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ENTERPRISE DIRECTORATE-GENERAL

Single Market : regulatory environment, standardisation and New Approach
Construction

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Standardisation Mandate to CEN

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**DEVELOPMENT OF HORIZONTAL STANDARDISED METHODS FOR THE
ASSESSMENT OF THE INTEGRATED ENVIRONMENTAL PERFORMANCE OF
BUILDINGS**

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1. JUSTIFICATION

1. The goal of the Commission is to provide a method for the voluntary delivery of environmental information that supports the construction of sustainable works including new and existing buildings (not all construction works will be included). These buildings should provide all of the necessary functions to the users whilst minimising their environmental impacts¹. One way to achieve this goal is to provide environmental information on the construction products and the materials that are used. This results in voluntary Environmental Product Declarations (EPD). The information should be presented in a format that is useful for other parties, such as architects and contractors.

2. There have been several independent initiatives within the European community to develop methodologies for the declaration of environmental information. All of these refer to the work of ISO/TC 207, which describes Type III environmental declarations. The declarations are generally in accordance with a national programme established by interested parties and the issues identified in ISO 14020 and ISO/TR 14025.

3. Type III environmental declarations are defined as:

Quantified environmental data for a product with pre-set categories of parameters based on the ISO 14040 series of standards, but not excluding additional environmental information.

4. The Type III environmental declaration programme is a voluntary programme for the development and use of Type III environmental declarations, with a set of rules including at a minimum: categories of parameters, involvement of interested parties, verification and declaration format

NOTE It should always be borne in mind that the overall environmental performance of the works is not only dependent on the materials used, but also on energy use, water use, building process, demolition process, etc.

5. All of the national programmes have been based on Life Cycle Assessment (LCA). In addition, calculation models have been developed or are under development for the assessment of the environmental performance of complete buildings, based on an aggregation of the environmental performance of its components. Some of these models include other aspects such as design and energy and water use of the building.

6. Further independent development of whole building (works) models and environmental product declarations on the national level leads to divergence and the risk that barriers to trade will develop will increase. To achieve harmonisation of a core EPD-system a European approach is required. This system provides a common language beyond the results of the ISO-standards.

¹ In this context aspects relevant for buildings mentioned in the Commission's Communication towards a thematic strategy on the urban environment (COM(2004)60) shall be included (where relevant) in the targets of this mandate.

7. National regulations regarding environmental product information are expected to emerge. At the moment no formal mandatory regulations exist. Industry however is already facing demand for information from the market place, based on different methods within the EU Member States. The net result of this is mounting costs for industry and a mutual non-acceptance of environmental product information. To ensure that comparable environmental information is generated and used, without creating barriers to trade, national schemes need to be based on a common European programme founded upon European or International standards for Environmental labels and declarations - type III environmental declarations.

2. RELEVANT INTERNATIONAL STANDARDS

8. The ISO environmental management committee, ISO-TC 207, has produced a set of standards, the 14040 series that provides the means for the systematic determination of environmental information in the form of a Life Cycle Assessment. Other standards, the 14020 series, provide the means for the declaration of the information. All of the standards are generic in nature because they may be applied to all materials, products and services; the committees producing the standards are said to be horizontal. ISO WD 14025, which is a revision of the technical report for Environmental labels and declarations - type III environmental declarations is the most relevant.

9. In the building construction area ISO/TC 59 is developing sector specific (vertical) standards for sustainability in buildings (buildings and constructed assets). The most relevant of these are:

- ISO/CD 21930 Environmental declaration of building products
- ISO/CD 21931 Framework for assessment of environmental performance of buildings and constructed assets
- ISO/CD 21932 Terminology
- ISO/CD 21929 Sustainability indicators
- ISO/AWI 15392 General Principles
- ISO/DIS 15686-6 Buildings and construction assets – Service life planning – Part 6: Guidelines for considering environmental impacts

10. These standards provide guidance beyond that of the ISO 14040 standards to the experts performing the LCA but might still leave room for choice and interpretation when they will be finalised. The European Union needs to set up a stable set of core indicators for the environmental declarations of construction products based on the methodological principles from the ISO TC 59/SC17 standards.

11. A set of standards is required that provide environmental information that supports the construction of sustainable works. These must give the guidance necessary to enable good agreement on the outcomes of LCA-studies. The standards must take into consideration the developing standards in ISO/TC 59 and ISO TC 207.

3. OPTIONS AND ROUTE FOR STANDARDISATION

12. Based on a study commissioned by DG Enterprise and as the result of several workshops with experts the possible routes towards standardisation have been explored. Two routes were identified as most promising:

- The development of a standard for the environmental performance of buildings; and
- The development of a horizontal standard for Environmental Product Declarations (EPD) for building products/materials.

As the result of further discussions DG Enterprise chose to combine these two.

13. Based on this decision CEN has forecast to initiate the establishment of a TC on the assessment of the environmental performance of buildings. Part of the work will be the development of a horizontal standard for the EPD for building products and materials. Another part will be the development of an assessment method for the integrated environmental performance of buildings. The similarities between the national schemes for the LCA of building products are considered to be large, leading to the expectation that a European horizontal standard for this aspect could be developed within a reasonable time span.

4. MANDATE TO CEN

14. A mandate is needed from the Commission that will permit CEN to progress the work within a CEN Technical Committee appointed for this purpose. The mandate should reflect the needs expressed in clauses 1, 2 and 3 and that the work should be carried out within the planned timeframe. It is recommended that CEN actively seeks the participation of stakeholders who should be involved in the development of the standards, viz., builders, users and designers.

NOTE: The energy use of buildings is the subject of the Directive on Energy efficiency (2002/91/EC). Standards are under development in this area and co-ordination is required in order to meet the specifications for the use in the assessment of the integrated environmental performance of buildings.

5. DESCRIPTION OF THE MANDATED WORK

5.1 Introduction

15. The work in ISO goes a long way towards meeting European requirements for the declaration of environmental information. There are however, areas that will not be agreed or elaborated within the ISO committees. The DG Enterprise Working Group on LCA/EPD has identified some key issues which might not be addressed in the standards under development within ISO as sufficiently precise guidelines for the exchange of

information for the European construction sector². These key issues are to be resolved by developing additional standards as more specific guidelines for executing the LCA and presenting the information (along with other information) in EPD's for building materials and products.

16. The ISO standard should be regarded as a framework for which the details have still to be defined on the basis of the identified key issues before it can be used in the European context. Some key issues for which CEN needs to develop detailed decisions and calculation rules in order to provide the methodology for European environmental product declarations are listed below.

- The categories/data to be reported in making an environmental declaration;
- The way to deal with PCRs and generic requirement;
- Definition of the product group e.g. based on TC structure in CEN;
- Procedure necessary to define a declared/functional unit;
- Procedure necessary to define additional information describing the product characteristics/performance;
- Choice and description of system boundaries;
- Choice of allocation rules and scenarios;
- Choice of cut-off criteria;
- Data quality requirements (use of specific and generic data);
- Procedure used for acquiring of information on sources/databases to use for acquiring generic data;
- Impact categories and categorization factors for the EPD;
- Procedure for the selection of additional information, e.g. measured values to provide basic information for the assessment of indoor air quality;
- Procedure for the selection of additional information giving direction on specific topics of the product life cycle (e.g. hints on processing a material important for assessment of the working environment).
- Procedure to guarantee consistency and comparability between product groups in case the EPD information is going to be used in building and construction LCAs.

17. The Commission asks CEN to develop the standards and technical reports in the intended perspective as described below.

18. The definitions contained in the ISO standards on terminology should be supplemented by additional definitions in the European standard as necessary.

² The selection of the construction sector is based to the advanced stage of use of LCA/EPD tools in this sector and therefore its promising position to provide an opportunity to create a system to handle the key issues not addressed in sufficient detail in the general ISO approach and possible specific needs of it users. The focus on construction does not imply any restrictions for the use of this scheme for other sectors and services.

5.2 Section 1: Framework Standard

5.2.1 Objective

19. This framework (head) standard should provide guidance to the standards for individual aspects during their development. The standard should take into account and incorporate existing expertise from existing aspects standards or other standards in these areas that are at an advanced stage of development.

5.2.2 Framework standard for integrated environmental building performance

20. The deliverable is a framework standard that is intended to provide the methodology for the assessment and the subsequent declaration of the integrated environmental performance of complete buildings and construction works. It should provide the means for the aggregation of the results from a set of supporting standards into a single data set that represents the environmental declaration of the whole building. The aggregation should be based on the results of the LCA for each of the aspects, i.e. materials, energy use, water use, construction process, design considerations, etc. and/or additional information. The standard describes the assessment of data quality for LCI-data and the effect of data-quality on the results of the LCA.

21. A standard is required describing the various aspects and the intended LCA outcome for each of the aspects in order to allow aggregation. The overall approach needs to be described in the framework standard.

22. The standards have to be in line with the procedural framework of the upcoming ISO 14025, which gives guidance on how to organise an EPD programme and who has to be involved and at which stage the involvement occurs.

5.2.3 Horizontal standard on the aggregation of LCA results of individual materials into the building

23. The deliverable is a horizontal standard that provides the methodology for the aggregation of materials data or data on components to provide the overall integrated environmental performance of a building³. Although the basis is a summation of the environmental performance of construction products/materials from which the building is constructed it is clear from the existing schemes that more is required; in particular an insight in the design of the building. The standard should provide guidance allowing design variability.

³ It may be necessary to review installed equipment (such as elevators) at some point.

5.3 Section 2: Building Products and Materials Related Standards

5.3.1 Objective

24. The standards for construction materials and products mentioned in this section are part of a set of standards from which the integrated environmental performance of a building can be calculated. The other parts will need to be developed within a reasonable time frame. CEN is asked to provide a planning for the development of these parts. The horizontal standard for the material aspect should not be seen as distinct from these other parts, even if the development requires a different time frame.

5.3.2 Standard on the LCA methodology for building products/materials

25. The deliverable is a standard based on the ISO TC 59 SC17 standard for the environmental declaration of building products, ISO CD 21930. This standard is expected to reach the point of no further technical changes by June 2005. The new CEN committee can finalise its work at this time and should provide an answer to the issues beyond the scope of ISO by providing information on the following:

- The categories/data to be reported in making an environmental declaration;
- The way to deal with PCRs and generic requirement;
- Definition of the product group e.g. based on TC structure in CEN;
- Procedure necessary to define a declared/functional unit;
- Procedure necessary to define additional information describing the product characteristics/performance;
- Choice and description of system boundaries;
- Choice of allocation rules and scenarios;
- Choice of cut-off criteria;
- Data quality requirements (use of specific and generic data);
- Procedure used for acquiring of information on sources/databases to use for acquiring generic data;
- Impact categories and categorization factors for the EPD;
- Procedure for the selection of additional information, e.g. measured values to provide basic information for the assessment of indoor air quality;
- Procedure for the selection of additional information giving direction on specific topics of the product life cycle (e.g. hints on processing a material important for assessment of the working environment).
- Procedure to guarantee consistency and comparability between product groups in case the EPD information is going to be used in building and construction LCAs.

26. As indicated above the standard should give guidance on the collection of data (Life Cycle Inventory, LCI), the calculation method, the environmental aspects to be reviewed, the characterisation factors, etc. The standard should be horizontal, implying that it can be used for all building products and materials. The standard should describe the assessment of data quality for LCI-data and the effect of data-quality on the results of the LCA. Also the discussion on the use of LCA for cradle-to-gate and cradle-to-grave for various products and materials needs to be resolved.

5.3.3 Standard on the communication format/EPD

27. This standard to be delivered should be based on the results of the standard for the LCA methodology for construction products/materials. The outcome of the LCA is one of the communication items of an EPD. Other information items are e.g. the description of the product, the unit product, emissions⁴ or elution rates (if relevant for the product/material), etc.

28. The standard describes the EPD format by which environmental product information is communicated from business-to-business and/or from business to consumer⁵. The standard has to ask for a minimum set of information to be declared.

5.3.4 Technical Report on generic data

29. The deliverable is a Technical Report that describes the existing databases with generic data (electricity, diesel, transport, etc.) and a route towards harmonised data for the generic data. An assessment scheme should be integrated in the standard to check the applicability of a dataset as generic data for an EDP/LCA. The assessment scheme has to ensure the consistency of all data that is allowed to be used as background data. If regional distinctions are required, procedures to define these need to be described.

30. The use of such harmonised generic data should be made mandatory when applying the standard mentioned under Section 1. The Technical Report should also resolve questions regarding the current ownership of the databases, how the databases should be updated (frequency and procedure) and how to address differences in local conditions.

5.4 Section 3: Construction and Demolition Processes Related Standards

31. The following is a list of the required standards for other aspects that together provide the basis for the assessment of the integrated environmental performance of the building. As such the following standards and/or technical reports are part of the overall methodology that is described in section 1⁶.

5.4.1 Technical report on the assessment of the environmental performance of the construction process of a building

32. The deliverable is a technical report that provides an LCA-based method for the assessment of the environmental impact of the construction process on relevant scenarios. It should identify which factors should be taken into account and which should

⁴ For emission rates measurement methods have to be agreed on to be able to use this information e.g. for indoor air quality assessments. Such methods will be developed under the CPD.

⁵ For the purpose of communicating business-to-consumer an aggregation of information would be required. It might be very much depending on the national interests what way the aggregation of the LCA-results should take place. If a consensus can be reached on the aggregation of the LCA-results the standard should also contain a part on the EPD for consumers.

⁶ When a standard on energy use of buildings would be finalised by CEN/TC 89 this standard needs to be followed.

not, what climate and what generalisations are acceptable regarding transport, etc. The results should be able to fit in the aggregation step for the integrated environmental performance of complete buildings and construction works.

5.4.2 Technical report on the assessment of the environmental performance of the end of life phase process (demolition, recycling, waste treatment processes) of a building and products

33. The deliverable is a technical report that provides an LCA-based method for the assessment of the environmental impact of the end-of-life (demolition) process. It should identify which factors should be taken into account and which should not, what climate or other variability should be taken into account (if at all) and what generalisations are acceptable regarding transport, waste handling, etc. The results should be able to fit in the aggregation step for the integrated environmental performance of complete buildings and construction works. In addition recycling and waste treatment processes should be integrated (if specific for materials, products or components) to be able to address the full life cycle of the building.

5.5 Section 4: Building Operation Related Standards

5.5.1 A technical report on the assessment of issues of building products related to the life time of the building (service life, durability, design, maintenance and replacement)

34. The deliverable is a technical report that provides an LCA-based method for the assessment of the environmental impact of the maintenance and repair processes based on relevant scenarios. It should identify which factors should be taken into account and which should not, what durability and guarantee requirements should be taken into account and what generalisations are acceptable regarding climate, temperature, etc. The results should be able to fit in the aggregation step for the integrated environmental performance of complete buildings and construction works.

6. EXECUTION OF THE MANDATE

35. The standards shall be developed in accordance with the requirements as stated below, which might be subject to changes and amendments. CEN will provide the Commission within 8 months after acceptance of the mandate a work plan with a detailed programme and a review of the feasibility of the development of the standards, containing a list of standards and normative documents that will be used to carry on this programme as well as information on existing schemes and routes for standardisation on the key issues. After examination of the work programme and consultations with CEN/CENELEC, the Commission will endorse the timetable and the list of standards or parts of standards, which meet the terms of this mandate.

36. For the development of the deliverables the following timetable is foreseen:

By December 2007

	Section 1	
5.2.2	A framework standard for integrated environmental building performance	EN
5.2.3	A horizontal standard on the aggregation of LCA results of individual materials into the building	EN

	Section 2	
5.3.2	A horizontal standard on the LCA methodology for building products/materials- including data quality of LCI data	EN
5.3.3a	A horizontal standard on the communication format/EPD Business-to-business	
5.3.3b	A horizontal standard on the communication format/EPD Business-to-consumer	EN
5.3.4	A Technical Report on generic data	TR

	Section 3	
5.4.1	A technical report on the assessment of the environmental performance of the construction process of a building	TR
5.4.2	A technical report on the assessment of the environmental performance of the end of life phase process (demolition, recycling, waste treatment processes) of a building and products	TR

	Section 4	
5.5.1	A technical report on the assessment of issues of building products related to the life time of the building (service life, durability, design, maintenance and replacement)	TR

37. CEN shall send to the Commission, within two months after their adoption, the standards in three linguistic versions (English, French and German) and the titles of the standards in the other languages of the European Union. This information shall be submitted on paper and in electronic format.

38. In order to obtain compatible standards that cover all aspects as the mandated work without overlaps with work already done or under way, CEN will closely co-operate with relevant other bodies.

39. The Commission reserves the possibility of specifying additional and more detailed requirements for the assessment methods for the environmental performance of buildings at a later stage. CEN provide the Commission with a work or business plan for the TC that will execute the work and will inform the Commission timely on any changes in the work plan. CEN will provide a yearly report on progress of the work.

40. The standstill period referred to in Article 7 of Directive 98/34/EC of 22 June 1998 shall commence when CEN accepts this standardisation mandate.