## **ENVIRONMENTAL PRODUCT DECLARATION**

as per EN ISO 14025 and EN 15804

Owner of the Declaration	ERFMI vzw, European Resilient Flooring Manufacturers' Institute
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ERF-2013211-E
Issue date	01.04.2013
Valid to	31.03.2018

## Heterogeneous polyvinyl chloride floor coverings according to EN ISO 10582 ERFMI European Resilient Flooring Manufacturers' Institute



Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com



### **General Information**

# ERFMI - European Resilient Flooring Manufacturers' Institute

#### **Programme holder**

IBU - Institut Bauen und Umwelt e.V. Rheinufer 108 D-53639 Königswinter

#### **Declaration number**

EPD-ERF-2013211-E

## This Declaration is based on the Product Category Rules:

Floor coverings, Version 1.1: 29.10.2012 (PCR tested and approved by the independent expert committee)

#### Issue date

01.04.2013

## Valid to 31.03.2018

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Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)

ans-Wolf Reinhardt

(Chairman of SVA)

## Product

#### **Product description**

Resilient floor coverings are an entire product family of flexible flooring solutions available in sheet, tiles and planks. It is classified in heterogeneous or homogeneous composition based on vinyl, linoleum, cork or rubber. Resilient floor coverings can provide different functionalities (acoustic, static control, slip resistance, easy maintenance etc.) to match a wide range of domestic, commercial and industrial applications. It is available in an enormous range of patterns and colours fitting with inspiration and decorative needs.

Heterogeneous polyvinyl chloride floor coverings consist of a wear layer and other compact layers which differ in composition and/or design and can contain reinforcement.

#### Application

According to EN ISO 10874 (EN 685) the area of application for resilient floor coverings is indicated by use classes. The declared product group covers use classes 23, 34, 43.

#### Heterogeneous polyvinyl chloride floor coverings

#### **Owner of the Declaration**

ERFMI vzw, European Resilient Flooring Manufacturers' Institute 71, Avenue de Cortenbergh B-1000 Brussels

#### Declared product / Declared unit

1m<sup>2</sup> heterogeneous polyvinyl chloride floor covering, installed

#### Scope:

In this EPD heterogeneous polyvinyl chloride floor coverings are declared. The application of this EPD is restricted to Heterogeneous polyvinyl chloride floor coverings produced by the members of the European Resilient Flooring Manufacturers' Institute (ERFMI). Data are based upon production during 2011 in Europe. Data have been provided by 4 companies of ERFMI which represents 100% of ERFMI members. The owner of the declaration shall be liable for the underlying information and evidence.

### Verification

The CEN Norm EN 15804 serves as the core PCR

Independent verification of the declaration and data according to EN ISO 14025

internally

x externally

Prof. Dr. Firgit Grahl (Independent tester appointed by SVA)

#### **Technical Data**

Technical construction data for the product group:

Constructional data	Value	Unit	Test standard
Product thickness *	2	mm	EN ISO 24346
Surface weight *	2.9	kg/m <sup>2</sup>	EN ISO 23997
Product Form		sł	neet
* ' ' ' '			

\* weighted average

#### **Base materials/ Ancilliary materials**

The product group has the following composition:

Component	Value	Unit
Additives	2.4	%
Filler	24.8	%
Plasticizer	19.4	%
Pigments	0.7	%
Polymers (PVC)	39.6	%
Auxiliaries	1.6	%
Lacquer	0.8	%
Flooring Recyclate (PVC)	10.6	%

The declared recipes were checked with the REACH candidate list from June 18th, 2012 and did not contain listed REACH substances.

## ERFEMI EUROPEAN RESILIENT FLOORING MANUFACTURERS' INSTITUTE

#### **Reference service life**

This EPD does not indicate RSL. Only module B2 (maintenance) is declared and the use stage scenario is independent on the life time of the product. The declared modules in the table of results (chapter 5) refer to one life cycle of the floor covering with B2 (cleaning) being declared for a time period of one year. For the calculation of the impact of B2 for a

## LCA: Calculation rules

#### **Declared Unit**

 1m² of installed floor covering.

 Name
 Value
 Unit

 Declared unit
 1
 m²

 Conversion factor to 1 kg
 1/2.9

The declaration refers to an average product from 6 production sites of ERFMI members. The data have been weighted according to the annual square meters produced by each site. The life cycle impact assessment is conducted based on the vertical average.

#### System boundary

Type of EPD: cradle to grave

Modules A1-A3 include processes that provide materials and energy input for the system, manufacturing and transport processes up to the factory gate, as well as waste processing.

Module A4 includes transport of the floor covering to the place of installation.

Module A5 includes the production of adhesive for the installation of the floor covering, and incineration of offcuts and packaging material. different time period the values for B2 have to be multiplied by the estimated service life in years. ERFMI provides an online tool for this calculation on the ERFMI home page (www.erfmi.com) for the enduser.

Module B2 is including provision of cleaning agent, energy and water consumption for the cleaning of the floor covering incl. waste water treatment. The LCA results in this EPD are declared for a one year usage.

Module C1 considers electricity supply for the deconstruction of the flooring.

Module C2 includes transportation of the postconsumer waste to waste processing.

End of life scenarios are declared for:

- 100% incineration in a waste incineration plant (WIP) - 100% landfilling
- 100% recycling according to information from AgPR,
- (Arbeitsgemeinschaft PVC-Bodenbelag Recycling)

Module D includes benefits from all net flows given in module A5 and C3 that leave the product boundary system after having passed the end-of-waste state in the form of recovery and/or recycling potentials. Module D is declared for each scenario separately.

#### Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account.

### LCA: Scenarios and additional technical information

The following technical information is a basis for the declared modules

#### Transport to the construction site (A4)

Name	Value	Unit
Litres of fuel	0,0046	l/m²*100km
Transport distance	2000	km
Capacity utilisation (including empty runs)	85	%

#### Installation in the building (A5)

Name	Value	Unit
Auxiliary (adhesive)	0.3	kg
Material loss (installation waste)	6.0	%

#### Maintenance (B2)

Name	Value	Unit
Maintenance cycle (vacuum cleaning & wet cleaning )	156	number/a
Water consumption	0.003	m <sup>3</sup>
Auxiliary (detergent)	0.04	kg
Electricity consumption	0.55	kWh

#### End of Life (C1-C4)

Name	Value	Unit
Incineration	2.9	kg
Recycling	2.9	kg
Landfilling	2.9	kg

## Reuse, recovery and/or recycling potentials (D), relevant scenario information

For module D the credits given in module A5 and C3 are declared.

For waste incineration combustion in a WIP (R1 < 0.6) with energy recuperation is considered.

### LCA: Results

The results for module B2 refer to a period of one year.

For the calculation of the impact of B2 for a certain service life the values for B2 have to be multiplied by the estimated service life in years. ERFMI provides an online tool for this calculation on the ERFMI home page (www.erfmi.com ) for the end-user.

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Parama PER PER PENF PENF SM RSF NRS FW	eter         U           E         [M]           M         [M]           RT         [M]           RM         [M]           RT         [M]           RT         [M]           I         [I]           F         [M]           iF         [M]           on         U	Jnit MJ 7 MJ 1 MJ 8 MJ 1 MJ 3 MJ 1 MJ 3 MJ 1 MJ 1 (kg) 2 PE renev of n renev Jse o	A1 - A3 7,3E+00 1,1E+00 8,5E+00 1,5E+02 3,7E+01 1,8E+02 3,5E-01 4,4E+01 RE = U wable pr non rene ewable p f second	A 1,6E 4,1E 4,1E 1,8E se of r imary wable primary dary m	4 -01 1,4 +00 1,4 -01 2,4 enewab energy primary y energg aterial;	SOUR           A5           - <td>CE US B2 - - - - - - - - - - - - -</td> <td>E: 1mi C1 - 4,2E-02 - 2,5E-01 0 - 1,1E-01 y excludi as raw m g non re a s raw m newable</td> <td>ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - - 1,6E-02 mg renew aterials; F newable materials; seconda</td> <td>biotic depl c3/ - - - - - - - - - - - - - - - - - - -</td> <td>C3/L C3/L C3/L C3/L C3/L C3/L C3/L C3/L</td> <td>C3/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - - - - - - - - - -</td> <td>C4/I</td> <td>C4/L - 1,4E-01 - 3,2E+00 0 - - - - - - - - - - - - - - - - -</td> <td>C4/R - - 0 - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 0 - - - - - 0 0 0 - - - - - - 0 0 0 - - - - - - - 0 0 0 -</td> <td>D/I -1,7E+ - -2,4E+ 0 - - -4,9E+ aw mate nergy re aterials; imary er econdar</td> <td>01 -2 00 -4 erials; esourc PEN nergy</td> <td>- - - - 2,5E+00 0 - - - - - - - - - - - - - - - - -</td> <td>D/R - - -1,7E-01 - - -2,5E+00 0 - - - - - - - - - - - - - - - - -</td>	CE US B2 - - - - - - - - - - - - -	E: 1mi C1 - 4,2E-02 - 2,5E-01 0 - 1,1E-01 y excludi as raw m g non re a s raw m newable	ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - - 1,6E-02 mg renew aterials; F newable materials; seconda	biotic depl c3/ - - - - - - - - - - - - - - - - - - -	C3/L C3/L C3/L C3/L C3/L C3/L C3/L C3/L	C3/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - - - - - - - - - -	C4/I	C4/L - 1,4E-01 - 3,2E+00 0 - - - - - - - - - - - - - - - - -	C4/R - - 0 - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 0 - - - - - 0 0 0 - - - - - - 0 0 0 - - - - - - - 0 0 0 -	D/I -1,7E+ - -2,4E+ 0 - - -4,9E+ aw mate nergy re aterials; imary er econdar	01 -2 00 -4 erials; esourc PEN nergy	- - - - 2,5E+00 0 - - - - - - - - - - - - - - - - -	D/R - - -1,7E-01 - - -2,5E+00 0 - - - - - - - - - - - - - - - - -
Parama PER PER PENF PENF SM RSF NRS FW	eter         U           E         [/]           M         [/]           T         [/]           T         [/]           RE         [/]           RM         [/]           F         [/]           F         [/]           On         U           U         U	Jnit           MJ	A1 - A3 7,3E+00 1,1E+00 8,5E+00 1,5E+02 3,7E+01 1,8E+02 3,5E-01 4,4E+01 RE = U wable pr non rene ewable p f second	A 1,6E 4,1E 4,1E 1,8E se of rr imary wable primary dary m	4 -01 1,1 +00 1,2 -01 2,1 enewab energy y energy aterial;	SOUR           A5           - <td>CE US B2 - - - - - - - - - - - - -</td> <td>E: 1mi C1 - 4,2E-02 - 2,5E-01 0 - 1,1E-01 y excludi as raw m g non re a s raw m newable</td> <td>ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - - 1,6E-02 mg renew aterials; F newable materials; seconda</td> <td>biotic depl c3/ - - 1,1E+00 - 2,3E+01 0 - - 1,4E+01 able prim 2FRT = T primary ei PENRT = r y fuels; N</td> <td>C3/L - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - 0 0 - - - - - - - - 0 0 -</td> <td>C3/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - - - - - - - - - -</td> <td>C4/I</td> <td>C4/L - 1,4E-01 - 3,2E+00 0 - - - - - - - - - - - - - - - - -</td> <td>C4/R - - 0 - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 0 - - - - - 0 0 0 - - - - - - 0 0 0 - - - - - - - 0 0 0 -</td> <td>D/I - -1,7E+ - -2,4E+ 0 - 4,9E+ aw mate nergy re- aterials; imary ere econdar</td> <td>01 -2 00 -4 erials; esourc PEN nergy ry fuel</td> <td>- - - - 2,5E+00 0 - - - - - - - - - - - - - - - - -</td> <td>D/R - - -1,7E-01 - - -2,5E+00 0 - - - - - - - - - - - - - - - - -</td>	CE US B2 - - - - - - - - - - - - -	E: 1mi C1 - 4,2E-02 - 2,5E-01 0 - 1,1E-01 y excludi as raw m g non re a s raw m newable	ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - - 1,6E-02 mg renew aterials; F newable materials; seconda	biotic depl c3/ - - 1,1E+00 - 2,3E+01 0 - - 1,4E+01 able prim 2FRT = T primary ei PENRT = r y fuels; N	C3/L - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - 0 0 - - - - - - - - 0 0 -	C3/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - - - - - - - - - -	C4/I	C4/L - 1,4E-01 - 3,2E+00 0 - - - - - - - - - - - - - - - - -	C4/R - - 0 - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 0 - - - - - 0 0 0 - - - - - - 0 0 0 - - - - - - - 0 0 0 -	D/I - -1,7E+ - -2,4E+ 0 - 4,9E+ aw mate nergy re- aterials; imary ere econdar	01 -2 00 -4 erials; esourc PEN nergy ry fuel	- - - - 2,5E+00 0 - - - - - - - - - - - - - - - - -	D/R - - -1,7E-01 - - -2,5E+00 0 - - - - - - - - - - - - - - - - -
Parama PER PERF PENF PENF SM RSF NRS FW Capti	eter         U           E         In           M         In           M         In           RE         In           RM         In           In         In           In <td< td=""><td>Unit         7           MJ         7           MJ         1           MJ         1      <tr td=""></tr></td><td>A1 - A3 7,3E+00 1,1E+00 8,5E+00 1,5E+02 3,7E+01 1,8E+02 3,7E+01 1,8E+02 3,5E-01 </td><td>AA</td><td>4 -01 1,1 +00 1,2 -01 2,1 enewak energy primary y energy y energy aterial; -01 4 6,</td><td>SOUR           A5           -</td></td<> <td>CE US B2 - - - - - - - - - - - - -</td> <td>E: 1m<sup>-</sup> C1 - 4,2E-02 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - - - - 2,5E-01 0 - - - - - - - - - - - - - - - - -</td> <td>ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - 3,8E-01 0 - 1,6E-02 ng renew aterials; F newable materials; S seconda DWAS C2 0</td> <td>biotic depl c3/ - - - - - - - - - - - - -</td> <td>C3/L - - - - - - - - - - - - -</td> <td>C3/R - - 0 - 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - - - - - - - - -</td> <td>C4/I</td> <td>C4/L - - - - - - - - - - - - - - - - - - -</td> <td>C4/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 0 - - - 0 0 0 - - - - 0 0 - - - - - - - - - - - - -</td> <td>D/I -1,7E+ -2,4E+ 0 -2,4E+ -2</td> <td>01 -2 00 -4 erials; esourc PEN nergy ry fuel</td> <td>- - - 2,5E+00 0 - - 4,9E-01 PERM = ces; PEN RM = Us resource ls; FW = <b>D/L</b> 0</td> <td>D/R - -1,7E-01 - -2,5E+00 0 - - -4,9E-01 = Use of RE = Use e of non ps; SM = Use of net D/R 0 0 0 0 0 0 0 0 0 0 0 0 0</td>	Unit         7           MJ         7           MJ         1           MJ         1 <tr td=""></tr>	A1 - A3 7,3E+00 1,1E+00 8,5E+00 1,5E+02 3,7E+01 1,8E+02 3,7E+01 1,8E+02 3,5E-01 	AA	4 -01 1,1 +00 1,2 -01 2,1 enewak energy primary y energy y energy aterial; -01 4 6,	SOUR           A5           -	CE US B2 - - - - - - - - - - - - -	E: 1m <sup>-</sup> C1 - 4,2E-02 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - - - - 2,5E-01 0 - - - - - - - - - - - - - - - - -	ADPF = A instal C2 - 1,5E-02 - 3,8E-01 0 - 3,8E-01 0 - 1,6E-02 ng renew aterials; F newable materials; S seconda DWAS C2 0	biotic depl c3/ - - - - - - - - - - - - -	C3/L - - - - - - - - - - - - -	C3/R - - 0 - 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - 0 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - - - - - - - - -	C4/I	C4/L - - - - - - - - - - - - - - - - - - -	C4/R - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 0 - - - 0 0 0 - - - - 0 0 - - - - - - - - - - - - -	D/I -1,7E+ -2,4E+ 0 -2,4E+ -2	01 -2 00 -4 erials; esourc PEN nergy ry fuel	- - - 2,5E+00 0 - - 4,9E-01 PERM = ces; PEN RM = Us resource ls; FW = <b>D/L</b> 0	D/R - -1,7E-01 - -2,5E+00 0 - - -4,9E-01 = Use of RE = Use e of non ps; SM = Use of net D/R 0 0 0 0 0 0 0 0 0 0 0 0 0
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Parama PER PER PENF PENF SM RSF NRS FW Caption RESU	eter         U           E         IM         [I]           M         [I]         [I]           RE         [I]         [I]           RE         [I]         [I]           F         [I]         [I]           F         [I]         [I]           F         [I]         [I]           On         U         [I]           D         [I]         [I]           D         [I]         [I]           D         [I]         [I]	Unit MJ 7 MJ 1 MJ 1 MJ 1 MJ 1 Kg 2 PE renew of n renew of n renew SOI Unit [kg] [kg] [kg]	A1 - A3 7,3E+00 1,1E+00 8,5E+00 1,5E+02 3,7E+01 1,8E+02 3,7E+01 1,8E+02 3,5E-01 	A.	4 -01 1,1 +00 1,2 -01 2,1 enewab energy y energy aterial; -01 4 6, -04 1,2 -04 1,2 -01	SOUR           A5           - <td>CE US B2 - - - - - - - - - - - - -</td> <td>E: 1m<sup>-</sup> C1 - 4,2E-02 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - - - - 2,5E-01 0 - - - - - - - - - - - - - - - - -</td> <td>ADPF = A instal C2 - - 1,5E-02 - - 3,8E-01 0 - 3,8E-01 0 - - - - - - - - - - - - -</td> <td>biotic depl c3/ - - - - - - - - - - - - -</td> <td>C3/L - - - - - - - - - - - - -</td> <td>C3/R - - - 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - - 0 0 - - - - - - - - - - - - -</td> <td>C4/I</td> <td>C4/L - - - - - - - - - - - - - - - - - - -</td> <td>C4/R - - 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - - 0 0 - - - - - - - - - - - - -</td> <td>D/I -1,7E+ -2,4E+ 0 -2,4E+ -2</td> <td>01 -2 00 -2 0 -2 00 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 </td> <td>- - - 2,5E+00 0 - - 4,9E-01 PERM = ces; PEN RM = Us resource ls; FW = <b>D/L</b> 0</td> <td>D/R - -1,7E-01 - -2,5E+00 0 - - -4,9E-01 = Use of RE = Use e of non ps; SM = Use of net D/R 0 0 0 0 0 0 0 0 0 0 0 0 0</td>	CE US B2 - - - - - - - - - - - - -	E: 1m <sup>-</sup> C1 - 4,2E-02 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - 2,5E-01 0 - - - - - 2,5E-01 0 - - - - - - - - - - - - - - - - -	ADPF = A instal C2 - - 1,5E-02 - - 3,8E-01 0 - 3,8E-01 0 - - - - - - - - - - - - -	biotic depl c3/ - - - - - - - - - - - - -	C3/L - - - - - - - - - - - - -	C3/R - - - 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - - 0 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - 0 0 - - - - - - 0 0 - - - - - - - - - - - - -	C4/I	C4/L - - - - - - - - - - - - - - - - - - -	C4/R - - 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - 0 0 - - - - 0 0 - - - - - 0 0 - - - - - - - - - - - - -	D/I -1,7E+ -2,4E+ 0 -2,4E+ -2	01 -2 00 -2 0 -2 00 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 -2 0 	- - - 2,5E+00 0 - - 4,9E-01 PERM = ces; PEN RM = Us resource ls; FW = <b>D/L</b> 0	D/R - -1,7E-01 - -2,5E+00 0 - - -4,9E-01 = Use of RE = Use e of non ps; SM = Use of net D/R 0 0 0 0 0 0 0 0 0 0 0 0 0
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Not all of the life cycle inventories applied in this study support the methodological approach for the waste and water indicators. The data are based on publications of industry. The indicators for waste and water of the system are evaluated, but contain a higher degree of uncertainty.

A Scenario "I" = 100% Incineration 2 Scenario "L" = 100% Landfilling 3 Scenario "R" = 100% Recycling The evaluation of best EoL-scenario requires the consideration of further aspects like avoidance of combustion of fossil fuels when incinerated and demand for landfilling when recycled.

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