

BUILDING TRUST



# Environmental Product Declaration

*In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:*

## SikaCeram<sup>®</sup> - 241 Flex



<b>Programme:</b>	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
<b>Programme operator:</b>	EPD International AB
<b>EPD registration number:</b>	S-P-12128
<b>Publication date:</b>	2024-01-10
<b>Valid until:</b>	2029-01-09
<b>UN CPC:</b>	375 Articles of concrete, cement and plaster


An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com).



## EPD information

The EPD was developed according to the requirements of EN 15804:2012+A2:2019/AC:2021 and EN ISO 14025. Also, the EPD was developed taking into account the principles of Product Category Rules (PCR) 2019:14 “Construction products” (Version 1.3.1) and c-PCR-017 Technical-chemical products (for construction sector).

- The EPD owner has sole ownership, liability, and responsibility for the EPD
- EPDs within the same product category but from different programmes may not be comparable
- EPD of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Programme	<b>The International EPD® System</b> Valhallavägen 81, SE 11427 Stockholm, Sweden <a href="http://www.environdec.com">www.environdec.com</a>
Programme Operator	<b>EPD International AB</b> Box 210 60, SE-100 31 Stockholm, Sweden <a href="mailto:info@environdec.com">info@environdec.com</a>
Owner of the EPD/ Location of the production site	<b>Sika Hellas ABEE</b> Protomagias 15 14568 Kryoneri Attiki, Greece +30 210 81 60 600 <a href="mailto:info@gr.sika.com">info@gr.sika.com</a> <a href="http://www.grc.sika.com">www.grc.sika.com</a>
LCA Practitioner	Terra Neutral PC Terra Nova Ltd Kaisareias 39, 11527, Athens <a href="http://www.terraneutral.gr">www.terraneutral.gr</a>
Product Category Rules (PCR)	CEN standard EN 15804 serves as the Core Product Category Rules (PCR), PCR 2019:14 (Version 1.3.1), c-PCR-017 Technical-chemical products (for construction sector)
PCR review was conducted by	The Technical Committee of the International EPD® System. A full list of members available on <a href="http://www.environdec.com">www.environdec.com</a> . The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> .
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:	<input checked="" type="checkbox"/> EPD verification by accredited certification body Third-party verification: Eurocert S.A.
	89 Chlois St. & Likovriseos, 14452, Greece email: <a href="mailto:info@eurocert.gr">info@eurocert.gr</a> <a href="http://www.eurocert.gr">www.eurocert.gr</a>
Eurocert S.A. is an approved certification body accountable for the third-party verification. The certification body is accredited by: Hellenic Accreditation System SA (E.S.Y.D), Accreditation number 21-8	
Procedure for follow-up of data during EPD validity involves third party verifier:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No



## General Information

### Scope

The goal of this report is the development of a specific Environmental Product Declaration (EPD) presenting the environmental performance of SikaCeram®- 241 Flex manufactured by Sika Hellas S.A. located in Krioneri during the reporting year 2022.

The intended use of this report as well as EPDs aims to inform construction companies, builders, engineers, concrete users, and end users.

### Manufacturer Information

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and motor vehicle industry. Sika has subsidiaries in 101 countries around the world and manufactures in over 300 factories.



**Sika Hellas** was founded in 1995 and it has production facilities in Athens and Thessaloniki. Sika Hellas is mainly active in the production, distribution, and marketing of construction products, as well as in the marketing of sealing and welding materials for industry. The introduction to the market of innovative materials, the guaranteed quality of its products, and the perfect technical support are the main characteristics of its corporate identity. The high-performance chemicals supplied to the construction industry include many types of waterproofing, cementitious, mortars for tiles, roofs, and wall surfaces.

Sika Hellas has developed and implemented an Integrated Management System:

- for the Quality of products and services according to the principles of EN ISO 9001: 2015
- for Occupational Health & Safety in the whole range of our activity according to EN ISO 45001: 2018
- for the Management of the Environment based on the environmental aspects of all our activity, according to the principles of EN ISO 14001: 2015.

## Product information

Product Name	SikaCeram® - 241 Flex
Description	High-performance, flexible cementitious tile adhesive
Packaging	25 kg bag

### Description

SikaCeram®-241 Flex is one component, high performance, deformable, white, pre-mixed cementitious tile adhesive, consisting of selected aggregates, special admixtures and polymers. It is suitable for external and internal applications, in horizontal and vertical surfaces.

### Uses

It is suitable for bonding:

- ceramic, monocottura, bicoturra, large size, mosaic, clinker, cotto, artificial granite tiles, marble and natural stones

It can be used on different substrates including:

- concrete, cementitious mortars, bricks, renderings, cementitious and gypsum boards
- kitchens, balconies, terraces, bathrooms and substrates with underfloor heating.

### Specifications

<b>Product declaration</b>	Improved deformable cementitious adhesive with reduced slip and extended open time, C2TES1 according to EN 12004-1:2017
<b>Appearance and color</b>	Powder, white
<b>Max grain size</b>	~ 0.5 mm
<b>Transverse deformation</b>	≥ 2.5 mm (EN 12004-2)
<b>Density</b>	Fresh mortar density: ~ 1.60 kg/l (at +20°C)
<b>Tensile adhesion strength</b>	≥ 1.0 N/mm <sup>2</sup> (Initial (EN 12004-2)) ≥ 1.0 N/mm <sup>2</sup> (after Heat Ageing) ≥ 1.0 N/mm <sup>2</sup> (after Water Immersion) ≥ 1.0 N/mm <sup>2</sup> (after Freeze/Thaw cycles)
<b>Slip resistance</b>	≤ 0.5 mm
<b>Mixing ratio</b>	6.5 – 7.3 L of water per 25 kg bag



### Content Information

Components	Content (%)
Fillers	60-70
Binders	20-30
Additives	<10
Minors	<1

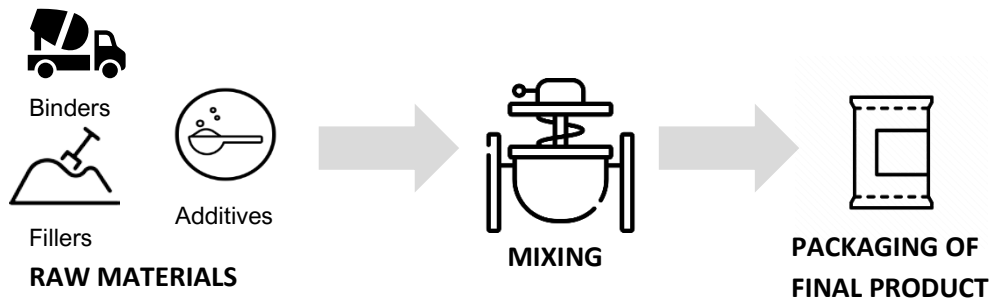
The packaging of the products includes wooden pallets that are reusable, stretch film, and paper bags. All packaging used is recyclable. Biogenic carbon in both packaging and products is less than 5% of the mass of products and packaging, and it is not included in the calculations. For more information about the product please visit:

<https://grc.sika.com/el/construction/epikollhsh-plakidiwn/kolles-plakidiwn/sikaceram-241-flex.html>

No substances included in the Candidate List of Substances of Very High Concern for authorization under REACH Regulations are present in the products above the threshold for registration with the European Chemicals Agency (< 0,1% wt/wt).

## Manufacturing Process

The manufacturing process includes mixing all the raw materials into mixers and packaging of final products.





## System Boundaries

The approach followed is “Cradle to gate with modules C1–C4 and module D (A1-A3, C and D)”, covering the Product stage which is mandatory, the End-of-life stage and the Benefits and loads beyond the system boundary. The following modules were considered:

A1: Raw material extraction and processing, processing of secondary material input (includes electricity and packaging production);

A2: Transportation of all raw materials to the manufacturing plant;

A3: Manufacturing process (includes the waste management of the production);

C1: De-construction, demolition;

C2: Transport to waste processing;

C3: Waste processing for reuse, recovery and/or recycling;

C4: Disposal;

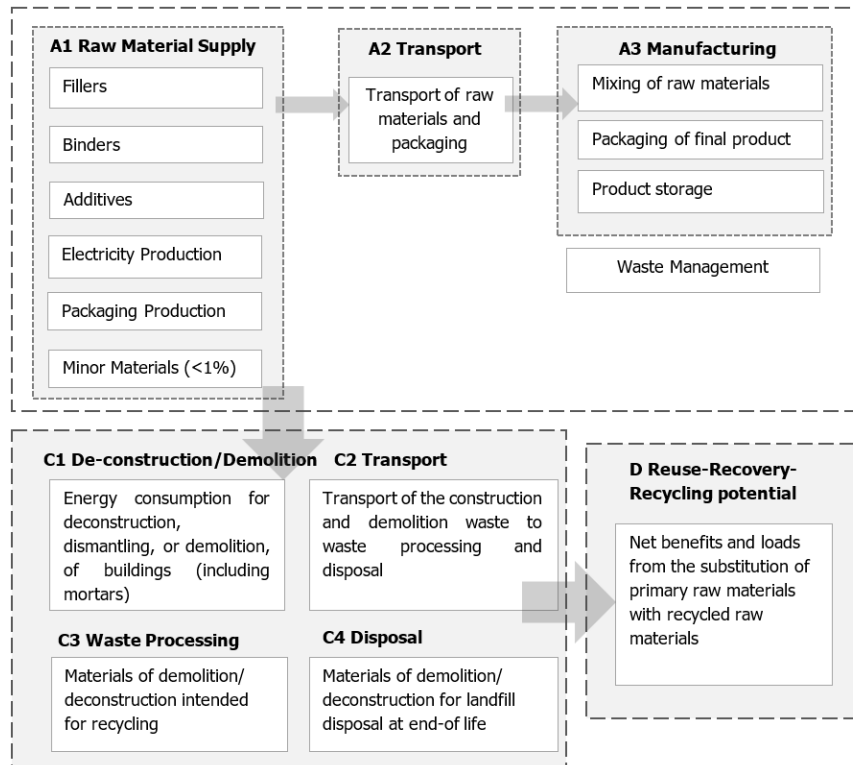
D: Reuse, recovery and/or recycling potentials, expressed as net impacts and benefits.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	GR	ND	ND	ND							GLO			GLO	
Specific data	>95%			-	-	-							-	-	-	-	
Variation – products	None			-	-	-							-	-	-	-	
Variation sites	Manufactured in onsite			-	-	-							-	-	-	-	

The life cycle stages A4, A5 and B, which are optional, were not included in the LCA study due to the fact that there is significant uncertainty in the construction process stage as well as the use stage.



## Description of the modules



**A1:** Production of all raw materials including electricity and packaging required for the manufacture of the products. Sika Hellas has issued GOs for electricity consumption during 2022 and is purchasing 100 % green electricity from its electricity supplier. More specifically, the electricity mix was reported by the electricity supplier as 61% photovoltaic and 39% wind power. Therefore, the climate impact of used electricity mix is 0.058 kg CO<sub>2</sub> eq/kWh (using the GWP-GHG indicator).

**A2:** Transportation of raw materials from other industrial units to the industrial unit in Krioneri (A2).

**A3:** Manufacturing process (energy demand) and waste management of the production.

**C1:** Mortars are not removed from the applied material during the deconstruction. Thus, the impacts of deconstruction/demolition of mortars are assumed to be zero.

**C2:** A distance of 100km and EURO 4 truck is assumed for the transportation of mortars that are included into debris, to waste processing after deconstruction.

**C3:** The recovery rate of mortars (as mixed construction waste) at the end-of-life, is 46.2 %. Carbonation may occur in this life stage, during the storage of the product. Carbonation is calculated according to c-PCR-017. The service life for this stage is assumed to be ¼ year, in “exposed to rain” conditions.

**C4:** 53.8% of mortar waste is assumed to end in landfill. Carbonation takes place also in this stage, and the calculation was according to C3. The service life assumed to be 100 years, and the exposure conditions “in ground”.

**D:** The recycled content in mortar is assumed to be zero. The recovery rate of C&D waste is 46.2%. The waste aggregates that are produced from this recovery process are used in the production of cement and several other projects of the construction sector.



## LCA information

<b>Declared unit</b>	The declared unit is 1kg of SikaCeram®-241 Flex
<b>Time representativeness</b>	All primary data used in this study is for the reporting year 2022
<b>Databases used</b>	The databases that were used were the following: Ecoinvent v.3.9.1 and EN15804 add-on for Ecoinvent. The impact assessment method used was the EN15804+A2
<b>Geographical Scope</b>	Worldwide
<b>Cut-off rules and exceptions</b>	All inputs and outputs were included in the calculation of the unit process of the production stage. The cut-off criteria were 1% for the total mass input and 1% for the renewable and non-renewable primary energy usage for each process, where the maximum was 5% for energy usage and mass that was included for all processes, according to EN 15804 and PCR 2019:14. The materials that were <1% for the total mass and excluded were minor materials. Wooden pallets are reusable. There was no biogenic carbon in the products. Biogenic carbon was less than 5% of the total mass of packaging and therefore it is not reported separately according to PCR 2019:14. It is assumed that energy usage for the deconstruction and demolition of mortars at the End-of-life stage (module C1) was <5% because they are not removed from the applying surface during deconstruction and so, were not included in LCA calculations. The manufacturing processes of the capital goods or spare parts, infrastructure for general management, office and headquarters operations as well as people activities (common activities, travel for work, etc.), and waste streams relating to maintenance of equipment have been exempted. Also, the construction process stage (A4-A5) and use stage (B1-B7) were excluded
<b>Data Quality</b>	All the data used to model the manufacturing process for the specific products covered by this EPD, are specific data and there are no data gaps. Data for raw material supply and transport to the manufacturing plant and production (A1-A3) are based on specific consumption data for the specific production process taking place at the production site in Krioneri, for the reference year 2022. Generic datasets were used for the upstream processes (production of raw material and transportation) as well as for the End-of-Life stage calculations. For this reason, the European life cycle inventory database EN15804 add-on for Ecoinvent has been used, as this database contains the most extensive and updated information and its scope coincides with the geographical, technological, and temporal area of the project. All the datasets used for calculations cover either the area of Greece, Europe, or the Rest of the World. Regarding electricity, a data set was modified according electricity mix reported on the GOs. The best available datasets are picked each time, as far as geography and date are concerned. Technological coverage is specific or average. The LCA was modelled with OpenLCA 2.0.2
<b>Assumptions</b>	The following assumptions have been made in this EPD: <ul style="list-style-type: none"><li>• LCA study does not include the manufacturing processes of the capital goods or spare parts</li><li>• It does not include equipment maintenance</li></ul>





- The environmental impact of infrastructure for general management, office and headquarters operations is not included
- The impact caused by people (common activities, travel for work, office activities, water use) was not considered
- The environmental impact of external transport has been calculated using lorries from the Ecoinvent 3.9.1 database, EURO 4. These lorries have been selected to reflect the most realistic scenario possible
- The scenarios included are currently in use and are representative for one of the most probable alternatives
- Modules C1-C4 were based on scenarios
- Mortars at the End-of-Life stage are assumed to be collected as mixed construction and demolition waste (C&D waste)
- Concerning module C1, mortars are not removed from the applied material during the deconstruction. Thus, the impacts of deconstruction/demolition of mortars are assumed to be zero
- For module C2 a distance of 100km and EURO 4 truck is assumed for the transportation of mortars as C&D waste, to waste processing after deconstruction
- Regarding module C3, the recovery rate of mortars (as mixed construction waste) at the End-of-life, is 46.2% based on ELSTAT report of 2020. The process losses of the waste treatment plant are assumed to be negligible. The remaining 53.8% of mortar waste is assumed to end in landfill (C4). For the carbonation of waste during storage, before the recycling process, a service life of ¼ year under “exposed to rain” exposure conditions was assumed. Also, the carbonation of waste in landfill assumed for a service life of 100 years under “in ground” exposure conditions
- Module D calculates the potential environmental benefits of the recycling or reuse of materials. The recycled content in mortar is assumed to be zero. The recovery rate of C&D waste is 46.2% The waste aggregates that are producing from this recovery process are used in the production of cement and several other projects of the construction sector

## Allocations

Taking into account that all the products are produced implementing the same production procedure, there is no allocation in different production subsystems (sub-processes). There are no co-products produced using other production procedures.

Regarding the input of raw materials, it was based on the composition of each specific product taking into account the BoM for each product. The material losses from manufacture were lower than 1%.

Waste has been divided by the total quantity of products. Therefore, no economic or physical for electricity or raw materials was used

## Environmental Performance

The environmental indicators for SikaCeram®-241 Flex are presented in the following tables. The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

### 1 kg of SikaCeram®-241 Flex

#### Potential environmental impact – Results per declared unit

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
ADPE	kg Sb eq	1,69E-06	0,00E+00	6,19E-08	-1,24E-08	-4,63E-09	-3,07E-08
ADPF	MJ (net calorific)	4,94E+00	0,00E+00	2,69E-01	-7,22E-02	-8,20E-02	-8,47E-02
AP	mol H+ eq	1,20E-03	0,00E+00	7,74E-05	-3,33E-05	-2,46E-05	-3,74E-05
EPF	kg P eq	6,37E-05	0,00E+00	1,32E-06	-9,76E-07	-2,72E-07	-1,73E-06
EPM	kg N eq	3,18E-04	0,00E+00	2,95E-05	-1,35E-05	-9,45E-06	-1,02E-05
EPT	mol N eq	3,55E-03	0,00E+00	3,15E-04	-1,45E-04	-1,01E-04	-1,18E-04
GWPB	kg CO2 eq	4,64E-04	0,00E+00	5,44E-06	-6,06E-06	-1,29E-06	-6,43E-06
GWPF	kg CO2 eq	4,36E-01	0,00E+00	1,87E-02	-2,81E-02	-9,05E-02	-6,49E-03
GWPL	kg CO2 eq	2,33E-04	0,00E+00	9,28E-06	-2,91E-06	-2,01E-06	-5,64E-06
GWPT	kg CO2 eq	4,37E-01	0,00E+00	1,87E-02	-2,81E-02	-9,05E-02	-6,51E-03
GWP - GHG	kg CO2 eq	4,36E-01	0,00E+00	1,87E-02	-2,81E-02	-9,05E-02	-6,50E-03
ODP	kg CFC-11 eq	5,61E-09	0,00E+00	4,09E-10	-8,22E-11	-9,46E-11	-8,28E-11
POCP	kg NMVOC eq	1,15E-03	0,00E+00	1,13E-04	-4,49E-05	-3,53E-05	-3,56E-05
WDP	m3 world eq	1,13E-01	0,00E+00	1,32E-03	-5,90E-04	-2,55E-04	-7,23E-03

#### Use of resources – Results per declared unit

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PENRE	MJ	4,54E+00	0,00E+00	2,45E-01	-6,70E-02	-7,46E-02	-8,05E-02
PENRM	MJ	4,07E-01	0,00E+00	2,33E-02	-5,28E-03	-7,40E-03	-4,20E-03
PENRT	MJ	4,94E+00	0,00E+00	2,69E-01	-7,23E-02	-8,20E-02	-8,47E-02
PERE	MJ	3,76E-01	0,00E+00	4,14E-03	-3,82E-03	-6,89E-04	-6,11E-03
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,76E-01	0,00E+00	4,14E-03	-3,82E-03	-6,89E-04	-6,11E-03
FW	m <sup>3</sup>	2,77E-03	0,00E+00	3,21E-05	-3,48E-05	-8,47E-05	-1,70E-04
NRSF	MJ	8,98E-03	0,00E+00	1,54E-04	-1,33E-04	-1,81E-05	-1,86E-04
RSF	MJ	4,65E-03	0,00E+00	7,85E-05	-1,16E-04	-7,05E-06	-6,84E-05
SM	Kg	1,22E-02	0,00E+00	2,91E-04	-2,34E-04	-3,62E-05	-2,17E-04

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## Output flows – Results per declared unit

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
CRU	kg	-7,40E-22	0,00E+00	-1,04E-23	6,77E-24	-6,40E-24	4,15E-24
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	8,46E-03	0,00E+00	2,64E-04	-2,18E-04	-2,97E-05	-1,76E-04

## Waste production – Results per declared unit

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
HWD	kg	-4,36E-03	0,00E+00	-2,49E-04	7,98E-05	5,63E-05	-2,16E-04
NHWD	kg	-7,75E-03	0,00E+00	-1,28E-02	8,12E-02	5,37E-01	8,41E-04
RWD	kg	-4,80E-06	0,00E+00	-8,67E-08	1,16E-07	1,20E-08	-1,05E-07

Disclaimer 1: The indicator GWP-GHG includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013).  
Disclaimer 2: The results of the environmental impact indicators ADPE, ADPF and WDP shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## References

1. General Programme Instructions of the International EPD® System Version 4.0
2. ISO 14040:2006 Environmental management Life cycle assessment. Principles and framework
3. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines
4. ISO 14020:2000 Environmental labels and declarations – General principles
5. ISO 14025:2010 Environmental labels and declarations – Type III Environmental Declarations– Principles and procedures
6. PCR – “2019:14 Construction products” (Version 1.3.1)
7. PCR 2019:14-c-PCR-017 Technical-chemical products (for construction sector) (c-PCR to PCR 2019:14) (adopted from EPD Norway 2022-07-08, NPCR 009 – Part B for Technical – Chemical products for building and construction industry (Version 2.0))
8. EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
9. ELSTAT (2020) <https://www.statistics.gr/>

## Abbreviations

<b>ADPE</b>	Environment: Abiotic depletion potential (elements)
<b>ADPF</b>	Environment: Abiotic depletion potential (fossils)
<b>AP</b>	Environment: Acidification potential
<b>EPF</b>	Environment: Eutrophication potential (freshwater)
<b>EPM</b>	Environment: Eutrophication potential (marine)
<b>EPT</b>	Environment: Eutrophication potential (terrestrial)
<b>GWPB</b>	Environment: Global warming potential (biogenic)
<b>GWPF</b>	Environment: Global warming potential (fossil)
<b>GWPL</b>	Environment: Global warming potential (land use)
<b>GWPT</b>	Environment: Global warming potential (total)
<b>GWP - GHG</b>	Environment: Global warming potential (greenhouse gas emissions)
<b>ODP</b>	Environment: Ozone depletion potential
<b>POCP</b>	Environment: Photochemical ozone creation potential
<b>WDP</b>	Environment: Water deprivation potential
<b>PENRE</b>	Primary energy: Non-renewable (energy use)
<b>PENRM</b>	Primary energy: Non-renewable (material use)
<b>PENRT</b>	Primary energy: Non-renewable (total)
<b>PERE</b>	Primary energy: Renewable (energy use)
<b>PERM</b>	Primary energy: Renewable (material use)
<b>PERT</b>	Primary energy: Renewable (total)
<b>FW</b>	Resource: Net use of fresh water
<b>NRSF</b>	Resource: Non-renewable secondary fuels
<b>RSF</b>	Resource: Renewable secondary fuels
<b>SM</b>	Resource: Secondary materials
<b>CRU</b>	Output: Components for reuse
<b>EEE</b>	Output: Exported energy (electrical)
<b>EET</b>	Output: Exported energy (thermal)
<b>MER</b>	Output: Materials for energy recovery
<b>MFR</b>	Output: Materials for recycling
<b>HWD</b>	Waste: Hazardous waste disposed
<b>NHWD</b>	Waste: Non-hazardous waste disposed
<b>RWD</b>	Waste: Radioactive waste disposed