Nationale
Milieu DATABASE
HET FUNDAMENT VOOR DUURZAME BOUW

Version 1.1 (May 2022)

NMD Verification protocol Inclusion of data in the National Environmental Database

Environmental Performance Assessment Method for Construction Works

STICHTING NATIONAL ENVIRONMENTAL DATABASE
Visseringlaan 22b • 2288 ER Rijswijk • Tel. +31 70 307 29 29
E-mail: info@milieudatabase.nl • Website: www.milieudatabase.nl

Contents

1. Introduction

1.1. General

This version of the NMD Verification protocol, version version 1.1 May 2022, replaces the Verification protocol version 1.0 July 2020. The version numbering has restarted as a result of the new lay-out and title. The Verification protocol describes the procedure for verifying data for inclusion in the National Environmental Database. The requirements based on which verification takes place are described in the Environmental Performance Assessment Method for Construction Works[1] (hereinafter referred to as: Assessment Method).

The Assessment Method was developed for unambiguous and verifiable calculation of material-related environmental performance of construction works. For more information and for definitions of terms used in this Verification protocol, the Assessment Method version 1.1 March 2022 is available via the Stichting National Environmental Database (Stichting NMD) website: *www.milieudatabase.nl/en/*

1.2. National Environmental Database

The National Environmental Database (NMD) was established to enable unambiguous calculation of environmental performance of construction works in the Dutch context. The NMD contains information about products and activities formulated in accordance with the Assessment Method in the form of product cards that refer to environmental profiles. These product cards and environmental profiles are used in various calculation tools to calculate the environmental performance of construction works. Together with the calculation rules, this ensures verifiable, reproducible and unambiguous calculation results.

There are three product information categories in the NMD:

- Category 1: proprietary data, verified by an independent, qualified third party in accordance with the NMD Verification protocol.
  For whom: manufacturers, suppliers
- Category 2: non-proprietary data, verified by an independent, qualified third party in accordance with the NMD Verification protocol, including a statement of representativeness, for example, for the Dutch Market or a group of manufacturers, and mentioning the participating companies.
  For whom: groups of manufacturers, suppliers, sectors, government authorities, etc
- Category 3: non-proprietary data, owned and managed by Stichting NMD and not verified according to the NMD Verification protocol. All procedures relating to category 3 product information are included in Appendix II of the Assessment Method?
  Public availability: underlying data (structure of product cards and basic profiles) are publicly available via the Stichting NMD website: *www.milieudatabase.nl/en/*

Category 1 and 2 data that are included in the NMD are supplied by construction product manufacturers and sectors. They also remain owners of the environmental profiles.

[1] *In this version of the verification protocol 'construction works', replaces 'buildings and civil engineering structures'. Civil engineering includes earthworks, roadworks and hydraulic engineering. In this context, it refers more broadly to the entire infrastructure sector, including, for example, railway construction and energy infrastructure.*

The Assessment Method serves as a product category rule (PCR) for the Life Cycle Assessment (LCA) that is carried out in order to produce an Environmental Product Declaration (EPD). This makes the environmental information from the EPDs suitable for inclusion in the NMD as category 1 and category 2 product information. The Assessment Method therefore indicates how EPDs should be formulated as these supply information for the product cards. EPDs are in line with EN 15804. The Assessment Method is a generic PCR for construction products. In addition to the Assessment Method, sectors produce product-specific product category rules (PCRs).

Category 3 data are a catch-all solution to provide environmental profiles in the NMD in the absence of, and as a counterpart to, category 1 and category 2 data for a construction product. Stichting NMD is owner of these environmental profiles, which are formulated under Stichting NMD's responsibility or were submitted by a sector in the past.

A surcharge factor is applied to category 3 environmental profiles, because experience has shown that unverified environmental profiles often indicate a too low environmental impact as the inventory data are less complete, and to stimulate the submission of category 1 and 2 data to the database. This surcharge factor is determined by Stichting NMD, which administers the NMD, and is implemented in the calculation tools via the calculation rules. An overview of the agreements and procedures for category 3 product cards is included in Appendix II of the Assessment Method?

As well as the product cards in the NMD, Stichting NMD also manages the process database. This is an LCA database of raw materials and background processes based on Ecoinvent 3.6[2]'allocation, cut-off by classification' and adjusted for use in the context of the Assessment Method. These processes form a generic basis for LCA practitioners if no specific data are available, as stated in section 2.6.3.6. in which in all cases the representativeness of these processes should also always be considered in the LCA report on which the EPD is based. EPDs are in line with EN 15804. Category 3 data are modelled according to processes from the NMD process database, which means that Category 3 data are updated following any changes in Ecoinvent or the Assessment Method.

The Assessment Method, the calculation rules, the NMD and the process database are a cohesive package that enable an unambiguous calculation of the environmental performance of construction works. The figure below indicates that the Assessment Method serves both as a product category rule (PCR) to produce EPDs as well as to determine the calculation rules for the core of the calculation tools.

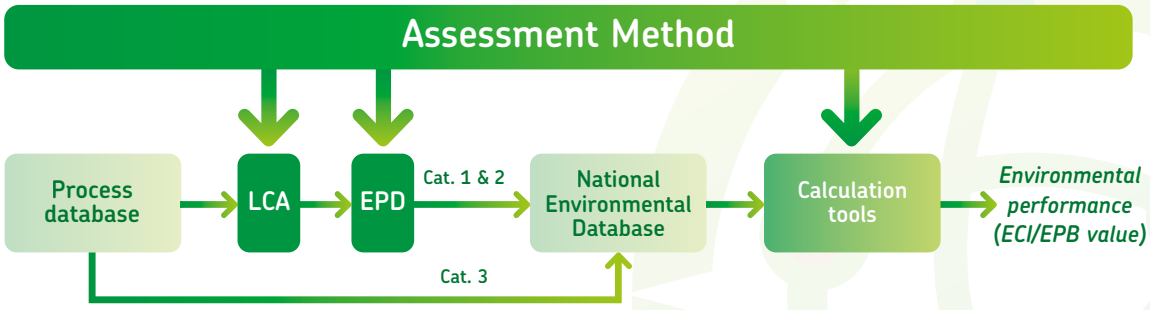

Figure 1: Visualisation of the cohesion between the two databases managed by Stichting NMD, the ECI/EPB value and the elements for which the Assessment Method prescribes requirements.

[2] *Appendix II includes information on how changes to the used Ecoinvent can be implemented. Files based on version 3.5 will still be accepted until 1 July 2021.*

1.3. NMD Verification protocol

Environmental data that are declared in the NMD in accordance with this Assessment Method are verified using the procedure as described in this NMD Verification protocol. The EPD compiler is responsible for ensuring a check in accordance with the latest version of the NMD Verification protocol. Earlier versions can no longer be processed once any transition period has expired. To enable verification according to the NMD Assessment Protocol, the LCA practitioner should complete the comment column in the Assessment Tables document stating where the requested information can be found in the project file and adding this completed document to the project file. The document is available as Word file on the Stichting NMD website: *www.milieudatabase.nl/en/*

The Verification protocol's topic and area of application are Category 1 and 2 data:
Category 1 and 2 data for inclusion in the NMD concern verified information on a construction product's environmental aspects that is generated at the initiative of manufacturers or their representatives via an environmental Life Cycle Assessment (LCA) and is ready for inclusion in the NMD.
Category 1 and 2 data for inclusion are self-declarations verified by a recognised third party, type III EPD (Environmental Product Declaration) specifically intended for the Dutch market.

The individual manufacturer or its representative (sector organisation, association, holding)[3], is responsible for providing information about the construction products as well as the accompanying services that are supplied. The manufacturer is then also the party that formulates or has data formulated for inclusion in the NDM and requests inclusion from Stichting NMD. After successful completion of the verification process, data can be included in the NMD. This verification should be implemented by a verifier who meets the NMD conditions procedure for recognition as LCA expert and has obtained NMD recognition for LCA experts for verifying category 1 and 2 data for inclusion in the NMD', version 1.0 (July 2020) and appears on the 'List of recognised LCA experts'. Both documents are available via *www.milieudatabase.nl/en/*

The verification should be implemented in accordance with the requirements determined in this Verification protocol. The verification comprises four steps:

1. A recognised verifier assesses whether the data for inclusion in the NMD are formulated in accordance with the current Assessment Method;
2. The recognised verifier assesses whether the data are entered correctly in the NMD 3.0 input interface (inputting product cards NMD 3.0).
3. The recognised verifier presents their verification report to the manufacturer. The manufacturer then arranges payment to Stichting NMD.

The recognised verifier arranges delivery of the final report, verification statement and input of the product card in the NMD.

The verification protocol comprises:

- Application procedure for inclusion in Stichting NMD's NMD (chapter 2);
- Requirements for inclusion of data in the NMD (chapter 3);
- Instructions for the assessment by the verifying agency (chapter 4);

The assessment tables that should be completed by the verifying agency are included in appendix A. Appendix B covers the project file and LCA report requirements.

Please refer to the Assessment Method for all terms and abbreviations used.

[3] *hereinafter referred to as 'the manufacturer'*

1.4 Equivalency

When the Assessment Method requirements are not met (chapter 2), it is possible that there is equivalency. See the Procedure for Determining equivalency and verification data for NMD, which is included in Appendix D.

2. Application procedure for inclusion in the NMD

The application procedure is presented in figure 2. The detail of the components is shown below the figure.

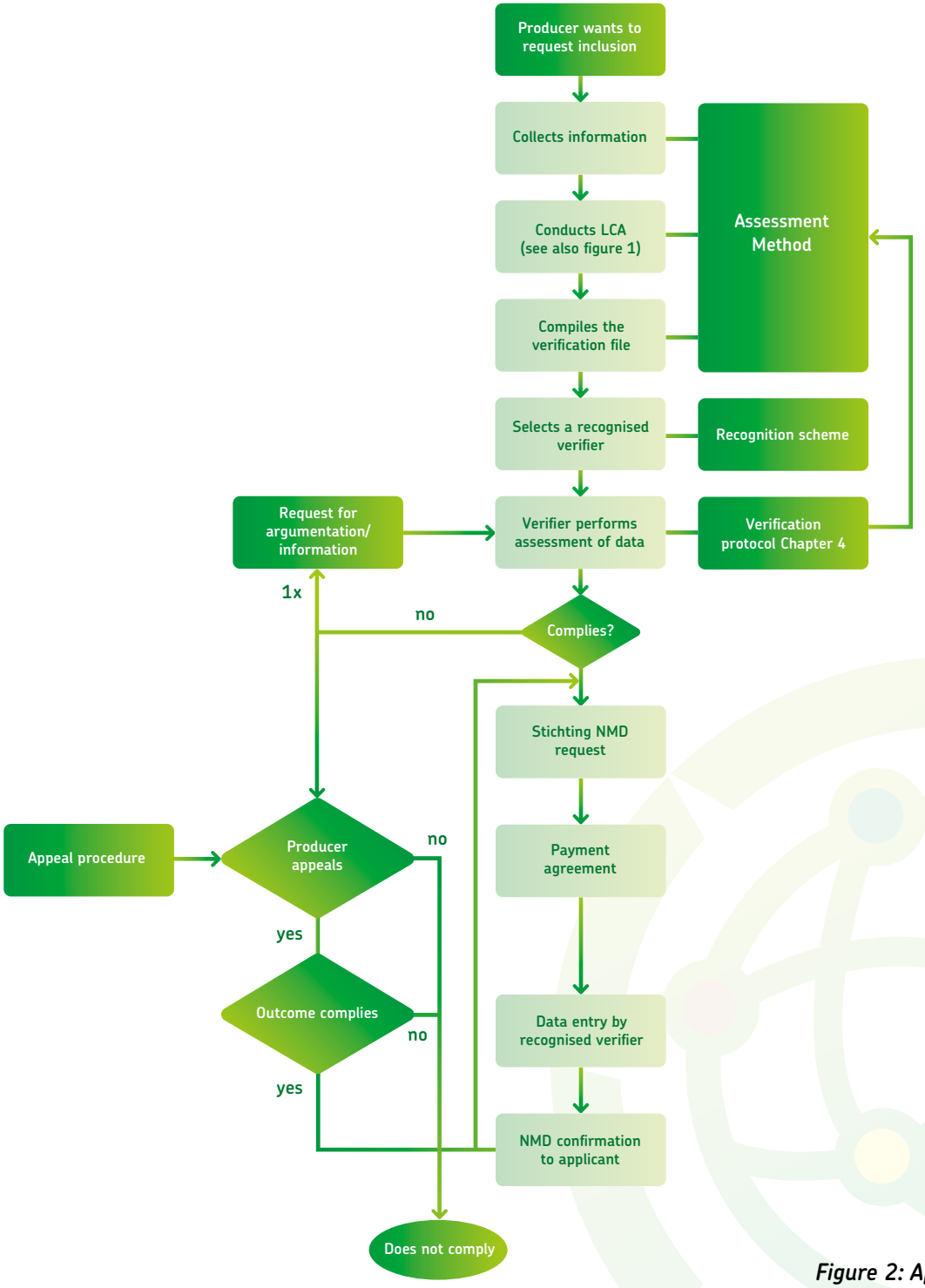

Figure 2: Application procedure

2.1 Information about applying for inclusion in the NMD

Information about applying for inclusion in the National Environmental Database (NMD) can be found in the 'Process diagram outlining how to submit data to the NMD', see *www.milieudatabase.nl/en/*.

2.2. LCA

The requirements of the LCA are articulated in the Assessment Method.

2.3. Verification file

The manufacturer offers the verifying agency a file for verification that at least comprises:
- the LCA report as described in the Assessment Method;
- the product card in accordance with the most recent delivery format and other details that are needed for good inclusion in the NMD, as described in the Assessment Method;
- the completed verification table
- a statement that the methodological requirements from the Assessment Method have been met and that the input data meet the Assessment Method requirements.

Additional data to support the data in the LCA report or on the product card may be included.

2.4. Selection of recognised verifier

The manufacturer selects a recognised verifier/verifying agency from the 'List of recognised LCA verifiers'. Stichting NMD strongly recommends selecting a recognised verifier with specific expertise (for example: asphalt, steel or concrete). The expertise areas are stated per verifier in the above-mentioned List and will be reviewed periodically by Stichting NMD.

The selection options for a recognised verifier can be limited by Stichting NMD to safeguard the independence of the verification. This means that the number of options in the input interface may be smaller than stated on the 'List of recognised LCA verifiers'. Variation in cooperation between LCA practitioners and recognised LCA verifiers is leading in this.

The manufacturer makes agreements with the verifying agency regarding the verification schedule and costs.

2.5. Implementing the assessment of data

The verifying agency assesses the data for inclusion in the NMD in accordance with the procedure stated in chapter 4 of this verification protocol. The verifying agency reports its final decision to the manufacturer.

2.6. Complaints about the assessment

If the manufacturer does not agree with the final decision or has other complaints about the verification, they can notify Stichting National Environmental Database (Stichting NMD) of this. The 'Appeals and Objections Committee' established by Stichting NMD for objections to any Stichting NMD measures or decisions will handle the complaint. Complaints can be submitted via info@milieudatabase.nl.

2.7. Application file

The manufacturer submits the following when applying for inclusion of data in the NMD:
the report by a recognised verifying agency showing that the LCA and the product card meet the verification protocol requirements and the Stichting NMD requirements for inclusion in the NMD.

2.8. Assessment of the application for inclusion of data in the NMD

Stichting NMD produces an invoice based on the application. Stichting NMD informs the recognised verifier about the receipt of payment

2.9. Inclusion of data in the NMD

After concluding the verification, the recognised verifier supplies the following to Stichting NMD via info@milieudatabase.nl:

1. LCA report in accordance with the NMD Assessment Method/NMD Verification protocol;
2. The verification report of the LCA report reviewed by a Stichting NMD recognised LCA expert;

In conjunction with this, the product card and/or basic profile data can be forwarded via the NMD 3.0 input interface. A guide for entering data in the input interface and the review process for forwarding data is available for all recognised experts. All recognised experts have their own personalised access to the input interface.

NB. The recognised LCA expert can only release data for input after parts 1 and 2 have been submitted to Stichting NMD for the file. Stichting NMD will conduct checks on this. Compliance with this procedure is part of the Stichting NMD recognition. Repeated violations of this procedure can result in the recognition being withdrawn.
At all times, Stichting NMD retains overview of the supplied files and the input interface including the review process status. Stichting NMD retains the right to conduct checks and to allow
third parties to access the files with respect to that stated under 1 and 2.

3. Requirements for obtaining a positive Stichting NMD verification, for inclusion in the NMD

Figure 3 shows the process of preparing the LCA project file that is submitted for verification. Preparing an LCA project file is a part of the total application procedure for inclusion in the NMD. This is presented as a diagram in chapter 2 (figure 2).

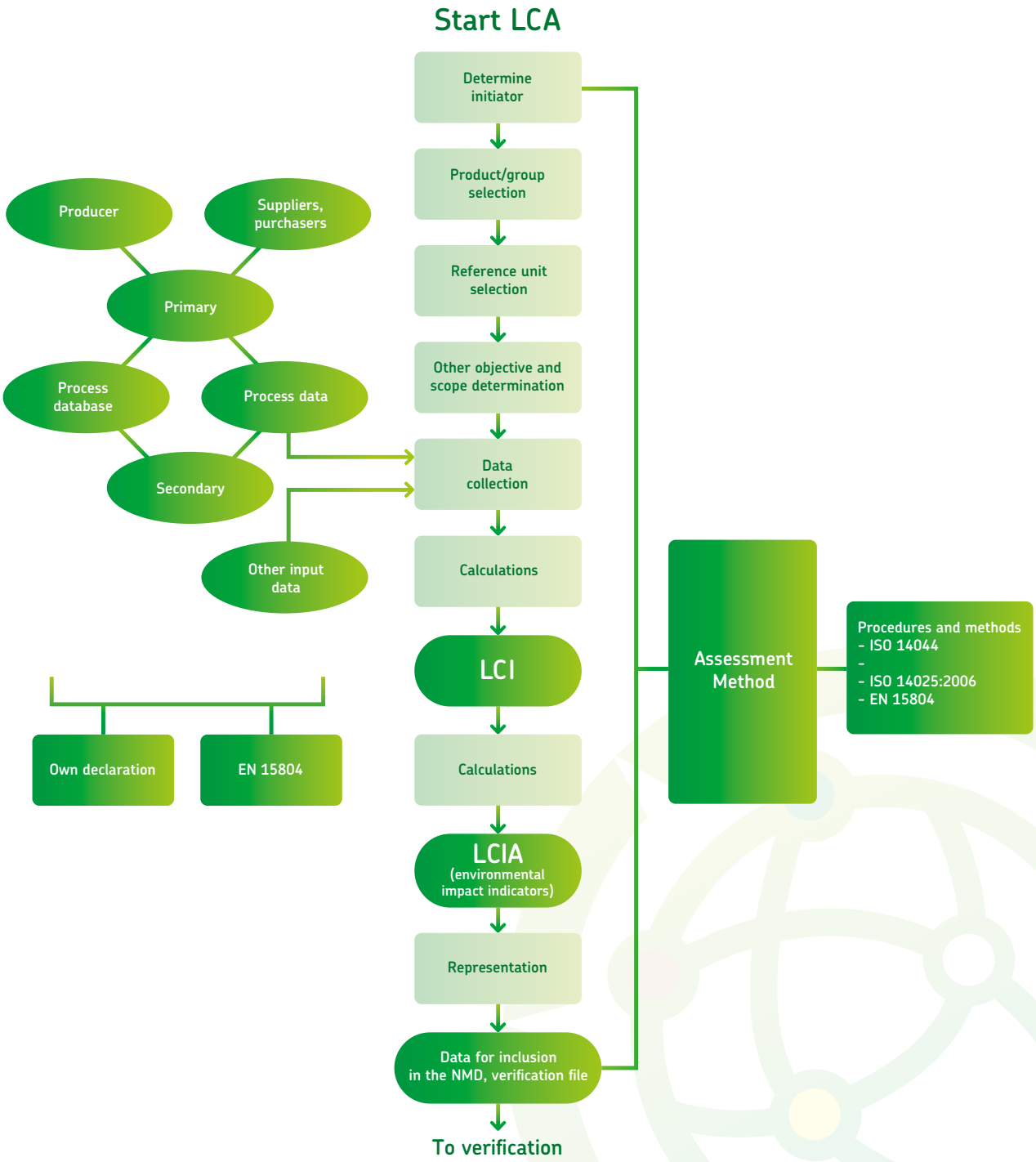

Figure 3: Implementation of the LCA and preparing the project file

3.1. Documentation and management of the project file

The project file for the LCA study must comply with the Assessment Method. The project file remains with the manufacturer. It must be available for inspection by an independent third party designated by Stichting NMD if requested in the context of verifying the verification system or in the event of an appeal and objection procedure arising from the procedure for assessing complaints as stated in section 2.6.

3.2. LCA report

The LCA report should be implemented in accordance with the Assessment Method. This LCA report contains at least the components as stated in section 2.8 of the Assessment Method. Appendix B.2 of this Verification protocol includes an informative checklist. The Assessment Method is leading for the verification. The LCA report also contains the tables from appendix A of this Verification protocol in which the LCA practitioner has entered references in the 'comments' column to the sections in the LCA report where information concerning the relevant topic is stated. The assessment itself (complies: yes/no) may not be completed in the tables by the LCA practitioner.

3.3. Assessment by the recognised verifier

The LCA report and the product card must meet the requirements from this Verification protocol. This should be determined by a recognised verifier who meets the conditions set by Stichting NMD.
The verification must be implemented using instructions from chapter 4 of this Verification protocol and must be recorded in a verification report.

3.4. Second Opinion

After checking and/or publication of environmental data, Stichting NMD retains the right to request a second opinion from an independent, third party. This involves Stichting NMD commissioning an investigation to verify whether the data comply with the NMD Verification protocol. Stichting NMD invokes this right in accordance with the procedure as stated in appendix C. The costs for hire of a third party for conducting a second opinion will be charged to Stichting NMD.

4. Instructions for the assessment by the recognised verifier

4.1. Documents to be assessed

The verifying agency assesses the following documents:

- an LCA report that meets the Assessment Method requirements;
- the completed verification table;
- the product card(s) as entered in the input interface, including scaling if applicable, for which the manufacturer (or its representative) is applying for inclusion

The assessment takes place per product card. The same LCA report can apply to various product cards.
In practice, it has proven possible to assess (large) numbers of EPDs from one manufacturer or industry at a time, provided these are included in one project file.

4.2. Method of assessment

The assessment should be implemented by completing the tables from appendix A.
The tables contain the data requirements for inclusion. The corresponding chapter or the corresponding section from the Assessment Method are stated per table. The verifying agency indicates in the tables whether the data in the LCA report regarding the relevant topic comply with the requirements by selecting 'yes' (which means: complies) or 'no' (does not comply). N/a should be entered if a requirement does not apply. In the final column, the verifier can add comments and an explanation in the event of a negative assessment. In the event of a negative assessment, the verifier does not need to give advice on how the requirements can be met. The verifier should, however, provide reasons.

If, based on his or her expertise, the verifier has concerns about input data that should be assessed procedurally, the agency should mention this in a separate letter to the manufacturer, together with the reason(s) for the concern. The letter does not form part of the assessment report.
The following steps must be followed:

- The verifying agency reports the reason for concern to the manufacturer in a separate letter
- If the manufacturer does not provide a satisfactory answer, the verifying agency should mention this in the verification report.
- The verifying agency can present the letter to Stichting NMD in confidence, after which this will be discussed by the Stichting NMD Technical Committee (TIC).

The manufacturer is free to deviate from the criteria in the Assessment Method. Deviations are permitted as long as these are explained and are within the conditions set by the Assessment Method. The verifier should use their own knowledge and expertise to determine whether the deviation has been explained sufficiently and is acceptable. In cases of doubt, a 2nd verifier can be requested. This will be included in the verification report. The manufacturer still remains responsible for the data presented.

4.3. Assessment per chapter

The final assessment per table/chapter will be 'yes' if all topics in the relevant section or chapter are answered with 'yes' or 'n/a'. The final assessment per chapter will be 'no' in other cases.

4.4. Total assessment

The requirements from the Assessment Method are met when the final assessment for each chapter is 'yes'. A product card can only be included in the NMD if there is a positive final assessment.

4.5. Contact with the manufacturer and reporting

The report of the verifying agency contains:

- the verifier's findings in the form of tables completed by him/her;
- the final assessment of whether the standard has been met or not.

The verifier reports at least once in draft form to the manufacturer, after which the manufacturer is given the opportunity to provide additional information, which the verifier includes in his or her final assessment. Additional information from the manufacturer must be supplied as an addendum to the LCA report.
The verifier submits the final report to the manufacturer.

4.6 Data entry in NMD

The recognised verifier is responsible for the final input of the product cards in the NMD.

Appendix A. Assessment tables

Requirements for preparing and reporting the environmental data of construction products and construction elements and a presentation of the data in an environmental statement are included in chapter 2 of the Assessment Method for Construction Works. This appendix contains an overview of these requirements in the form of assessment tables. A verifying agency recognised by Stichting NMD can use the assessment tables to determine whether the requirements for preparing an EPD for inclusion in the NMD have been met.

The table follows the Assessment Method and EN 15804 structure. This means that the same topics can appear several times, for example first more generally and later in detail. When this leads to one requirement, this is included once.

Assessed by (name of agency + practitioner)	
Date	
Concerns	

Methodological requirements

METHODOLOGICAL REQUIREMENTS (section 2.1 and 2.2 of the Assessment Method; chapter 1 and 2 and section 8.2 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Methodological requirements	The LCA file includes a declaration that the methodology used complies with the standards: ISO 14040 and 14044, EN 15804 and ISO 14025 for EPD. The LCA file includes a declaration that the methodology used complies with the additions from the most recent version of the Assessment Method. Relevant PCRs are used and are also part of the declaration. Reasons are given for any deviations.		
	The EN standards and versions of the Assessment Method mentioned in the above statements concern the most recent versions, or penultimate version for which the transition period still applies.		
General aspects	The following must be included in the report: • the client of the LCA study; • the LCA practitioner; and • the date of the LCA report publication		
Final assessment	Meets the Assessment Method's methodological requirements and general aspects.		

General aspects (section 2.5 of the Assessment Method; section 5 EN 15804)

OBJECTIVE (section 2.5.1 Assessment Method; section 5.1 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes / no**	**Comments**
Objective	The objective of the product card is to transfer reliable and precise quantitative environmental data about construction materials, construction products and construction elements to the NMD. These can serve as the basis for making construction work calculations and to generate solutions that reduce environmental impact. The product card has one or both of the following applications: 1. Sharing environmental data in the chain so that the next links are able to prepare an environmental statement of their product; 2. Using environmental data in LCA calculations for construction works. Methodological comparability (can be aggregated) of environmental data is particularly important for this application.		
Target group	The EPD target group (customers of the products, NMD) is described.		
Final assessment	Meets the Assessment Method's requirements concerning the objective.		

TYPES OF EPD AND ASSOCIATED LIFE CYCLE PHASES (section 2.5.2 Assessment Method; section 5.2 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Type EPD	It is clearly indicated whether: 1. only the production phase is presented as basic profile or 2. the entire life cycle		
Life cycle phases	The life cycle phases are included in accordance with the Assessment Method: 1. Modules A1-3 as basic profile if only the production phase is considered. 2. In the entire life cycle, A to D		
Final assessment	Meets the Assessment Method's requirements concerning the EPD type and life cycle phases.		

NB: The additional information requested under section 5.4 EN 15804 is not relevant for the NMD and is not assessed via this table.

COMMUNICATION FORMAT AND FORMAT FOR SUBMITTING DATA TO STICHTING NMD FOR THE NMD (section 2.5.6 Assessment Method; section 5.6 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Communication format EN 15804 Assessment Method	The communication format does not need to be in accordance with EN 15804 requirements if the intention is only to include this in the NMD. The most recent Stichting NMD format for supplying product cards is used. The file contains a statement that the communication format used is in accordance with the Assessment Method (2.8.2.2).		
Final assessment	Meets the Assessment Method's communication format requirements.		

Product category rules, calculation rules for the LCA (section 2.6.3 Assessment Method; section 6.3 EN 15804)

FUNCTIONAL UNIT, DECLARED UNIT AND REFERENCE SERVICE LIFE (section 2.6.3.1 to 2.6.4.3 Assessment Method; section 6.3.1 to 6.3.4 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Functional unit (section 2.6.3.1 Assessment Method)	Contains a description of the function(s) that need to be fulfilled and the context of the application, such as the construction work type.		
	Contains the performance requirements that apply to the function(s), including the necessary function duration (RSL).		
	Contains the conditions and the region within which the function(s) must be fulfilled as far as this is relevant for the function.		
	Contains an amount of the function(s) expressed in an SI unit or a combination of SI units.		
	The functional unit is in line with Stichting NMD's functional descriptions, the most recent list being included on www.milieudatabase.nl/en/. The correct reference to the functional description is included. It is clear whether this concerns a total product, in which case it is verified that all compulsory components are actually included in the study. If this concerns a sub-product, the total products and component (CUAS) within which this falls is clearly described.		
	Includes a product description of the construction product that is subject to the environmental declaration.		
Reference service life (section 2.6.3.4 Assessment Method)	If the entire life cycle A-D is declared, the reference service life (RSL) assumes a reference service life per type of construction product from the SBR publication Service Life of Construction Products [SBR, 2011], which can be downloaded via the ISSO Knowledge database. Deviations from this may be made if these are substantiated. Documentation is then needed to calculate the RSL. The RSL must be representative for the specified product in the specified application(s).		
	Includes a description of the construction product, building or civil engineering construction element;		

Declared unit (section 2.6.3.2 Assessment Method)	Includes a specification of the construction product or construction work component		
	If applicable, includes the possible application areas, expressed in categories or quality designations where necessary, together with the empiric service life of the construction product or the construction element per application area where relevant		
	Includes the amount of the construction product expressed in an SI unit or a combination of SI units		
	Includes the weight of the construction product		
	Includes the materialisation of the construction product in material description and weight		
Final assessment	Meets the functional unit, declared unit and reference service life criteria		

SYSTEM BOUNDARIES AND CRITERIA FOR OMITTING INPUT AND OUTPUT

(sections 2.6.3.5, 2.6.3.6 and 2.6.4.3 Assessment Method; sections 6.3.5, 6.3.6, 6.4.3.3 and 8.2 EN 15804)

Topic	Criterion	Meets the criterion yes/no	Comments
Process tree	The life cycle of the construction product must be modelled in the form of a process tree. The process tree contains all economic flows (both goods (materials, products) as well as services), both qualitative (names of the processes) as well as quantitative (amounts), that are needed for the declared unit or to be able to fulfil the function(s) from the functional unit. When the process tree is unclear because this comprises many components, a process tree with the most important components will suffice. The other details can be included in table form per information module. Incidents, such as unforeseen damage, are not included in the process tree.		

Phases in the life cycle of the construction product.	The process tree must at least make a distinction between the following life cycle phases: - production phase (A1-A3); - transport phase (A4); - building and installation process/construction (A5); - use and maintenance phase (B1 -B5); - demolition and processing process (C1-C4); - environmental costs and benefits recycling/reuse (D).		
Check system boundaries production phase (A1-A3)	Check the system boundaries of the components from the production phase. Streams that lose their waste status and leave the production phase (A1-A3) must be allocated as by-products (see EN 15804 6.4.3.2). Environmental impact and avoided environmental impact of allocated by-products are not included in module D (see EN 15804 6.3.4.6). If such an allocation of by-products is not possible, other methods can be chosen, if substantiated. **PLEASE NOTE ANY DEVIATING PROCEDURE MUST BE APPROVED BY THE TIC**		
Check system boundaries Transport phase (A4)	The transport phase (A4) starts when the construction product or element is ready for transport from the manufacturer to the buyer and ends when it is delivered to the construction site adjacent to the means of transport.		
Check system boundaries for the construction and installation process (A5)	These processes (A5) are included in the form of one or more scenarios. Standard values for 'loss in the form of construction waste' are included in section 2.6.3.6.		

Check system boundaries use phase (B1 – B5)	Check the system boundaries of the use phase components: - B1 - The use of the construction product (life cycle phase B1) concerns the application in the Netherlands. - B2 - The maintenance (life cycle phase B2) concerns only material-related maintenance and not structure-related or location-related maintenance. Cleaning maintenance is only included if functionally important. - B3 - Recovery (life cycle phase B3) - B4 - Replacement of the entire product is defined in the calculation rules at building level by the addition of extra product cards. Replacement of the entire product will, therefore, not be reported separately in the use phase. Replacement of parts that cannot match the service life of the entire product are included here. - B5 - Renovation (life cycle phase B5) is not part of this Assessment Method.		

Check system boundaries for demolition and processing phase (C1-C4)	C1 - The demolition phase, which starts when the structure is no longer in use and ends when the structure has been demolished or dismantled. This phase, therefore, comprises the activities at the demolition location. C2 EN 15804 applies. Standard values for the transport distances to the sorting locations, landfill locations and waste incineration plants (WIPs) are included in section 2.6.3.6. C3 EN 15804 applies. C4 EN 15804 applies. For landfill processes, an end point of 100 years after landfill is assumed (see also 2.6.3.6 under generic data).		
Check system boundaries module D	EN 15804 applies. Raw material equivalents are clearly described in accordance with the Assessment Method requirements (2.6.3.4) and are plausible. Section 2.6.4.3 describes how the net impact of module D must be calculated. The calculation is clearly documented and plausible.		
Check system boundaries General	Requirements for the system boundaries have been followed, well-documented and are plausible. Deviations, as long as these are permitted within the Assessment Method, are sufficiently justified.		
Determining the system boundary for end-of-waste status	For the end-of-waste phase, the system boundary is determined in accordance with Appendix IV of the Assessment Method. If a material, product or element is left without fulfilling a further function ('left without function'), it is treated as waste.		

Determining environmental effects in modules C3, C4 and D	The environmental impact is calculated via the end-of-life processing scenarios as published on www.milieudatabase.nl/en/. All deducted environmental interventions are included in module D.		
Criteria for omitting input and output	The basic principle is that all inputs and outputs for which data are available are included in the calculation. • Estimates for missing data are conservative (worst case). • Process data include infrastructure and capital goods (such as the standard Ecoinvent data). Any deviations to the above are substantiated/ reported.		
Average product	The average composition is based on: annual figures or multiple year figures of the entire production, weighted according to production; or on a composition covering more than 80% of the production quantity in the year of study.		
Average production (EN 15804 section 8.2)	Product groups (similar products from one manufacturer and/or from different production plants) are presented as averages: • Calculation rules for forming averages • Representativeness of averages If different locations/products: presentation of the modelling of all locations and products, as well as their weighting.		
Final assessment	Meets the Assessment Method requirements relating to system boundaries, phases in the life cycle and criteria for omitting input and output.		

SELECTION OF DATA AND DATA QUALITY REQUIREMENTS (sections 2.6.3.7 and 2.6.3.8 Assessment Method; sections 6.3.7 and 6.3.8 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes / no**	**Comments**
Representativeness of processes	The processes in the product system that take place at the construction product manufacturer must present an up-to-date image (for the period or the time of the environmental declaration) that is representative in terms of geography and technology.		
	Individual production locations must derive their data from that location.		
	If in the case of horizontal aggregation in the product system all production locations supply data, the result is automatically representative of the relevant group. If not all production locations from the group provide data, a representative cross-section should be made from the group of production locations, as far as they produce for the Dutch market, with regard to geographical and technical differences that may lead to differences in environmental impact.		
Representativeness of other data	The other processes in the product system must give a representative or typical picture of the current geographical and technological situation. The area of application to which this norm applies is the Netherlands. 'Representative' means that data accurately reflect the real population. 'Typical' means that the data describe a certain, common situation (also called modal).		
Exceptions	As an exception to the timeliness rule, a future scenario may be assumed for the disposal scenario if the strictness clause that there will be a demonstrable working (return) system at the time of disposal is complied with. If deviating from the topicality requirements, this must be transparent. The plausibility of this is verified explicitly		

Standard values	The following standard values apply: - transport distance single journey to the construction site if the construction product is produced in the Netherlands: for bulk material 50 km, for other materials, products and elements 150 km; for civil engineering structures the transport distance per structure is offset in the calculation tool. - location to determine transport distance of materials from abroad to and from the construction site or customer: Utrecht; - end-of-life processing scenarios as published on https://milieudatabase.nl; - transport distance single journey from the demolition location to the sorting and/or crushing plant: 50 km; - transport distance single journey for transporting soil: 50 km; - transport distance single journey from the demolition or sorting location to the landfill location: 50 km; - transport distance single journey of combustible material from the demolition or sorting location to the waste incineration plant (WIP): 100 km.		
Standard values in the event of loss in the form of construction waste	For the release of construction waste, the standard values from the Assessment Method are used for: - Prefabricated products: it is assumed that 3% of the materials will be lost (at the construction site or during transport). - In-situ products: It is assumed that 5% of the materials will be lost. - Auxiliary and finishing materials: It is assumed that 15% of the materials will be lost. If it is desirable to deviate from these standard values, this is possible provided the research results include numerical substantiation.		
Standard values for incineration in a waste incineration plant (WIP)	In the case of incineration in a waste incineration plant (WIP), the avoided energy production can be offset in module D from the amount of net exported energy (MJ per energy carrier).		

ILCD format and nomenclature (if available; see Assessment Method)	The documentation format and the data sets for the life cycle inventory data that are used in the LCA modelling use the current ILCD format and nomenclature as defined in the 'International Reference Life Cycle Data System (ILCD) Handbook - Nomenclature and other conventions' document, which can be downloaded via the European Commission's central website.		
Data quality	Data quality is based on the principle that the data quality of data relating to processes that take place at the construction product's manufacturer, must be higher than those of the other processes. Furthermore, the principle is that the economic flows must be as realistic as possible within practical limits for the LCA practitioner. If the aforementioned ILCD format has not (yet) been followed, data quality must be assessed using a data quality system in accordance with Appendix D of this Verification protocol and any additional recorded instructions from Stichting NMD.		
Product scenarios	If multiple installation options are available for a product (or functional unit) that have an impact on the end-of-life phase and/or the options for reuse, recovery or recycling, multiple environmental profiles (C1-C4, D) can be provided. The following preconditions apply here: — the product delivered is in fact suitable for the application; — additional resources and/or substances are declared in the relevant module D; — specific design conditions that apply are clearly described; — disposal scenarios are up-to-date with the same exception applying as described previously.		
Final assessment	Meets the Assessment Method's requirements concerning the selection of data and data quality.		

Inventory (section 2.6.4 Assessment Method; section 6.4 EN 15804)

INVENTORY: DATA COLLECTION (section 2.6.4.1 Assessment Method; section 6.4.1 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Data categories	Environmental interventions of the product system processes must be collected within the following data categories: extraction of raw materials, emissions to air, emissions to water and emissions to soil.		
Data collection Interventions	The name, unit and amount of every intervention must be mentioned. The name must indicate what has actually been measured.		
	The preferred order for determining emissions is: 1. Methods designated in laws, decrees or ministerial regulations; 2. Methods from standard sheets; 3. Methods that are described in (possibly sector-specific) private law agreements		
	All environmental interventions from the most recent CML-NMD method that are available via www.milieudatabase.nl/en/ and those of the International Reference Life Cycle Data System (ILCD) Handbook ('identified by the name EN_15804'), must be considered. At least the following interventions must have a value: — emissions to air when using thermal energy of CO2, CO, NOx (NO2 and N20), SO2, CxHy and particulates (PM10: particulates < 10 µm); — emissions to water of COD, BOD, P-total, N-total and solid matter (PM10: particulates < 10 µm); — emissions to the soil of PAHs and heavy metals; — other emissions for which environmental regulations impose requirements on the manufacturer of the construction product.		

Data collection Biogenic carbon (CO_2, CH_4, etc.)	Both biogenic carbon uptake and emissions are modelled in the modules where they occur.		
Data collection Waste	Have released materials been determined to be waste? Has the end-of-waste status been checked? Has it been determined whether waste is hazardous?		
Data sources	Data from the construction product's manufacturer must originate from primary sources and be valid (representative) for the period stated in the environmental declaration.		
	Data from other processes must be valid (representative) for the period stated in the environmental declaration.		
	Those supplying to and purchasing from the relevant construction product's production locations should be requested to provide production process data in accordance with the requirements of this standard.		
	If a supplier or purchaser provides no or insufficient data, public sources, industry figures and literature data will be used. In that case, a check will be made as to whether there are deviations compared with the NMD. Any deviations should be stated in the verification report. The verifier should indicate whether the deviation is so significant that this should be reported on the NMD product card.		

	Standard public sources and literature sources must be used. The following can be used as guideline (EN 15804 6.3.8): • <10 years for background data • <5 years for manufacturer data • Manufacturer data based on 1 year average • Time period of 100 years in the event of a landfill scenario - longer if relevant • Technical background meets the physical reality • Integrity of generic data, validity of system boundaries and cut-off criteria for generic data are demonstrated If a supplier uses sector-average data (cat. 2) it must be demonstrated that the supplier is part of this relevant sector average.		
	If processes or standard values are available from different regions, the following order of priority will be used: 1) the relevant country; 2) a comparable neighbouring country; 3) the relevant region (for example Northwest Europe); 4) the relevant continent or sub-continent; 5) the world.		
Reliability	The value of an environmental intervention must be an average of the measurements or calculations over a time period within which occurring fluctuations as a consequence of seasonal influences, measurement method and similar are averaged out.		
Representativeness	The values of the environmental interventions must be representative for the process for which the environmental data are collected. The plausibility of this is verified		

Completeness	All interventions from the most recent CML-NMD method must be considered. The interventions will then be awarded a value unless the value is unknown. This creates a threefold division: 1) a positive or negative value; 2) the value 0 (for all interventions of which the value is below the detection limit); 3) a question mark (if it is not known whether the intervention takes place).		
Sum parameters	Where available, sum parameters (such as NO_x, C_xH_y, COD, BOD, P-total, N-total, PAH 10 and heavy metals) should be broken down into individual components for characterisation. The standard list contains several sum parameters for which characterisation factors are also available. The intervention value of the sum parameters can be entered in two ways: a) The intervention value of the sum parameter is known. This is entered; One or more individual substances are known, but only a characteristic factor is available for the sum parameter. A sum parameter is a representative characteristic value for the sum of a group of substances for a particular environmental impact, for example PAHs. The other substances' intervention values are then entered into the sum parameter pro rata. When data are available for several substances from the sum parameter, the sum parameter will be calculated for each substance and the results averaged.		b)
Data quality of other processes	When the manufacturer of a construction product requests data from suppliers and purchasers they must request the same data quality of the environmental intervention as is required for the manufacturer's processes. If a supplier or purchaser cannot meet this data quality, this must be clear from the data quality description (see Assessment Method section 2.6.3.7).		

Validation of data (by the EPD compiler)	For the processes carried out at the construction product manufacturer, the energy balance will have to be determined at company level and deviations will have to be corrected to an accuracy of ≥ 95%.		
	For the processes carried out at the construction product manufacturer the mass balance per process used will have to be determined (if different from the data at company level) and deviations will have to be corrected to an accuracy of ≥ 95%.		
	The validity of the remaining processes needs to be checked by determining the mass balance per process and correcting deviations to an accuracy of ≥ 95%.		
Recording data quality per unit process	The reliability of the environmental intervention must be recorded in the process data documentation, as far as data are known: • time-based representativeness • geographic and technological representativeness of processes • completeness of the economic flows, by justifying the truncated processes • completeness of the environmental interventions, by justifying the estimated environmental interventions		
Reproducibility	A reference of all sources, both primary as well as public sources and literature is recorded. This will at least include: title, author/compiler and year.		
	In the context of reproducibility, a project file is recorded as stated in section 2.8.4 of the Assessment Method.		
Consistency	The consistency must be justified by explaining the sources used and processes gone through in order to ensure that the LCA is consistent.		
Final assessment	Meets the Assessment Method's requirements concerning the inventory and data collection.		

Life cycle inventory: calculation procedures and allocation

LIFE CYCLE INVENTORY: CALCULATION PROCEDURES AND ALLOCATION (section 2.6.4.2 & 2.6.4.3 Assessment Method; section 6.4.2 & 6.4.3 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Check calculation procedure module D	The calculation procedure for net output flows of secondary materials or fuels has been implemented in accordance with the Assessment Method. The steps in the calculation procedure are clearly described and detailed step by step.		
Check declaration module D	The module D credits are declared in a correct way The following aspects are substantiated in this: - A mass balance that includes all individual input flows of secondary raw materials and all output flows of materials for recycling. - The quality and quantity must be determined for all materials for recycling that are used as secondary materials. - Any waste flows from the recycling process will be included. - Module D is calculated using the sum of the net output of the individual secondary raw material flows.		
Final assessment calculation procedures	Meets the Assessment Method's requirements concerning calculation procedures and allocation.		

Life cycle impact assessment

LIFE CYCLE IMPACT ASSESSMENT (section 2.6.5. Assessment Method; section 6.5 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Impact categories	The environmental profile of set 1 (EN 15804/A1:2013, characterisation factors taken from the NMD Assessment Method comprises the eleven environmental impact categories that are mentioned in Assessment Method section 2.6.5.		
	The environmental profile of set 2 (EN 15804/A2:2019 comprises the 19 core and additional environmental impact categories that are mentioned in Assessment Method section 2.6.5.		
Current set of characterisation factors	Check whether the most recent complete set of characterisation factors for the environmental indicators and environmental impact indicators has been used. This can be checked via: www.milieudatabase.nl/en/.		
Calculation of environmental profiles	The values of the environmental impact categories are calculated by: 1) Allocating the environmental interventions from the inventory to the environmental impact categories; 2) Multiplying the interventions per environmental impact indicator by the characterisation factors from the CML-NMD method and the NMD Assessment Method; 3) Adding up the values obtained per environmental impact indicator. The calculation steps must be included in the LCA report, or the LCA practitioner must state that the calculation method, as stated here, has been followed. Emissions from substance groups. The emissions from substance groups are included in accordance with the Assessment Method.		

Non-characterised interventions	If not all environmental interventions have been characterised: - If the cause concerns a deviating name, correct the name so that the substance can be characterised; - If the cause is a missing characterisation factor, this should be characterised according to a similar chemical and physical substance. If this is not available, include this in a list of non-characterised interventions, stating when an environmental impact can be expected.		
Aggregation of environmental profiles	An 'average' environmental profile of a process is obtained during aggregation of environmental profiles. The average environmental profiles are calculated according to the weighted production quantity[4]average of the selected production locations. The production quantities may be estimated with respect to size.		
Final assessment	Meets the Assessment Method's requirements concerning the life cycle impact assessment.		

[4] *Or production volume if that is a standard unit.*

LIFE CYCLE INTERPRETATION (section 2.6.6 Assessment Method)			
Topic	**Criterion**	**Meets the criterion yes/no**	**Comments**
Sensitivity analysis	Contains the impact of the most important choices and assumptions made in the LCA.		
	Contains the influence of geographical and technological distribution within a group of product locations. Use the highest and lowest values in the sensitivity analysis.		
	Contains the distribution as a consequence of distribution in an average composition. Use the highest and lowest values in the sensitivity analysis.		
	Contains the distribution due to averaging when establishing a group average. Use the highest and lowest values in the sensitivity analysis.		
	Contains the distribution as a consequence of uncertainties in starting points within the allocation for recycling. If method 1) or 2) from 2.6.4.3 from the Assessment Method is used, use method 3) in a sensitivity analysis. If method 3) is used, conduct a sensitivity analysis for the distribution in values.		
	The differences amount to no more than 20% on one of the environmental impacts compared with the average value. If the sensitivity analysis shows that the differences amount to more than 20%, a split must be made in separate environmental declarations to remain within the 20% limit. A decision can be taken to present the worst case environmental profiles. This is the way to handle variations of environmental impacts with very low values.		
Final assessment	Meets the Assessment Method's requirements concerning the life cycle interpretation.		

Content of the EPD (section 2.7 of the Assessment Method; section 7 EN 15804)

STATEMENT OF GENERAL INFORMATION REQUIREMENTS ON EXTERNAL PERFORMANCE VIA A PRODUCT CARD AND/OR BASIC PROFILES (section 2.7.1 to 2.7.5 Assessment Method; section 7.1 to 7.5 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes / no**	**Comments**
General (section 2.7.1)	The following must be mentioned in an EPD. a) the name and address of the manufacturer (and); b) the description of the use to which the data relate; c) identification of named construction product (including any product code); d) a description of the product; e) the name of the programme operator; f) the date on which the declaration was issued and the validity term of 5 years; g) information about which phases are not considered, if the statement is not based on an LCA of all life cycle phases; h) a declaration that EPDs of building products cannot be comparable if they do not comply with the Assessment Method; i) in the event that an EPD describes an average of a number of products, a declaration that this does not lead to a deviation of more than 20% of the average per environmental impact indicator. j) the site(s), manufacturer or a group of manufacturers or those who represent them, for whom the EPD is representative; l) information about where further information can be obtained. It should also be indicated which third party has conducted the independent verification.		
Regulations for declaring LCA information per module (section 2.7.2 and 2.7.2.3).	The environmental impact categories (table 2 Assessment Method), the use of raw materials (table 3), waste categories (table 4) and output flows (table 5) have been used.		
Scenarios and additional technical information (section 2.7.3)	Complies with EN 15804:		

Additional information on use phase (section 2.7.4)	Information on the emission of hazardous substances to indoor air, soil and water in the use phase has been provided.		
Aggregation of information modules (section 2.7.5)	The input format for the product card and basic profile has been used.		
Final assessment	Meets the EPD content requirements		

Project report

PROJECT REPORT (the project report is not part of the public communications) (section 2.8 of the Assessment Method; section 8 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes / no**	**Comments**
Project file	The project file contains at least the information as described in section 2.8 of the Assessment Method.		A checklist with the topics that should be included in the project file has been added to appendix B.1 of this verification protocol as a resource for the verifier.
LCA report	The LCA report contains at least the information as described in section 2.8 of the Assessment Method.		A checklist with the topics that should be included in the LCA report has been added to appendix B.2 of this verification protocol as a resource for the verifier.
Scaling	Where applicable, the scaling on the product card should meet the provisions of Assessment Method section 2.8.2.2.		
Final assessment	Meets the Assessment Method's reporting requirements.		

Verification and validity of data for the National Environmental Database

VERIFICATION BY A THIRD PARTY AND VALIDITY OF AN EPD (section 2.9 of the Assessment Method; section 9 EN 15804)			
Topic	**Criterion**	**Meets the criterion yes / no**	**Comments**
Report of verifying agency	Contains the findings of the verifier		
	Contains the final assessment of whether this standard has been met or not.		
Declaration of quality	The verifier declares him or herself to be a recognised Stichting NMD expert and verifier		
Final assessment	Meets the Assessment Method's requirements concerning critical assessment by a third party.		

Informative Appendix B. Reporting requirements

This appendix contains the topics that need to be included in the project file and the LCA report.
The requirements are based on the requirements from the Assessment Method The verifier can use these lists as a checklist. It should be noted that the checklists below do not claim to be complete.

B.1 Project file (based on Assessment Method section 2.8.4)

A project file for a construction product's LCA study must be compiled that contains at least the following:

- the ingoing and outgoing environmental flows (environmental interventions) that have been used as input for the LCA calculations;
- the documentation (measurements, calculations, estimates, sources, correspondence, traceable references to origin, etc.) based on which the process data for the LCA have been formulated. This includes documentation on the recipe used to determine the composition of the manufacturer's construction product, energy consumption figures, emission data and waste production, as well as data substantiating completeness. In specific cases reference can be made to, for instance, standards or quality regulations;
- documentation that shows that the materials, products or elements (reference flow) can fulfil the desired function(s) and performance;
- documentation that shows that the selected processes and scenarios in the process tree comply with the requirements set by this Assessment Method;
- documentation substantiating the selected service life of the construction product;
- data with which sensitivity analyses and internal checks on the collected data have been implemented. The internal check includes a mass balance per process step, a mass balance at company level and an energy balance at company level;
- documentation and substantiation of the percentages used to calculate in the end-of-life processing scenario;
- documentation and substantiation of the percentages and figures (number of cycles, prices, etc.) used to calculate in the allocation procedure;
- for an environmental declaration of a weighted average for more than one production location or manufacturer:
  - the unweighted values;
  - documentation from which the weighting factors (production quantities) used were derived;
    documentation with which any qualitative information is substantiated in the environmental declaration;
- information that shows that all suppliers and any relevant purchasers have been approached for the LCA study. If this has not happened, information must show that data have been used that can be considered as equivalent to data from suppliers (e.g. when the suppliers have published joint data for use in LCAs);
- procedures according to which the data collection has been implemented (questionnaires, instructions, information material, agreements on confidentiality, etc.);
- the characterisation factors used and where these are applied to calculate environmental impact indicators, normalisation factors and weighting factors;
- the criteria and the substantiation that have been used to determine system boundaries and the selection of incoming and outgoing flows;
- documentation to substantiate any other choices, scenarios and assumptions.

B.2 LCA rapport

The LCA study of a construction project must be recorded in an LCA report that is available for external assessment. This LCA report should at least contain (where applicable):

- the name or names of the issuer(s) of the environmental declaration;
- the name of the LCA practitioner;
- the date of the report;
- a declaration that the LCA has been conducted in accordance with the requirements from the Assessment Method for Construction Works;
- a description and substantiation of the geographic and technological representativeness of the relevant product location(s), issuer(s) of the environmental declaration and the impact of any geographic and technological distribution on the end results;
- the time period within which the LCA was conducted;
- the objective for which the intended environmental declaration was prepared;
- the target group for which the intended environmental declaration was prepared;
- the functional unit;
- the construction product (reference flow) that is subject to the LCA and for which an environmental declaration is prepared. The description must be such that it is clear which product(s) from the product range this concerns;
- a bill of materials (the names of substances do not need to be stated for the composition, but the structure of the construction product does);
- any additional function(s) that are not included in the functional unit and that relate to the use of the construction product in construction works;
- a description of how the composition of all materials, products or elements is determined in the bill of materials (e.g. via a definition of standards);
- a description of the process tree and the process tree demarcation, with substantiation;
- the assumed service life of the construction product, including justification and/or the number of times that replacements have been included in the LCA calculations;
- a description and justification of the scenarios used;
- information that shows that the Assessment Method system boundaries have been followed, any deviations from this and why, and the impact this has on the end results;
- the data categories;
- the procedures for data collection (questionnaires, checklists. etc.);
- the calculation procedures (for example for estimates);
- which data originate from primary sources and which data from secondary sources;
- a substantiation of the choice made for generic data (NMD, Ecoinvent, other data);
- an acknowledgement of the source of the literature, including at least the title, author and year;
- if standard values are not used, a description of the conversion efficiency of energy sources, of how the extraction and transport of fuels is handled, of the combustion values of energy carriers, of the fuel mix in electricity generation, and of the distribution of the energy flow;
- a description of how the extent of completeness per data category is determined and how deviations have been handled;
- a list of process emissions that are part of the environmental permit;
- a list of contracted suppliers;
- the way in which data have been validated;
- the outcomes of mass and energy balances, corrections and statements for deviations;
- a qualitative description of data quality;

- the allocation method used;
- a statement of the processes in which allocation is used;
- the percentages and other data with which allocation has been calculated;
- information showing that the allocation requirements from this standard have been met;
- the environmental profiles and the other environmental impact indicators;
- the way in which a weighted average is realised;
- the characterisation factors used and where these are applied to calculate environmental figures, normalisation factors and weighting factors (not only a reference, but the factors themselves);
- the non-characterised substances;
- the results of the sensitivity analyses, including the analyses prescribed in this standard and other choices and assumptions which, according to the LCA practitioner, affect the distribution of the result (if any).

Appendix C. Second Opinion Procedure

According to section 3.4 of the NMD Verification protocol, after verification and/or publication of category 1 and 2 data, Stichting NMD retains the right to request a second opinion from an independent, third party.
This means that, in the event of concerns about the correctness of data, an investigation will be commissioned by Stichting NMD to verify whether the data complies with the NMD Verification protocol.

Introduction

1. In the event of a concern about data correctness, this should be reported to Stichting NMD, which will then attempt to collect sufficient information about the reason for the concern. If it is plausible that data deviate from the standard, for example by comparison with reference products, Stichting NMD may decide to commission a second opinion.
2. Annually, the NMD Foundation will randomly submit around ten - the number depending on the number of cards selected according to point 1 - for a second opinion, spread across various product groups and functions (C&U, civil engineering).

Decision

Stichting NMD decides whether the concern about data correctness is justified. This prevents a second opinion being conducted for reasons of competitive interests. A second opinion is only requested once the data owner in question has been given the opportunity to disprove the doubts. If it cannot be determined unequivocally whether the concern is justified, Stichting NMD will present the case to the TIC and take a decision based on its advice.

Independence

To safeguard the independence of the second opinion, Stichting NMD will request the second opinion from a third party that has no relation to the manufacturer, the LCA report practitioner involved in the submission for verification or the recognised verifier of the relevant product. This party should have knowledge of the product or the related product group in question and is preferably on the list of recognised NMD experts.

Process

- Stichting NMD receives a complaint and this leads to a case for a second opinion
- Stichting NMD makes a random selection of cards for a second opinion
- Stichting NMD supplies the cards, including the LCA report and Verification report to one or several independent, third parties that have the required knowledge.
- The party or parties verify the cards according to the Verification protocol and the Assessment Method and communicate the outcome via a concise report to Stichting NMD.
- Stichting NMD draws a conclusion about the correctness of the data based on the report.
- Stichting NMD informs the data owner of the conclusion and the possible consequences (for example: removal of the card from the NMD).

Disputes

No objection can be made against a Stichting NMD decision.

Appendix D. Procedure for Determining equivalency and data verification for NMD

D.1 Procedure status

The current Procedure for Determining equivalency and data verification for NMD, also referred to as the Equivalency Procedure, should be included as attachment to the NMD Verification protocol for Inclusion of data in the National Environmental Database. Stichting National Environmental Database (Stichting NMD) is the party responsible for this. The Procedure has been formulated by the NMD Technical Committee (TIC) and is adopted by the NMD Environmental Performance Committee for Construction and Civil Engineering.

Proposals to improve the procedure can be forwarded to the NMD at any time. If demanded by importance and urgency, the Technical Committee (TIC) will be asked to formulate a text proposal. The procedure will ultimately be adopted by the NMD Environmental Performance Committee for Construction and Civil Engineering. Changes to the procedure can also be published in the form of an Amendment Sheet or supplement.

This concerns the first version, version 1.0, of the procedure. Interim updates to the procedure are possible without changes to the NMD Verification protocol's version number itself.

D.2 Scope of the Procedure for Equivalency

Environmental performance of construction works
The objective is to reduce the material-related environmental impact of construction works. This procedure further discusses improvements to environmental performance.
A system has been established for this to enable environmental impact to be quantified. This system, managed by Stichting NMD, comprises an Assessment Method, including calculation rules and an Environmental database. The system helps ensure that construction practice is aware of the environmental performance of construction works so that this can be managed. This relates to both private and public law environments. Article 5.9 of the 2012 Building Decree has prescribed the quantification according to the Assessment Method for Environmental performance of construction works since 1 January 2012. However, the equivalency procedure is also aimed at the private environment.

Section 5.2. Environment, new-build

Article 5.8. Management article:

1. A construction work that is being built is such that the environmental impact of the materials used in the construction work is limited.
2. Insofar as requirements have been designated for a use function in table 5.8, the requirement set in the first paragraph is met for that use function by applying those provisions and the requirements pursuant to those provisions.
3. The first paragraph does not apply to the use functions for which no requirement is designated in table 5.8.

Article 5.9. Sustainable construction:

1. A use function has an environmental performance of no higher than 1 determined according to the Assessment Method for Environmental performance of Buildings and Civil Engineering structures.
2. An office building has an environmental performance of no higher than 1 determined according to the Assessment Method for Environmental performance of Buildings and Civil Engineering structures.
3. The second paragraph does not apply to an office building if the total usable surface area in office functions and secondary functions in the office building or in the building of which the office building forms part is smaller than 100 m^2.
4. The second paragraph does not apply to an office building that forms part of a building that has other use functions than an office or secondary function.
5. Rules on the provisions in paragraphs one and two may be laid down by ministerial regulation.

In the case of equivalence, a number of levels can be distinguished:

1. The unambiguous determination of the environmental performance of a building
   This concerns an equivalent alternative for the total Assessment Method.
2. Ensuring the quality of data for the National Environmental Database (NMD)
   This concerns an equivalent alternative for determining and verifying the data, aimed at obtaining the status of verified information (category 1 or 2).

Until now, there has mainly been a need for a procedure aimed at level 2. There are product valuation systems, with different process steps. It is also expected that EPDs will be offered from abroad that do not strictly comply with Dutch standards. The procedure is then also aimed at this second level.

Subject and area of application: category 1 and 2 data

Stichting NMD's NMD comprises the Basic profile database (environmental information) and the Product cards database (composition and quantities of construction materials). These databases contain information sub-divided into three categories:

Category 1: proprietary data, verified by third parties.
For whom: manufacturers, suppliers

Category 2: non-proprietary data, verified by third parties, including a statement of representativeness, (for example, representative for the Dutch Market or a group of manufacturers).
For whom: sectors, groups of manufacturers, suppliers

Category 3: non-proprietary data (unbranded), not verified by third parties but has been verified in outline by the Stichting NMD Technical Committee.
For whom: sectors, manufacturers, suppliers and clients

Category 1 and 2 data for inclusion in the NMD concern:
Verified information on the environmental aspects of a construction material, construction product or construction element that is generated at the initiative of manufacturers or their representatives via an environmental Life Cycle Assessment (LCA) and is ready for inclusion in the NMD.

Alternative route

The Assessment Method and the standard Verification protocol aim towards a single LCA that focuses on one product or on several products. The Equivalency Procedure offers the option for other formats.
Examples:

- International EPD
- Tool for generating LCA data

Summarised

The Equivalency Procedure focuses on an equivalent route for determining and verifying data as category 1 or 2 in the NMD. The route can focus on a single LCA but also on generating and supplying via a process or tool. These data can be used in both private and public law settings.

D.3 Verification of equivalency

Basic idea

The requirements set in the Assessment Method and the Verification protocol must guarantee NMD data quality. Quality is understood to mean a direct derivative of the objectives pursued by the requirements. An alternative route for determining and/or testing the data is only equivalent if the goals are achieved to at least the same extent. An alternative route will only be approved if the applicant has sufficiently demonstrated that this is the case.

The above is the basic requirement set for the alternative route. A conscious choice has been made not to set an elaborate set of requirements or criteria. This is in order to provide sufficient space to develop equivalent solutions within the frameworks. When assessing the alternative route, the requirements in the Assessment Method and the Verification protocol will serve as guidelines. The applicant will have to indicate where and why they are deviating from this and will have to demonstrate that this is not at the expense of the objectives described below.

As well as the basic requirement, in all cases the involvement of an external verifier is required. An external verification will always form part of an alternative route.

Assessment Method objectives

The main objectives are:

1. Environmental performance of construction works
   The underlying objective is to reduce the material-related environmental impact of construction works. This concerns the performance of the total construction work and not that of individual products. This means that it must be possible to combine products.
2. Level playing field
   The environmental performance of products in a construction work can influence market positions of the construction material industry suppliers. The system must be such that there is an environment that safeguards fair competition.

The following sub-objectives flow from this:

1. Consistency
   The option to combine products places even higher requirements on consistency than an EPD of individual products. It is also important for the Level playing field that the products are assessed on exactly the same requirements. This means that:
   a) Total lifespan
      This concerns the environmental impact throughout a construction work's entire lifespan. To determine this, information is needed at product level that covers the entire lifespan. It must also be possible to compile complete construction works using the products in the database. This means that the products must be able to deliver the functionality as defined in the element descriptions. If components are missing this can be resolved, for example, via a worst-case approach or through supplementation with defaults occurring in the NMD.
   b) Calculation results
      If other calculation rules are applied this is only possible if this results in the same environmental performance per unit of product as the application of the calculation rules linked to the Assessment Method. The plausibility can be demonstrated using a case study, for instance. Another option is to show that the most relevant components have been determined according to the method.

c) Environmental impact
The inputs and outputs of all processes during the life cycle are covered. It must be guaranteed that at least the processes and emissions are included that would have been the case if the Assessment Method had been applied.
The environmental performance must be expressed in terms of the environmental impact specified in the Assessment Method if the processes and emissions are to be aggregated. If information is missing on some of the impact, this will have to be supplemented. For example, a worst-case approach.
Environmental data (EPDs) in accordance with EN 15804 without the different environmental impact categories from the Assessment Method are therefore not eligible for equivalence.

d) Representativeness
The construction works are in the Netherlands. The environmental product information must be representative for the relevant product on the Dutch market. This means, for example, that actual transport distances are used in the event of production in a foreign country.

2. Reliability
It must be prevented that the alternative route is used to obtain a competitive advantage. This places strict requirements on reliability and on:

a) Transparency
A sufficient level of reporting is needed for this. This does not always need to be in the form of text or tables, but can also include insightful tools.

b) Reproducibility
The results should be reproducible. If deviating from the calculation rules, for example, a spreadsheet with the calculations and results can be provided.

c) Handling uncertainties
Where there are uncertainties or if information is missing, this should be stated clearly.
At least a sensitivity analysis is required unless it is clearly demonstrated that a 'worst-case' approach has been used.

d) Correctness, completeness
The Assessment Method sets extensive requirements on primary data collection among suppliers and the checks on this (balances, requirements to consider all purchased materials, etc). Can it be guaranteed that no incomplete or incorrect data are obtained from the manufacturer? For example: is maintenance of a machine that generates substantial waste included or excluded? Are all emissions included (even if they are not measured)? The requirements mentioned under 'Validation of data' (mass and energy balance) in Appendix A, Assessment tables of the Verification protocol are in force.

D.4 Equivalency procedure

Stichting National Environmental Database procedure

The environmental performance calculation is included in the Building Decree. This makes the Ministry of the Interior the responsible party for the procedure that focuses on the equivalency principle. The Equivalency Committee has been established in relation to the Building Decree. So far, this committee has limited itself to fire safety. The Environmental performance calculation (level 1, in the scope in Chapter 1) has not yet been addressed. As yet, no procedure has been detailed for level 1.

Requests have been submitted at level 2, the data in the NMD. Considering the relationship with the NMD, this has been accommodated at Stichting NMD. The Equivalency Procedure as described in this document has been established for this. The diagram below is detailed to level 2.

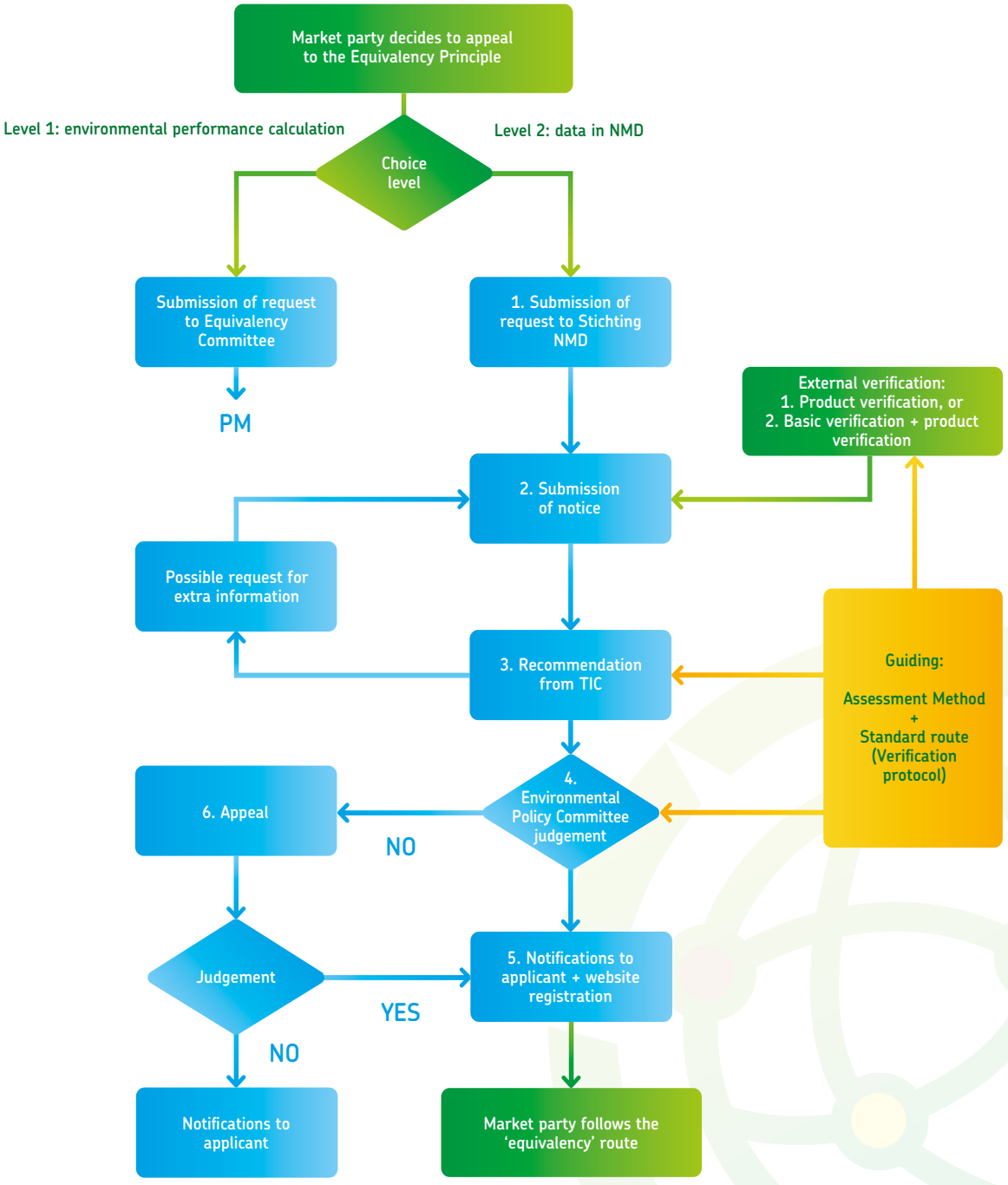

Figure: Schematic illustration of Equivalency Procedure

Equivalency of NMD Verification protocol routing:

1. The data owner indicates to Stichting NMD that it would like to use the equivalence clause (the Equivalency Procedure NMD Verification protocol can be downloaded via the Stichting NMD website).
2. The data owner provides a memorandum to Stichting NMD indicating how they have met the objectives described in the procedure. The Assessment Method and the standard route of the Verification protocol are leading here. An external verification forms part of the supplied memorandum. This external verification can comprise a combination of the basic verification and a 'product verification'. For the basic verification, a certain system or working method will be checked for equivalence and an indication will be given of what still needs to be verified per individual product. The product verification can then be implemented in very little time, partly dependent on the basic verification.
3. Stichting NMD submits this memorandum for verification to the Technical Committee (TIC), which works under the Stichting NMD flag. The TIC assesses whether the correct topics have been addressed and argued by the verifier. The TIC can also request missing information from the data owner. The TIC produces a binding recommendation, which is submitted for approval to the Environmental Policy Committee for Construction and Civil Engineering Works (MBG), which also operates under the NMD flag.
   Any TIC member involved in the application cannot be part of the consultation to determine equivalence.
4. The MBG then accepts or rejects the advice and presents its substantiated decision to Stichting NMD.
5. Stichting NMD feeds this decision back to the data owner within three weeks of submitting the memorandum. The decision, including the reasons, will be registered by Stichting NMD and posted on its website.
6. If the decision is negative, there is an option to appeal. This appeal can be lodged with the Appeals and Objections Committee established by Stichting NMD for objections to each measure or decision by Stichting NMD.

If the decision is positive, the data owner goes through the same process as when following the standard Verification protocol route. Among other things, this entails verification by a recognised external party.

File

If Stichting NMD receives a request, it immediately creates a file. All relevant correspondence is recorded in this file, as well as the information presented by the applicant, including the result of the external verification. The TIC advice and MBG pronouncements and any appeals are also recorded in the file.

Costs

The procedure is in the interests of the data owner. It is also logical that the data owner contributes to the costs. This concerns in any event the administrative costs and the assessment by the TIC.

Appendix E. Data quality system for assessing processes

'This appendix is used for as long as the ILCD documentation format for data quality is unavailable.'

Based on the MRPI data quality assessment system that was developed in 2003, adjustments have been made so that this can be applied to the assessment of aligned processes in the database. The data quality of process data is now assessed using a data quality system developed for three categories:

- Unit processes (section 1).
- Horizontal aggregated processes (section 2).
- Vertical aggregated processes (section 3).

It is possible that a process can be categorised in several categories, which is why it has been agreed that the following diagram should always be used:

Is this a vertical aggregated process? If yes, complete assessment table 3, if no:
Is it a horizontal aggregated process? If yes, complete assessment table 2, if no:
Complete assessment table 1 for unit processes.

The assessor should include the main quality assessment considerations in the score. The three empty data quality assessment tables are included in Appendix D.4.

E.1 Unit processes

UNIT PROCESSES						
To be assessed		The set of inputs and outputs (economic flows, excluding the product, and environmental interventions) of a physical individual process, or a set of processes within an individual production location; or the characterisation of a physical individual process in relation to the LCA in which it is used.				
Use for		Data provided by individual companies; or assessment of process data of individual companies in using an LCA.				
Indicator	Pedigree score	**1**	**2**	**3**	**4**	**5**
COMPLETENESS						
Completeness of environmental interventions		All environmental interventions from the LCA 2 list* have a value	All environmental interventions that could reasonably be expected have a value	Interventions are missing that could reasonably be expected but are expected to be less relevant to the process's environmental profile	Interventions are missing that could reasonably be expected but are expected to be relevant to the process's environmental profile or of which no assessment can be made in advance as to whether they are relevant	
Example		Value can also be zero. The value may reasonably be set to zero.				Missing interventions unknown
Completeness of economic flows (flows = raw materials, energy, emissions, waste.)		All flows are qualified and quantified	All flows are quantified. The flows that are expected to be relevant to the process's environmental profile are quantified	All flows are quantified. The majority of the material and energy flows are quantified	The economic flows for which data were available are quantified	The complete-ness of economic flows is unclear/ unknown
Example		E.g.: Each additive is mentioned and the amount used is stated.	E.g. Additives that appear to be the main material in terms of production and composition are not quantified. E.g. water emission is not quantified			

Mass balance at process level	Closure >95%	Closure 90-95%	Closure 80-90%	Closure 70-80%	Closure <70% or unknown
Example	Mass balance = total mass of input raw materials in relation to the total of products+ emissions+waste				
Mass balance at company level	Closure >95%	Closure 90-95%	Closure 80-90%	Closure 70-80%	Closure <70% or unknown
Example	Mass balance = total amount of raw materials used versus total production+waste+emissions (purchase/sales, corrected for stock)				
Energy balance at company level	Closure >95%	Closure 90-95%	Closure 80-90%	Closure 70-80%	Closure <70% or unknown
Example	Sum of energy consumption of individual processes versus the energy bill				
REPRESENTATIVENESS					
Time-based representativeness of process in relation to the year of assessment	< 2 years' difference; or (select the best option): The process is standard for the period studied in the LCA	2-5 years' difference; or (select the best option): The process details have changed. This leads to an estimate of changes of less than 5% in the substance flows	5-10 years' difference; or (select the best option): The process has partially changed. This leads to an estimate of changes of between 5% and 20% in the substance flows	10-15 years' difference; Or (select the best option): The process has largely changed. This can result in changes of >20% in some of the occurring substance flows	>15 years' difference or unknown; or (select the best option): The process will no longer be used in the period under investigation Or: The process has largely changed. For all substance flows this can result in changes of >20%
Example	Data are from 2018 and were provided in 2020 as valid for the 2018-2020 period	Data are from 2016 and were provided in 2020			
Geographic representativeness	The location of the process has a direct relation to the desired area	The location of the process covers a larger area, within which the desired area falls	The location of the process has equivalent production conditions to the desired area	The location of the process has some equivalent production conditions	The location of the process has completely different production conditions/ geographic representative-ness is unknown
Example	Data from a Dutch manu-facturer, intended to be provided as Dutch data. Data from a German manufacturer of the lines that are specific for Dutch production	Data from a German manufacturer that supplies to both the German and Dutch market, in which NL is the desired area.			

Technological representativeness	Data from a company, process and product of study.	Data from a process/product of study, but from another company	Data from a process/product of study, but from another technology	Data from comparable processes/ products, but the same technology	Data from comparable processes and materials, but other technology
Example	Specific company				
CONSISTENCY AND REPRODUCIBILITY					
Uniformity and consistency	n/a, because uniformity and consistency between processes in the LCA are by definition not assessed for unit processes. This is assessed for aggregated processes.				
Reproducibility by third parties	entirely reproducible	Process description is entirely reproducible quantitatively with the used environmental interventions	Process description entirely and quantitatively reproducible	Process description is qualitative and reproducible in line with main themes	not at all reproducible

E.2 Horizontal aggregated processes

HORIZONTAL AGGREGATED PROCESSES					
To be assessed	The set of inputs and outputs (economic flows, excluding the product, and environmental interventions) of a group process, or the characterisation of a group process in relation to the LCA in which it is used				
Use for	A process that is represented as 'average' of a similar process from different production locations; or assessment of process data of a group when used in an LCA				
Indicator Pedigree score	**1**	**2**	**3**	**4**	**5**
COMPLETENESS					
Completeness of environmental interventions	All environmental interventions from the LCA 2 list* have a value	All environmental interventions that could reasonably be expected have a value	Interventions are missing that could reasonably be expected but are expected to be less relevant to the process's environmental profile	Interventions are missing that could reasonably be expected but are expected to be relevant to the process's environmental profile or of which no assessment can be made in advance as to whether they are relevant	Missing interventions unknown
Example	Value can also be zero. The value may reasonably be set to zero.				
Completeness of economic flows	All flows are qualified and quantified	All flows are quantified. The flows that are expected to be relevant to the process's environmental profile are quantified	All flows are quantified. The majority of the material and energy flows are quantified	The economic flows for which data were available are quantified	The completeness of economic flows is unclear/ unknown
Example	Flows = raw materials, energy, emissions, waste. E.g.: Each additive is mentioned and the amount used is stated.	E.g.: Additives that appear to be the main material in terms of production and composition are not quantified. E.g.: water emission is not quantified			
Mass balance at process level	Closure >95%	Closure 90-95%	Closure 80-90%	Closure 70-80%	Closure <70% or unknown
Example	Mass balance = total mass of input raw materials in relation to the total of products+ emissions+waste				

Mass balance at company level	Of the companies that together determine over 80% of the production volume, the mass balance per company is >95% closing	Of the companies that together determine over 80% of the production volume, the mass balance per company is >90% closing	Of the companies that together determine over 80% of the production volume, the mass balance per company is expected to be closing for >80%	Of the companies that together determine over 80% of the production volume, the mass balance per company is >70% closing	Of the companies that together determine over 80% of the production volume, the mass balance per company is <70% closing or unknown
Example	Mass balance = total amount of raw materials used versus total production+waste+emissions (purchase/sales, corrected for stock)				
Energy balance at company level	Of the companies that together determine over 80% of the production volume, the energy balance per company is >95% closing	Of the companies that together determine over 80% of the production volume, the energy balance per company is >90% closing	Of the companies that together determine over 80% of the production volume, the energy balance per company is expected to be closing for >80%	Of the companies that together determine over 80% of the production volume, the energy balance per company is expected to be closing for >70%	Of the companies that together determine over 80% of the production volume, the energy balance per company is <70% closing or unknown
Example	Sum of energy consumption of individual processes versus the energy bill				
REPRESENTATIVENESS					
Time-based representativeness of process in relation to the year of assessment	<2 years' difference; or (select the best option): All underlying processes are standard for the period studied in the LCA	2-5 years' difference; or (select the best option): The details have changed in one of the underlying processes. This leads to an estimate of changes of less than 5% in the average substance flows	5-10 years' difference; or (select the best option): Part of the underlying processes has changed. This leads to an estimate of changes of between 5% and 20% in the average substance flows	10-15 years' difference; Or (select the best option): The underlying processes are largely changed. This can result in changes of >20% in some of the occurring substance flows	>15 years' difference or unknown; or (select the best option): The process will no longer be used in the period under investigation Or: The underlying processes are largely changed. For all substance flows this can result in changes of >20%
Example	Data are from 1999 and were provided in 2000 as valid for the 1999 - 2001 period	Data are from 1999 and were provided in 2003			

Completeness of number of locations/ geographic representativeness	All companies in the group have supplied data	A representative cross-section of the group in terms of geographical differences in flows (e.g. transport distance, temperature dependence, regulation). Differences evenly represented in average.	Cross-section from the group that represents geographic differences.	Random cross-section from the group	Geographic differences not included
Geographic representativeness	The area covered by the group has a direct relation to the desired area	The area covered by the group covers a greater area within which the desired area falls	The area covered by the group has similar production conditions to the desired area	The area covered by the group partly has similar production conditions	The area covered by the group has entirely different production conditions/geographic representativeness unknown
Example		Western European data that are used in the Netherlands	Data from products that are produced in the Netherlands for which German data are used		
Completeness of number of locations/ technological representativeness	All companies in the group have supplied data	A representative cross-section of the group in terms of technological differences. Differences evenly represented in average.	A cross-section from the group that represents technological differences.	Random cross-section from the group	Technological differences not included
Technological representativeness	Data from companies, process and product of study.	Data from a process/product of study, but from another company than represented by the group	Data from a process/product of study, but from another technology	Data from comparable processes/ products, but the same technology	Data from comparable processes and materials, but other technology
Example		German gravel for which Dutch data are used	For a PVC product, data are used from another PVC process		

CONSISTENCY AND REPRODUCIBILITY					
Uniformity and consistency	The data that together determine >80% of the environmental impact are collected in the same way with the same precision.	The data that together determine >80% of the environmental impact are determined in the same way.	The data that together determine >80% of the environmental impact are collected according to the same approach and based on the best available and validated data.	The data that together determine >80% of the environmental impact are based on available data according to the same procedure.	The data that together determine >80% of the environmental impact are based on different sources with different precision without validation of discrepancies between them.
Uniformity and consistency	The data that together determine >80% of the environmental impact are collected in the same way with the same precision	The data that together determine >80% of the environmental impact are determined in the same way	The data that together determine >80% of the environmental impact are collected according to the same approach and based on the best available and validated data.	The data that together determine >80% of the environmental impact are based on available data according to the same procedure.	The data that together determine >80% of the environmental impact are based on different sources with different precision without validation of discrepancies between them.
Example	Energy and emission data according to the same registration systems.	Energy and emission data based on measurements	Combination of measured and estimated values with explainable deviations, collected according to the same procedure.	Companies have completed the same questionnaire. Differences between them have not been investigated further	Combination of literature data from various companies from different years, with different data
Reproducibility by third parties	entirely reproducible	Process description entirely reproducible quantitatively with the used environmental interventions for the processes that determine >80% of the environmental impact.	Process description entirely and quantitatively reproducible	Process description is qualitative and reproducible in line with main themes	not at all reproducible

E.3 Vertical aggregated processes

VERTICAL AGGREGATED PROCESSES					
To be assessed	The set of inputs and outputs (economic flows, excluding the product, and environmental interventions) of a vertical aggregated process (LCI), and the consistency and reproducibility of a vertically aggregated process				
Use for	Assessment of a vertical aggregated process				
Indicator Pedigree score	**1**	**2**	**3**	**4**	**5**
COMPLETENESS					
Completeness of environmental interventions	All environmental interventions from the LCA 2 list* have a value	All environmental interventions that could reasonably be expected have a value	Interventions are missing that could reasonably be expected but are expected to be less relevant to the process's environmental profile	Interventions are missing that can reasonably be expected, but are expected to be relevant to the process's environmental profile or of which no assessment can be made in advance as to whether they are relevant	Missing interventions unknown
Example	Value can also be zero. The value may reasonably be set to zero.				
Completeness of economic flows	Transparent, environment-related cut-off criteria consistently applied	Transparent, non-environment-related cut-off criteria consistently applied	Cut-off criteria not applied consistently	Cut-off criteria unclear but the processes that are included are specified	Unclear which processes are or are not included
Example	ALL PROCESSES THAT CONTRIBUTE LESS THAN 15% TO THE TOTAL ENVIRONMENTAL LOAD OF THE AGGREGATED PROCESS ARE COMITTED				
Mass balance at process level	Closure >95%	Closure 90-95%	Closure 80-90%	Closure 70-80%	Closure <70% or unknown
Example	Mass balance = total mass of input raw materials in relation to the total of products+ emissions+waste				
Mass balance at company level	This is currently not determined for vertical aggregated processes (currently practically unfeasible to determine for the underlying processes as this is generally not documented and is also not a documentation requirement in ISO 14048)				
Energy balance at company level	This is currently not determined for vertical aggregated processes (currently practically unfeasible to determine for the underlying processes as this is generally not documented and is also not a documentation requirement in ISO 14048)				

REPRESENTATIVENESS					
Time-based representativeness of process chain in relation to the year of assessment	<2 years' difference; or (select the best option):	2-5 years' difference; or (select the best option):	5-10 years' difference; or (select the best option):	10-15 years' difference; Or (select the best option):	>15 years' difference or unknown; or (select the best option):
	The processes that together determine >80% of the environmental impact are standard for the period studied in the LCA	Of the processes that together determine >80% of the environmental impact, some details have changed. This leads to an estimate of changes of less than 5% in the average substance flows	Of the processes that together determine >80% of the environmental impact, some have changed. This leads to an estimate of changes of between 5% and 20% in the average substance flows	Of the processes that together determine >80% of the environmental impact, several have largely changed. This can result in changes of >20% in some of the occurring substance flows	Of the processes that together determine >80% of the environmental impact, several are no longer used or have changed to such an extent that this can result in changes of >20% for all substance flows
Example	LCA in 2020 with data from 2018		An LCA in 2020 used data from 2002 as most important processes		
Geographic representativeness	The geographic area of the processes that determine >80% of the environmental impact, are in direct relation to the area that represents the aggregated process	The geographic area of the processes that determine >80% of the environmental impact, cover a greater area within which the area that represents the aggregated process falls	The geographic area of the processes that determine >80% of the environmental impact, has similar production conditions to the area that represents the aggregated process	The geographic area of the processes that determine >80% of the environmental impact, has partly similar production conditions	The geographic area of the processes that determine >80% of the environmental impact, has entirely different production conditions/ geographic representative-ness unknown
Example	The Netherlands for Dutch LCI or all Western European processes for a Western European presented LCI	Western European processes for a Dutch LCI			

Technological representativeness	For the processes that determine >80% of the environmental impact, the data are from actual companies, processes and products.	For the processes that determine >80% of the environmental impact, the data are from similar technologies.	For the processes that determine >80% of the environmental impact, the data are from the relevant product/ process but a different technology.	For the processes that determine >80% of the environmental impact, the data are from a similar product/ process but the same technology.	For the processes that determine >80% of the environmental impact, the data are from a similar product/process but a different technology.
Example		German gravel for which Dutch data are used	For a PVC product, data are used from another PVC process		
CONSISTENCY AND REPRODUCIBILITY					
Uniformity and consistency	The processes that together determine >80% of the environmental impact, have approximately the same quality level and are applied consistently.	The processes that together determine >80% of the environmental impact originate from the same database or are formulated by the same organisation and are used consistently	The processes that together determine >80% of the environmental impact are based on best available/ standard data and are made consistent where necessary	The processes that together determine >80% of the environmental impact are based on standard data	The processes that together determine >80% of the environmental impact are based on different sources with different precision and/or are not applied consistently.
Example	The most important processes are based on primary, verified data		The most important processes have been adjusted so that they use the same source of energy data	LCIs published in literature with their own energy data that cannot be adjusted	
Reproducibility by third parties	entirely reproducible	process tree entirely reproducible quantitatively with the used environmental interventions for the processes that determine >80% of the environmental impact	process tree entirely and quantitatively reproducible	process tree is qualitative and reproducible in line with main themes	not at all reproducible

E.4 Empty scoring tables for assessing data quality

1. Unit processes

Product	Product X
Additional information	This concerns... LCA is formulated by agency x in x
Assessor	Jan Jansen MilieuBureau X
General (subjective) opinion of assessor on usability in library (A = good; B = reasonable; C = poor) and explanation	B e.g. Even though not all quality criteria can be assessed with a high quality rating (because the assessor did not draw up the LCA himself), it can be stated with sufficient certainty that the process is of satisfactory quality to be used. Some attention could be paid to...
Date of assessment	22-03-2020
UNIT PROCESSES	
COMPLETENESS	
Completeness of environmental interventions	
Completeness of economic flows	
Mass balance at process level	
Mass balance at company level	
Energy balance at company level	
REPRESENTATIVENESS	
Time-based representativeness of process in relation to the year of assessment	
Geographic representativeness	
Technological representativeness	
CONSISTENCY AND REPRODUCIBILITY	
Uniformity and consistency	n/a, because uniformity and consistency between processes in the LCA are by definition not assessed for unit processes. This is assessed for aggregated processes.
Reproducibility by third parties	

2. Horizontal aggregated processes

Product	
Additional information	
Assessor	
General (subjective) opinion of assessor on usability in library (A = good; B = reasonable; C = poor) and explanation	
Date of assessment	
HORIZONTAL AGGREGATED PROCESSES	
COMPLETENESS	
Completeness of environmental interventions	
Completeness of economic flows	
Mass balance at process level	
Mass balance at company level	
Energy balance at company level	
REPRESENTATIVENESS	
Time-based representativeness of process in relation to the year of assessment	
Completeness of number of locations/geographic representativeness	
Geographic representativeness	
Completeness of number of locations/technological representativeness	
Technological representativeness	
CONSISTENCY AND REPRODUCIBILITY	
Uniformity and consistency Reproducibility by third parties	

3. Vertical aggregated processes

Product	
Additional information	
Assessor	
General (subjective) opinion of assessor on usability in library (A = good; B = reasonable; C = poor) and explanation	
Date of assessment	
VERTICAL AGGREGATED PROCESSES	
COMPLETENESS	
Completeness of environmental interventions	
Completeness of economic flows	
Mass balance at process level	
Mass balance at company level	
Energy balance at company level	
REPRESENTATIVENESS	
Time-based representativeness of process chain in relation to the year of assessment	
Geographic representativeness	
Technological representativeness	
CONSISTENCY AND REPRODUCIBILITY	
Uniformity and consistency	
Reproducibility by third parties	

Nationale
Milieu DATABASE
HET FUNDAMENT VOOR DUURZAME BOUW

STICHTING
NATIONAL ENVIRONMENTAL DATABASE

Visitor address
Visseringlaan 22b
2288 ER Rijswijk
Tel. +31 70 307 29 29
CoC: 41155040
VAT: NL009163475B01

Postal address
PO Box 1201
2280 CE Rijswijk
E-mail: info@milieudatabase.nl
Website: www.milieudatabase.nl