figures given above are for the whole installation however if you are going to be renovating the individual walls of your home; you can make some big savings by insulating them at the same time.

**** DIY Cost and Payback

It should also be noted that the payback period for insulation products may vary depending on whether the property is a new build or a refurbishment. As many older properties do not satisfy the same high level building standards as new builds today, there are greater energy saving benefits to be afforded through replacing/ topping up insulation levels. This therefore reducing the payback period as energy bills are reduced by a greater extent.

⁹ <http://www.energysavingtrust.org.uk/Home-improvements-and-products/Home-insulation-glazing/Cavity-wall-insulation>

¹⁰ <http://www.energysavingtrust.org.uk/Home-improvements-and-products/Home-insulation-glazing/Solid-wall-insulation>

¹¹ <http://www.energysavingtrust.org.uk/Home-improvements-and-products/Home-insulation-glazing/Solid-wall-insulation>

¹² <http://www.energysavingtrust.org.uk/Home-improvements-and-products/Home-insulation-glazing/Floor-Insulation>

5. Relevant EU legislation and information sources

5.1. EU Legislation

- The Energy Performance in Buildings Directive (EPBD) 2010/31/EU:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF>
- Directive on the indication by labelling and standard product information of the consumption of energy and other resources by energy related products 2010/30/EU
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0001:0012:EN:PDF>
- Construction Products Directive (CPD) 89/106/EEC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31989L0106:en:HTML>
- Council Directive 93/68/EEC amending many Directives including 89/106/EEC (construction products)
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31993L0068:EN:HTML>
- The CLP Regulation (EC) No 1272/2008. The Regulation of 16 December 2008 on classification, labelling and packaging of substances and mixtures
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:en:PDF>
- REACH Regulation 1907/2006
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:396:0001:0849:EN:PDF>
- The Montreal Protocol on Substances That Deplete the Ozone Layer
[http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:22001A0718\(01\):EN:HTML](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:22001A0718(01):EN:HTML)
- Regulation on Substances that Deplete the Ozone Layer EC 1005/2009
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:286:0001:0030:EN:PDF>
- Directive on Packaging and Packaging Waste 94/62/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31994L0062:EN:HTML>
- Commission Decision (97/129/EC) of 28 January 1997 establishing the identification system for packaging materials pursuant to European Parliament and Council Directive 94/62/EC on packaging and waste packaging
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31997D0129:EN:HTML>
- Directive amending Directive 94/62/EC on packaging and packaging waste 2004/12/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:047:0026:0031:EN:PDF>
- Hazardous Waste Directive (HWD) 91/689/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991L0689:EN:HTML>
- Waste Framework Directive 2008/98/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0003:EN:PDF>
- European Waste Catalogue (EWC)
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000D0532:EN:HTML>
- Landfill Directive 1999/31/EC

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31999L0031:EN:HTML>

- Directive on Energy End-use Efficiency and Energy Services 2006/32/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0032:EN:HTML>
- Directive establishing a framework for the setting of Ecodesign Requirements for Energy-related Products 2009/125/EC
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF>

5.2. Ecolabels and other criteria sources

- Good Environmental Choice Australia (GECA) Standard: Thermal Building Insulation Materials
<http://www.aela.org.au/StandardsRegister.htm>
- Environment Canada's Environmental Choice Program: Thermal Insulation Materials
<http://www.environmentalchoice.com/guidelines/guide.cfm?content=Guidelines&Name=>
- Environmental Choice New Zealand Label: Thermal (resistive-type) Building Insulants
<http://www.enviro-choice.org.nz/>
- Taiwan GreenMark Logo: Thermal insulation materials for building
<http://greenmark.epa.gov.tw/english/criteria.asp>
- Korea Ecolabel: EL243. Lagging, Insulating, and Sound Absorbing Material
http://www.koeco.or.kr/eng/business/business01_03.asp?search=1_3
- German Blue Angel: Building materials made from waste glass; Building materials made from waste paper. <http://www.blauer-engel.de/>
- UK Energy Saving Recommended (ESR) logo: Insulation (various)
http://www.energysavingtrust.org.uk/energy_saving_products
- US ENERGY STAR program: Home sealing
http://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_sealing