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GDSN Implementation Guideline for exchanging Product Carbon Footprint Data

How to use GDSN to exchange detailed information about Carbon Footprint of products

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1 Introduction

Green House Gas (GHG) emissions, like carbon (CO_2), are the primary driver of climate change.

To manage and report these emissions on a company or product level, they are categorized into three scopes according to the GHG Protocol:

- Scope 1 covers direct greenhouse gas emissions from sources that are owned or controlled by the reporting company, such as fuel combustion in facilities or vehicles
- Scope 2 refers to indirect greenhouse gas emissions resulting from the generation of purchased electricity, steam, heating, or cooling consumed by the reporting entity
- Scope 3 encompasses all other indirect greenhouse gas emissions that occur throughout a company's value chain, including those from upstream and downstream activities, such as emissions from suppliers, transportation, and the use of sold products by customers

When environmental impacts are assessed at product level, different assessment methods may be used depending on the objective, the product category, the intended audience and the required level of detail. These methods do not all have the same scope. Some methods assess only selected life cycle stages or selected environmental aspects, while others follow a more comprehensive life cycle approach. **Life Cycle Assessment (LCA)** provides the scientific and methodological basis for assessing environmental aspects and potential environmental impacts of products and services over their life cycle. Under ISO 14040 and ISO 14044, an LCA is structured around four phases: goal and scope definition, life cycle inventory analysis (LCI), life cycle impact assessment (LCIA) and interpretation. Depending on the goal and scope, an LCA may consider multiple environmental impact categories, such as climate change, resource use, water use, acidification, eutrophication, land use or other relevant impact categories. A complete LCA can therefore support a broad environmental assessment of a product. However, conducting an LCA is complex and product-specific. The quality and availability of data, the definition of system boundaries, allocation rules, assumptions and the selected impact assessment methods can strongly influence the result. For this reason, the respective method, scope, assumptions and data quality should be documented transparently when product-level environmental information is exchanged.

Several specialised methods build on life cycle thinking or the LCA framework. The Product Carbon Footprint is an LCA-based method to quantify and communicate the environmental impacts of products using defined methodological requirements.

Product Carbon Footprint (PCF) is not equivalent to a full LCA. A PCF is a focused assessment of the greenhouse gas emissions and removals associated with a product and is expressed in CO_2 equivalents (CO_2eq). It uses life cycle thinking and may be based on LCA approaches, but it addresses one impact category only: climate change. Common methodological references for PCF calculation include ISO 14067 and the GHG Protocol Product Life Cycle Accounting and Reporting Standard.

The PCF is measured in CO_2 equivalents (CO_2eq), a metric that allows for the comparison of the global warming potential of different greenhouse gases. By expressing the impact of gases like methane (CH_4) and nitrous oxide (N_2O) in terms of the amount of CO_2 that would produce the same warming effect, CO_2eq provides a consistent and comparable measure of emissions.

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The following table shows a comparison between LCA and PCF and serves as an overview of both assessments:

	Life Cycle Assessment (LCA)	Product Carbon Footprint (PCF)
Focus	Evaluates broader environmental aspects and potential impacts across the entire life cycle of a product.	Measures greenhouse gas emissions and removals, primarily expressed as CO_2eq.
Purpose	Identifies environmental hotspots and supports sustainable decision-making across multiple impact categories.	Identifies, measures and supports the reduction of product-related carbon emissions.
Measurement	Analyses different environmental impacts using several impact indicators.	Quantifies emissions in terms of , CO_2e usually linked to a functional unit.
Impact Coverage	Can include climate change, water use, resource use, acidification, eutrophication, land use, toxicity, particulate matter and other environmental categories.	Covers one impact category only: climate change. Other environmental, social or economic impacts are outside the scope.
Life Cycle Perspective	Can cover the full life cycle or a defined system boundary such as cradle-to-gate or cradle-to-grave.	Uses life-cycle thinking and defined system boundaries, but only for greenhouse gas emissions within those boundaries.
Functional Unit	Defines the product function or reference flow used to compare environmental performance.	Defines the reference unit used to calculate and compare product-related GHG emissions.
System Boundaries	Set in the goal and scope phase and decisive for interpretation and comparability.	Define which life-cycle stages are included in the carbon footprint calculation, e.g. partial or full product life cycle.
Framework	i.e. ISO 14040 and ISO 14044.	i.e. ISO 14067 and the GHG Protocol.
Advantage	Provides a holistic view by considering multiple environmental impacts and potential trade-offs.	Provides a focused and communicable climate indicator for carbon transparency and reduction measures.
Disadvantage	Can be complex, data-intensive and more difficult to communicate due to the number of impact categories.	A narrow carbon focus may overlook other relevant environmental impacts.

These two methods of calculation have therefore a different approach as the table shows. Which one is chosen depends on what results a company wants to achieve. While an LCA provides a comprehensive assessment of a product's environmental impact over its entire life cycle, considering multiple impact categories, the PCF focuses on greenhouse gas emissions. The LCA can be used for a broad environmental assessment and the PCF for targeted emission reduction.

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The relationship between LCA and PCF should therefore be understood as a hierarchy of scope, not as an equivalence. LCA is the overarching methodological framework for life cycle-based environmental assessment. PCF is a targeted carbon-focused assessment that applies life cycle principles to quantify the climate change impact of a product. CO_2 emissions are an important part of many LCA studies, but they are not covering the whole LCA.

Another consideration is the regulatory aspect, as it is becoming a legal requirement in the European Union and the United Kingdom for companies to report their carbon footprint.

1. ***European Union****: The Corporate Sustainability Reporting Directive (CSRD) mandates that a broader set of large companies and listed SMEs report on their sustainability, including carbon footprint.*
2. ***United Kingdom****: The UK has made Task Force on Climate-related Financial Disclosures (TCFD) aligned disclosures mandatory for the largest companies by 2025.*

These regulations aim to increase transparency and accountability, encouraging companies to reduce their environmental impact. While the CSRD can apply to both LCA and PCF, as it mandates comprehensive sustainability reporting, the PCF is explicitly listed as a data point depending on its materiality for the reporting company. The **TCFD** focuses mainly on climate-related financial disclosures, which aligns more closely with PCF.

Note that there are two methods to calculate the impact. The focus will be the PCF although many attributes that are described in this document are connected to LCA. Reference is made to the carbon footprint data in the following chapters. This relates exclusively to the product and not the company level.

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2 Importance of Product Carbon Footprint Data

Product Carbon footprint data is essential for making the environmental impacts of products transparent and traceable. This can be particularly important in the Fast-Moving Consumer Goods (FMCG) sector, which is characterized by high production and consumption rates. Accurate and standardized data enable companies to optimize their supply chains, make more sustainable decisions, and reduce their emissions. At the same time, consumers can make informed purchasing decisions, opting for products with lower carbon emissions, ultimately contributing to a more sustainable economy. So, there are several reasons why sharing carbon footprint data is so important for a company:

1. **Transparency and Accountability**: It allows companies to be transparent about their environmental impact and hold themselves accountable to consumers and stakeholders.
2. **Comparability**: Standardized data enables consumers and businesses to compare products based on their environmental footprint, promoting more informed purchasing decisions.
3. **Sustainability**: It encourages companies to adopt more sustainable practices in their production and distribution processes, ultimately reducing overall carbon emissions.
4. **Policy Development**: Governments can use this data to develop and implement more effective policies aimed at reducing carbon emissions.

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3 Structure of the Guideline

For the exchange of Product Carbon footprint data in GDSN, specific attributes are available.

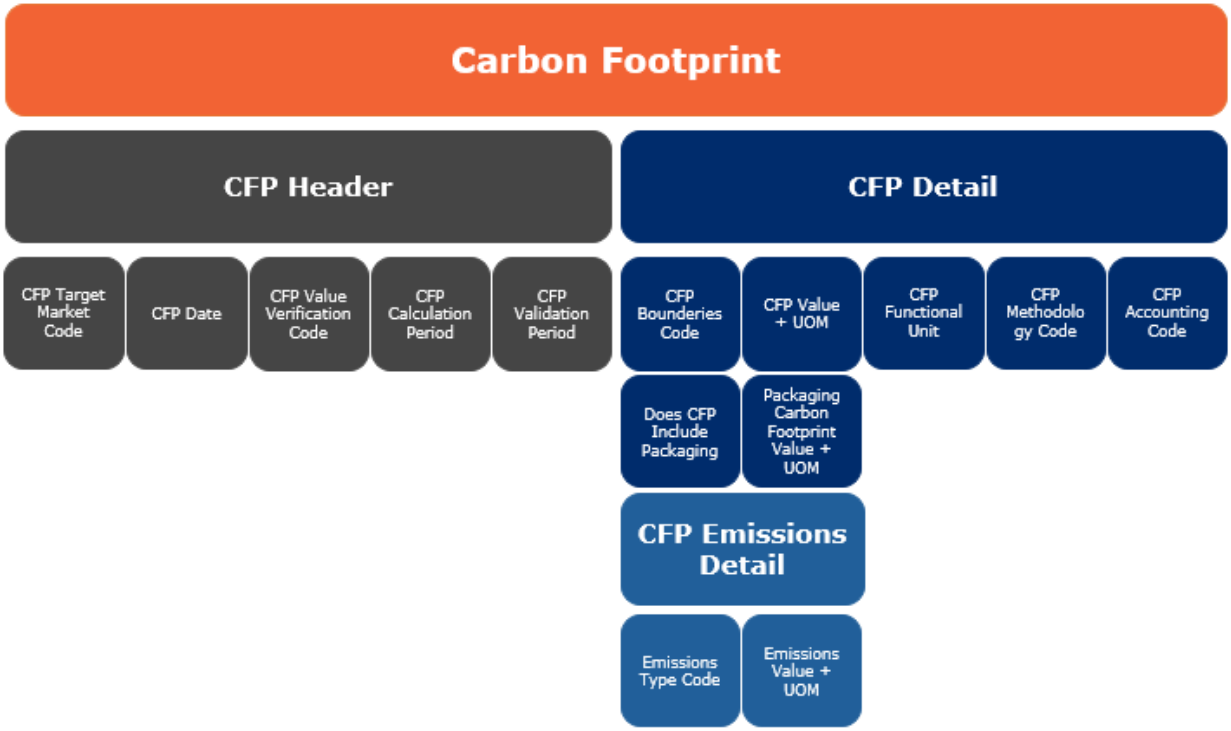
In Chapter 4 of the guideline, the usage of these attributes is described.

The attributes are divided into three classes:

1. **CarbonFootPrintHeader** – composed of attributes applicable to all detailed information specified in the dedicated CarbonFootPrintDetail class.

2. **CarbonFootPrintDetail** - the attributes in this class should be repeated in case more information is available. Ideally, all results and details from the Life Cycle Analysis (LCA) should be included.

3. **EmissionsType –** The attributes in this class, located below the **CarbonFootprintDetail** class, are used to specify the emission type(s) associated with the carbon footprint value. The class should be repeated whenever multiple emission types are identified.



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4 Product Carbon Footprint attributes

4.1 Class: CarbonFootPrintHeader

The attributes in the class CarbonFootPrintHeader shall not be repeated and are applicable to the CFP attributes of the trade item. Data is only required for Consumer Units.

4.1.1 *CFP Target Market Code (BMS ID 8728)*

- **GDSN name:** cfpCountryCode
- **Definition:** The code specifying a target market for which the carbon footprint values have been calculated. Transportation emissions can greatly vary from country to country.
- **Instruction:** Populate the country code for which the values have been calculated.
- **Business Usage Statement:** Used by the seller and the buyer to identify the country for which the carbon footprint data has been calculated.
- **Remark:** Associated code list is 'countryCode'
- **Example:** '528' (Netherlands)

4.1.2 *CFP Date (BMS ID 8730)*

- **GDSN name:** cfpDate
- **Definition:** The date on which the product carbon footprint assessment was conducted.
- **Instruction:** Enter the date on which the product carbon footprint assessment was conducted.
- **Business Usage Statement:** Used by the seller and the buyer to identify the date of the calculated carbon footprint values.
- **Example:** 2024-05-31T00:00:00

4.1.3 *CFP Value Verification Code (BMS ID 8731)*

- **GDSN name:** cfpValueVerificationCode
- **Definition:** The code indicating how the calculated carbon footprint value is verified.
- **Instruction:** Enter the code indicating how the value is verified.
- **Business Usage Statement:** Used by the seller and the buyer to identify the verification used to calculate the carbon footprint values.
- **Example:** EXTERNAL_VERIFICATION
- **Code list:** *CfpValueVerificationCode*

Code name	Code value	Code definition
External verification	EXTERNAL_VERIFICATION	The values have been verified by an external party.
Not verified	NOT_VERIFIED	The values have been calculated according to the reported calculation method, but have not been verified.
Peer reviewed	PEER_REVIEWED	The values and methodology have been reviewed internally or by 3rd party.

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4.1.4 *CFP Calculation Period (BMS ID 8924)*

- **GDSN name:** carbonFootprintCalculationPeriod
- **Definition:** The code specifying the period used for calculating the product carbon footprint.
- **Instruction:** Enter the code indicating the time horizon during which the product carbon footprint was calculated.
- **Business Usage Statement:** Used by the seller and the buyer to identify the period of the calculated carbon footprint.
- **Example:** 12_MONTHS
- **Code list:** CarbonFootprintCalculationPeriod

Code name	Code value	Code definition
6 months	6_MONTHS	For the calculation of the product carbon footprint, a period of maximum 6 months was taken into account.
12 months	12_MONTHS	For the calculation of the product carbon footprint, a period of 6 to maximum 12 months was taken into account.
18 months	18_MONTHS	For the calculation of the product carbon footprint, a period of 12 to maximum 18 months was taken into account.
24 months	24_MONTHS	For the calculation of the product carbon footprint, a period of 18 to maximum 24 months was taken into account.

4.1.5 *CFP Validation Period (BMS ID 8926)*

- **GDSN name:** carbonFootprintValidationPeriod
- **Definition:** The code specifying the validity period of the calculated product carbon footprint.
- **Instruction:** Enter the code indicating the time horizon for which the calculated product carbon footprint remains valid.
- **Business Usage Statement:** Used by the seller and the buyer to identify the validity period of the calculated carbon footprint.
- **Example:** 12_MONTHS
- **Code list:** CarbonFootprintValidationPeriod

Code name	Code value	Code definition
6 months	6_MONTHS	The calculated product carbon footprint remains valid for 6 months.
12 months	12_MONTHS	The calculated product carbon footprint remains valid for 12 months.
18 months	18_MONTHS	The calculated product carbon footprint remains valid for 18 months.
24 months	24_MONTHS	The calculated product carbon footprint remains valid for 24 months.

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Code name	Code value	Code definition
30 months	30_MONTHS	The calculated product carbon footprint remains valid for 30 months.
36 months	36_MONTHS	The calculated product carbon footprint remains valid for 36 months.

4.2 Class: CarbonFootprintDetail

The attributes in the CarbonFootPrintDetail class should be repeated in case more information is available. Ideally, all results and details from the Life Cycle Analysis (LCA) should be included. Data is only required for Consumer Units.

4.2.1 *CFP Boundaries Code (BMS ID 8734)*

- **GDSN name:** cfpBoundariesCode
- **Definition:** The code identifying the life cycle stage that the product carbon footprint value refers to. The boundary setting may vary depending on the purpose of the product carbon footprint assessment.
- **Instruction:** Enter the code that represents the stage that the carbon footprint value refers to. This value should be repeated in case information of several stages is available. Only use the stages that correspond with your Life Cycle Assessment (LCA) report.
- **Business Usage Statement:** Used by the seller and the buyer to identify the life cycle stage that the carbon footprint value (specified in the CFP Value attribute) refers to. There may be multiple instances of the CFP Boundaries Code attribute in cases such as:
  - A single CO_2 value is provided to cover multiple life cycle stages (for example, transport and manufacturing), where the attribute is repeated.
  - A different CO_2 value is provided for each life cycle stage (for example, manufacturing and consumer use), where the entire carbon footprint group (class) of attributes is repeated.

  For the exchange of PCF information between suppliers, customers and trading partners, providing an aggregated carbon footprint value, particularly on a "cradle to gate" basis, is often considered the most practical and useful approach. It supports comparability across products and suppliers and enables a holistic representation of the product's carbon footprint.

  Where available, additional reporting by individual CFP Boundaries Codes (for example, "raw materials", "manufacturing","use") can provide increased transparency and support hotspot identification, product decarbonization activities and internal carbon footprint analyses. Such boundary-specific information should be considered complementary to, rather than a replacement for, an aggregated product carbon footprint result.

- **Example:** RAW_MATERIALS
- **Code list:** *CfpBoundariesCode*

Code name	Code value	Code definition
Cradle to consumption	CRADLE_TO_CONSUMPTION	Total amount of CO2 emission from a life cycle assessment (LCA) model that assesses a product's environmental footprint from raw materials extraction until it is consumed. (PEF guidance, the European Commission 2021b)

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Code name	Code value	Code definition
Cradle to gate	CRADLE_TO_GATE	Total amount of CO2 emission from a life cycle assessment (LCA) model that assesses a product's environmental footprint from raw materials extraction until it leaves the factory gate.
Cradle to grave	CRADLE_TO_GRAVE	Total amount of CO2 emission from a life cycle assessment (LCA) model that assesses a product's environmental footprint from raw materials extraction until its disposal, including manufacturing, transportation, product use.
End of life	END_OF_LIFE	The emission of the product when it is disposed, recycled, recovered after use.
Inbound logistics	INBOUND_LOGISTICS	The emissions of the product resulting from its inbound logistics, including all logistical activities associated with the receipt of goods into a logistics center – such as delivery, unloading, incoming goods inspection, and storage.
Manufacturing	MANUFACTURING	The emissions resulting from the manufacturing/production of the product.
Raw materials	RAW_MATERIALS	The emissions resulting from the production/extraction, packaging, storage, warehousing and transportation of raw materials.
Transport of final product	TRANSPORT_FINAL_PRODUCT	The emissions resulting from the distribution of the product to the retail network or to downstream stakeholders. This stage includes transport of the final product and its packaging, storage and warehousing.
Use	USE	The emissions of the product when used by the consumer.

4.2.2 *CFP Value (BMS ID 8736)*

- **GDSN name:** cfpValue
- **Definition:** The emissions value, i.e., carbon footprint, for a specific boundary setting.
- **Instruction:** Enter the value for the carbon footprint that corresponds to the boundaries code used in attribute cfpBoundariesCode.
- **Business Usage Statement:**
  - Used by the seller and the buyer to state the emissions value per boundary setting (specified by the CFP Boundaries Code).
  - Used by consumers who are concerned about the environment for search and discovery to assist in the selection of products with lower carbon footprints.
- **Example:**
  - For a clothes dryer:
    - CFP Boundaries Code = USE
    - CFP Value and Measurement Unit Code = 1.7 KG_CO2_EQ_PER_FU (Kilogram CO_2 equivalent per functional unit)
  - For a plastic bottle:
    - CFP Boundaries Code = MANUFACTURING

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- CFP Value and Measurement Unit Code = 8.28 KG_CO2_EQ_PER_100G (= Kilogram CO_2 equivalent per 100 gram)

4.2.3 CFP Value Measurement Unit Code (BMS ID 8737)

- **GDSN name:** cfpValue/@cfpValueMeasurementUnitCode
- **Definition:** Any standardised, reproducible unit that can be used to measure any physical property.
- **Instruction:** Enter the unit of measurement that corresponds to the used cfpValue.
- **Business Usage Statement:**
  - Used by the seller and the buyer to state the emissions value per boundary setting (specified by the CFP Boundaries Code).
  - Used by consumers who are concerned about the environment for search and discovery to assist in the selection of products with lower carbon footprints.
- **Code list:** CfpValueMeasurementUnitCode
- **Example:**
  - For a plastic bottle:
    - CFP Boundaries Code = MANUFACTURING
    - CFP Value and Measurement Unit Code = 8.28 KG_CO2_EQ_PER_100G (= Kilogram CO2 equivalent per 100 gram)

Code name	Code value	Code definition
Euro CO2eq per kg	EUR_CO2_EQ_PER_KG	Euro CO2 equivalent per kilogram.
Kg CO2eq per 100 g	KG_CO2_EQ_PER_100G	Kilogram CO2 equivalent per 100 grams.
Kg CO2eq per 100 ml	KG_CO2_EQ_PER_100ML	Kilogram CO2 equivalent per 100 milliliters.
Kg CO2eq per functional unit	KG_CO2_EQ_PER_FU	Kilogram CO2 equivalent per functional unit.
Kg CO2eq per kg	KG_CO2_EQ_PER_KG	Kilogram CO2 equivalent per kilogram.

4.2.4 *CFP Functional Unit (BMS ID 8739)*

- **GDSN name:** cfpFunctionalUnit
- **Definition:** The functional unit describes the quantity and/or performance characteristics of a product as it is used by the end-user, which forms the basis for calculating the emissions value (i.e., carbon footprint), and can be used for comparison to other similar products.
- **Instruction:** Specify the Functional Unit (in text) in case you have selected the cfpValue/@measurementUnitCode "KG_CO2_EQ_PER_FU". If you have selected another UoM this attribute shall not be used.
- **Business Usage Statement:** Used by the seller and the buyer to understand the basis of use for which the CFP Value attribute is calculated, when the attribute CFP Boundaries Code value is 'USE', indicating emissions related to the use of the item by the consumer.
- **Example:**
  - For a washing machine:

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- CFP Functional Unit = 'Washing machine with a capacity to wash 10 kg of laundry at 60 degrees'

- For a plastic shopping bag:
  - CFP Functional Unit = 'Shopping bag with a volume of 22 liters, can carry a maximum weight of 12 kilograms'

4.2.5 *CFP Methodology Code (BMS ID 8742)*

- **GDSN name:** cfpMethodologyCode
- **Definition:** The code specifying the method used to assess and communicate the environmental impact of the product in terms of carbon footprint.
- **Instruction:** Use the code to specify the calculation method that is used to calculate the CFP values.
- **Business Usage Statement:** Used by the seller and the buyer to identify the methodology used to calculate the carbon footprint.

  A variety of carbon footprint calculation methodologies are currently available, which is reflected in the extensive list of supported methodology codes. The selection of a methodology depends on the reporting organisation's requirements, industry practices and the intended use of the carbon footprint information.

  To support consistent interpretation and comparability of exchanged carbon footprint data, trading partners are encouraged to use widely recognised methodologies where appropriate. Organisations should apply the selected methodology consistently across their carbon footprint declarations whenever feasible.

  Widely recognised and commonly applied approaches include the GHG Protocol and ISO 14067. These methodologies provide established principles and requirements for quantifying and reporting product carbon footprints.
- **Example:** CARBON_FOOTPRINT_STANDARD
- **Code list:** *CfpMethodologyCode*

Code name	Code value	Code definition
Carbon footprint standard	CARBON_FOOTPRINT_STANDARD	Product-specific value, based on carbon footprint standard (ISO 14067).
EcoBeautyScore	ECOBEAUTYSCORE	The primary objective of the EcoBeautyScore association is to develop a common environmental impact scoring system for cosmetic products, equipping consumers with the knowledge to be able to make informed purchasing decisions.
EN 15804	EN_15804	EN 15804 specifies the requirements for Environmental Product Declarations (EPDs) for the sustainability assessment of construction works and establishes core rules for the product category of construction products.
ENVIMAT	ENVIMAT	Value for the product-group from an input-output study, based on ENVIMAT in Finland (Nissinen et al. 2019, SYKEra 15/2019).
Environmental Product Declaration (EPD)	EPD	An Environmental Product Declaration (EPD) is a Type III environmental label which quantifiably demonstrates the environmental impacts of a product. ISO14025 is the normative basis for EPDs.

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Code name	Code value	Code definition
Greenhouse Gas (GHG) Protocol	GHG_PROTOCOL	The Product Life Cycle Accounting and Reporting Standard can be used to understand the full life cycle emissions of a product and focus efforts on the greatest Greenhouse Gas (GHG) reduction opportunities.
Global Logistics Emissions Council (GLEC)	GLEC	Global Logistics Emissions Council (GLEC) is a global method for calculation and reporting logistics emissions.
International Reference Life Cycle Data System (ILCD)	ILCD	The International Reference Life Cycle Data System (ILCD) is an initiative developed by the Joint Research Centre (JRC) and the Directorate-General for Environment (DG ENV), with the aim to provide guidance and standards for greater consistency and quality assurance in applying life cycle assessment (LCA).
Input-output (IO) model	IO_MODEL	Spend-based input-output models to calculate the carbon footprint of products by multiplying the monetary value of purchases by emission factors derived from economy-wide input-output tables.
Intergovernmental Panel on Climate Change (IPCC)	IPCC	Intergovernmental Panel on Climate Change (IPCC) Global Warming Potential (GWP) factors.
ISO 14025	ISO_14025	ISO 14025 specifies the requirements for Environmental Labels and Declarations, type III environmental declarations (EPDs) including principles and procedures.
ISO 14040/44	ISO_14040_44	ISO 14040/44 defines the principles and framework for life cycle assessments (LCAs). ISO 14040 describes the general framework, while ISO 14044 provides the detailed requirements for conducting the four phases of an LCA: goal and scope definition, life cycle inventory analysis (LCI), life cycle impact assessment (LCIA), and interpretation.
ISO 14064	ISO_14064	ISO 14064 specifies requirements for selecting Greenhouse Gas (GHG) validators/verifiers, establishing the level of assurance, objectives, criteria and scope, determining the validation/verification approach, assessing GHG data, information, information systems and controls, evaluating GHG assertions and preparing validation/verification statements.
Not classified	OTHER	A standard calculation method, not classified in the codelist.
Partnership for Carbon Transparency (PACT)	PACT	The Partnership for Carbon Transparency (PACT) includes a streamlined methodology for calculating and exchanging product-level Scope 3 data across value chains.
PCR	PCR	Product Category Rules.

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Code name	Code value	Code definition
PCR EDF	PCR_EDF	Product-specific value, based on Product Category Rule (PCR) of an Environmental Product Declaration (EPD) system.
Product Environmental Footprint (PEF)	PEF	The Product Environmental Footprint (PEF) methodology is performed following the PEF guidelines published by the European Commission and, if available, specific category rules (PEFCRs). It adopts the frameworks of ISO 14040/44 but represents a specific methodology of the European Commission.
ReCiPe	RECIPE	Based on National Institute for Public Health and the Environment (RIVM), Institute of Environmental Sciences (CML), Product Category Rule (PCR).
Together for Sustainability (TfS)	TFS	Together for Sustainability (TfS) is a member-driven initiative, raising Corporate Social Responsibility (CSR) standards throughout the chemical industry.

4.2.6 *CFP Accounting Code (BMS ID 8744)*

- **GDSN name:** cfpAccountingCode
- **Definition:** The code indicating which method is used to conduct the lifecycle assessment for carbon footprint calculation.
- **Instruction:** Use the code that corresponds to the method that is used.
- **Business Usage Statement:** Used by the seller and the buyer to identify what activities are represented by the carbon footprint values.
- **Example:** CONSEQUENTIAL
- **Code list:***CfpAccountingCode*

Code name	Code value	Code definition
Attributional	ATTRIBUTIONAL	An attributional life cycle assessment (ALCA) is focusing on describing, assessing and quantifying environmentally relevant physical flows of specific life cycle(s) and its subsystems. An ALCA gives an estimate of what part of the global environmental burdens belongs to the study object. An ALCA does not include environmental benefits or other indirect consequences that arise outside the life cycle of the investigated product.
Consequential	CONSEQUENTIAL	A consequential life cycle assessment (CLCA) is focusing on describing, assessing and quantifying environmentally relevant flows and how they will change in response to possible decisions. A CLCA gives an estimate of how the production and use of the study object affect the global environmental burdens. For example, an increased use of a material in the studied system can lead to less material being used in other systems.

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4.2.7 Does CFP Include Packaging (BMS ID 8847)

- **GDSN name:** doesCarbonFootprintIncludePackaging
- **Definition:** The indicator specifying if the carbon footprint calculation includes packaging.
- **Instruction:** Use the code to state if the carbon footprint calculation includes packaging.
- **Business Usage Statement:** Used by the seller and the buyer to indicate whether packaging is included in the reported carbon footprint value.

  As organizations may apply different approaches regarding the inclusion of packaging components in product carbon footprint calculations, this attribute helps identify whether packaging-related emissions are reflected in the reported carbon footprint value.
- **Example:** TRUE
- **Code list:** *NonBinaryLogicEnumeration*

4.2.8 *Packaging Carbon Footprint Value (BMS ID 8928)*

- **GDSN name:** packagingCarbonFootprintValue
- **Definition:** The emissions value, i.e., carbon footprint, associated with the packaging of the product, for a specific boundary setting.
- **Instruction:** Use the code to provide the carbon footprint value of the packaging if doesCarbonFootprintIncludePackaging equals TRUE.
- **Business Usage Statement:** Used by the seller to report his own carbon footprint according to SBTI differentiated by the packaging.
- **Example:** 2

4.2.9 *Packaging Carbon Footprint Value Measurement Unit Code (BMS ID 8929)*

- **GDSN name:** packagingCarbonFootprintValue/@*cfpValueMeasurementUnitCode*
- **Definition:** Any standardised, reproducible unit that can be used to measure any physical property.
- **Instruction:** Use the code to provide a measurement unit for the value.
- **Business Usage Statement:**
  - Used by the seller and the buyer to state the emissions value for the packaging per boundary setting (specified by the CFP Boundaries Code).
  - Used by consumers who are concerned about the environment for search and discovery to assist in the selection of products with lower carbon footprints.
- **Example:**
  - For a plastic bottle:
    - CFP Boundaries Code = MANUFACTURING
    - doesCarbonFootprintIncludePackaging = TRUE
    - Packaging Carbon Footprint Value and Measurement Unit Code = 2 KG_CO2_EQ_PER_100G (= Kilogram CO2 equivalent per 100 gram)
- **Code list:** CfpValueMeasurementUnitCode

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4.3 Class: EmissionsType (within CarbonFootprintDetail Class)

The attributes in the EmissionsType class should be repeated in case multiple emission types are involved in the Carbon Footprint Value. Ideally, all results and details from the Life Cycle Analysis (LCA) should be included. Data is only required for Consumer Units.

4.3.1 Emissions Type Code (BMS ID 8934)

- **GDSN name:** emissionsTypeCode
- **Definition:** The code specifying the type of emissions included in the Carbon Footprint Value.
- **Instruction:** Use the code to specify the type of emissions which are included in the total product carbon footprint value.
- **Business Usage Statement:** Used by the seller to report his own carbon footprint according to SBTI differentiated by the types of emissions.

  The separate reporting of emission types is particularly relevant for organizations applying guidance from the Science Based Targets initiative (SBTi), the Greenhouse Gas (GHG) Protocol and other recognised carbon accounting frameworks, which increasingly require specific treatment and disclosure of different emission categories.

  For products and supply chains containing agricultural, forestry or other land-based raw materials, the distinction between FLAG (Forest, Land and Agriculture) and non-FLAG emissions provides additional transparency regarding emission sources and drivers.
- **Example:** FLAG
- **Code list:** EmissionsTypeCode

Code name	Code value	Code definition
Biogenic emissions	BIOGENIC	Biogenic CO_2 emissions are greenhouse gases released from natural sources like the combustion or biodegradation of biomass. Biogenic emissions are important in the Life Cycle Assessment (LCA) during the several phases, e.g., raw material extraction or production.
Flag emissions	FLAG	FLAG (Forest, Land, and Agriculture) emissions include those from Agriculture, Forestry, and Other Land Use (AFOLU), covering emissions from land use change and the management of raw materials.
Fossil emissions	FOSSIL	Fossil indicates emissions from fossil fuels.
IOBC/GWP-GHG emissions	IOBC_GWP_GHG	IOBC/GWP-GHG indicates emissions which includes the combined effect of greenhouse gas emissions, excluding uptake and emissions of biogenic carbon dioxide.
Luluc emissions	LULUC	LULUC indicates emissions from land use and land use change.
Non flag emissions	NON_FLAG	Non-FLAG (not from Forest, Land and Agriculture) emissions resulting from the production/extraction, packaging, storage, warehousing and transportation of raw materials.

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Code name	Code value	Code definition
Removals	REMOVALS	Removals are CO_2 reductions of a product through biogenic or technical processes that can be reported separately from the gross footprint, provided they are traceable and methodologically proven. These values are presented to offer a comprehensive overview of the product's carbon footprint expressed in CO_2eq.

4.3.2 *Emissions Value (BMS ID 8936)*

- **GDSN name:** emissionsValue
- **Definition:** The value of the specific emission type provided in the Emissions Type Code.
- **Instruction:** Use the code to provide the value of the emissions type.
- **Business Usage Statement:** Used by the seller to report his own carbon footprint according to SBTI differentiated by the types of emissions.
- **Example:** 1,5

4.3.3 *Emissions Value Measurement Unit Code (BMS ID 8937)*

- **GDSN name:** emissionsValue/@cfpValueMeasurementUnitCode
- **Definition:** Any standardised, reproducible unit that can be used to measure any physical property.
- **Instruction:** Use the code to provide a measurement unit for the value.
- **Business Usage Statement:** Used by the seller to report his own carbon footprint according to SBTI differentiated by the types of emissions.
- **Example:**
  - For a plastic bottle:
    - CFP Boundaries Code = TRANSPORT
    - Emissions Type Code = BIOGENIC
    - Emissions Type Code Value and Measurement Unit Code = 0,5 KG_CO2_EQ_PER_100G (= Kilogram CO2 equivalent per 100 gram)
- **Code list:** CfpValueMeasurementUnitCode

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5 Example

Attribute Name	Attribute Value
cfpCountryCode	528
cfpDate	2024-05-31T00:00:00
cfpValueVerificationCode	EXTERNAL_VERIFICATION
carbonFootprintCalculationPeriod	12_MONTHS
carbonFootprintValidationPeriod	24_MONTHS
cfpBoundariesCode	**RAW_MATERIALS**
cfpValue	8,28
cfpValueUom	KG_CO2_EQ_PER_100G
cfpFunctionalUnit	
cfpMethodologyCode	CARBON_FOOTPRINT_STANDARD
cfpAccountingCode	ATTRIBUTIONAL
emissionsTypeCode	FLAG
emissionsValue	1,5
emissionsValueUom	KG_CO2_EQ_PER_100G
cfpBoundariesCode	**MANUFACTURING**
cfpValue	3,75
cfpValueUom	KG_CO2_EQ_PER_100G
cfpFunctionalUnit	
cfpMethodologyCode	CARBON_FOOTPRINT_STANDARD
cfpAccountingCode	ATTRIBUTIONAL
doesCarbonFootprintIncludePackaging	TRUE
packagingCarbonFootprintValue	0,5
packagingCarbonFootprintValueUom	KG_CO2_EQ_PER_100G
cfpBoundariesCode	**TRANSPORT_FINAL_PRODUCT**
cfpValue	2,45
cfpValueUom	KG_CO2_EQ_PER_100G
cfpFunctionalUnit	
cfpMethodologyCode	CARBON_FOOTPRINT_STANDARD
cfpAccountingCode	ATTRIBUTIONAL

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