

Detailed description of data types defined for the IEDC prototype. Last update: February 2025.

The industrial ecology data commons (IEDC) data model currently contains 36 data types, which are defined and described below. See the database homepage for further material: <https://www.database.industrialecology.uni-freiburg.de/>

Table: Data types of the IEDC that have been defined so far.

Data category and description	Data type and first ID letters	Description	Layer(s)	Mandatory aspects	Optional aspects (selected)
Flow (1) Objects flowing between processes	Flow (1_F_)	Objects (good/ substance) flowing between processes	Mass, energy, monetary value, pieces,	[material/commodity] from [origin_process] in [origin_region] to [destination_process] in [destination_region] in [time]	[layer], if not globally defined, [age-cohort] of material/commodity flowing, [scenario]
	Process inventory (1_PI_)	flows entering and leaving process, for LCI datasets	Mass, energy, monetary value, pieces,	[layer] of [material/commodity] of [material_category] and [material_group] from [origin_process] in [origin_region] to [destination_process] in [destination_region] in [time period]	[age-cohort] of process technology, [scenario]
	Births deaths (1_BD_)	flows of people being born and dying	People	[people] born/died in [region] in [time] period	[sex], [year(s)] of birth or death, [scenario]
	Lorenz curve (1_LCF_)	Non-normalized Lorenz curve of the cumulative distribution of a flow across the population	Misc. units	[indicator] at [unity] in [region] in [time] unity aspect indicates cumulative share of population	
Stock (2) Object residing in a process	Stock (2_S_)	Objects (good/ substance) residing in process	Mass, energy, monetary value, pieces	[material/commodity] in [process] in [region] in [time] period	[age-cohort] of products, [scenario], [component]
	In-use stock (2_IUS_)	Objects (good/ substance) residing in use phase	Mass, energy, monetary value, pieces	[material/commodity] in [process = use phase] in [region] in [time] period	[age-cohort] of products, [scenario]
	Population (2_P_)	Population in region	People	Residence [region], [time] point	[age-cohort] of people, [scenario]

	Stock change (2_DS_)	Change in stock (net addition, withdrawal, disposal)	Mass, energy, monetary value, pieces	[material/commodity] in [process] in [region] in [time] period	[age-cohort] of products, [scenario], [component]
	Lorenz curve (2_LCS_)	Non-normalized Lorenz curve of the cumulative distribution of a stock across the population	Misc. units	[indicator] at [unity] in [region] in [time] unity aspect indicates cumulative share of population	
Material/Product property (3) Intensive (per unit) property of materials or products	Lifetime (3_LT_)	typically in use phase, or residence time in landfill etc.	Time	[material/commodity] in [process] in [region]	[age-cohort] of products, [scenario]
	Material composition (3_MC_)	Material composition of products, alloys, waste/scrap, etc.	Mass ratio	[material] in [material/commodity]	[age-cohort], [region] of production, [scenario]
	Share (3_SHA_)	share (in %) of something	Mass ratio, mass per area, mass per volume, mass per unit	[material/chemical element] in [material/commodity]	[process], [time], [region], [scenario]
	Price (3_PR_)	price data	Value per mass, value per unit	[material/commodity], [time], [region]	[process], [scenario]
	Intensity of use of products (3_IUP_)	service (physical or immaterial) extracted from products	Service per unit	[service] category per [commodity] in [process] in [region] in [time] period	[age-cohort], [technology] of product, [scenario]
	Specific energy consumption of products (3_EI_)	energy per unit of use of products, e.g., MJ/km of vehicle driven	Energy per unit of service, energy per hour of operation	[energy carrier] of [commodity] in [process] in [region] in [time] period per [service] category (unit of use)	[age-cohort], [technology] of product, [scenario]

	Characterisation factor (3_CF_)	Environmental or social midpoint or endpoint indicator per unit of substance listed in life cycle inventory	Per unit impacts	[impact_indicator] per [material] in [process] Here, the process aspects describes the compartment for which impacts are assessed.	
	Lorenz curve (3_LC_)	normalized (0-1) Lorenz curve of the cumulative distribution of an indicator across the population	Misc. units	[indicator] at [unity] in [region] in [time] unity aspect indicates cumulative share of population	
Process parameter (4) Intensive (per unit) property of processes	Process yield (4_PY_)	material yield of processes	Mass ratio	[material] in [input_commodity] into [output_commodity] in [process] in [region]	[technology] of process, [age-cohort], [scenario]
	Process extensions (4_PE_)	Extension per output	per unit emissions, per unit resource uptake	[material/commodity] per [output_commodity] in [process] in [region] in [time] [time] can be time point (exact measurement) or period (representative average value).	[technology] of process, [age-cohort], [scenario]
	Process costs (4_PC_)	Costs per capacity	per unit costs	[layer] per [output_commodity] in [process] in [region]	[technology] of process, [age-cohort], [scenario]
	Unit process inventory (4_UPI_)	flows entering and leaving process, normalized, for LCI datasets	Mass, energy, monetary value, pieces,	[layer] of [material/commodity] of [material_category] and [material_group] from [origin_process] in [origin_region] to [destination_process] in [destination_region] valid for [time] period. (exactly one exchange is labelled as material_group = 'ReferenceProduct')	[age-cohort] of process technology, [scenario]
	Transfer coefficients (4_TC_)	transfer coefficients, e.g., those used in ecoinvent	mass, energy, ...	[layer] of [input_material] to [process] in [region] to [layer] of [output_material] for [time] period	[scenario]

	Activity parameters (4_PAR_)	parameters, e.g., those used in ecoinvent	Parameter name	[process] in [region] for [time] period and [layer]	Here, [layer] is the parameter name. [scenario]
	Ratio of flows linked to process (4_SHR)	general ratio of flows linked to a process - determined by the same process they are all connected to	Mass, energy, monetary units, ...	[layere] of [output_material] per unit of [input_material] for [process] in [region] in [time]	Flows can be materials, commodities, or chemical elements
Process properties (5) extensive properties of processes	Process capacity (5_CAP_)	Capacity of processes	Mass flow, energy flow, number of items per time,	[output_commodity] in [process] in [region] in [time]	[technology] of process, [age-cohort], [scenario]
	Process parameters (5_PP_)	General process parameters (CAPEX, OPEX, lifetime, capacity ...)	Monetary value, lifetime, mass flow, product flow, ...	[economic_indicator or layer] in [process] in [region] in [time]	[technology] of process, [age-cohort], [scenario]
General ratios (6) Ratios of quantities of types 1-5	Per capita stock (6_PCS_)	Stock per person, e.g., cars per capita	Mass, energy, monetary value, pieces,	[good/substance] in [process] in [region] at [time] point	[age-cohort of product], [scenario]
	Per capita flows (6_PCF_)	Flows per person, e.g., GDP per capita	Mass, energy, monetary value, pieces,	[good/substance] from [origin_process] in [origin_region] to [destination_process] in [destination_region] in [time] period	[scenario]
	Material substitution coefficient (6_MSC_)	Amount of material 1 substituted by amount of material 2.	Mass ratio	new [material/substance] per old [material/substance] in [commodity]	[region], [time], [scenario]
	Misc_intensive (6_MIP_)	miscellaneous intensive properties, e.g., those used in ecoinvent	carbon content, dry matter content, ...	[material] from [origin_process] in [origin_region] to [destination_process] in [destination_region] for [time] period and [layer]	[scenario]

	Transfer coefficients (6_TC_)	Process transfer coefficient: Share of mass in an inflow that is transferred to a certain outflow	Mass ratio	[input_material] into [output_commodity] for [process]	[element], [age-cohort], [time], [technology], [region]
	Criticality (6_CR_)	criticality indicators	different criticality metrics	[material] in [process] in [region] for [time] period and [Impact_indicator]	Here, [Impact_indicator] is a criticality indicator. [scenario]
	Impact indicators (6_IMI_)	impact indicators, e.g., from LC impact assessment	mass, energy, ...	[material] from [origin_process] in [region] to [destination_process] for [time] period and [layer] and [Impact_indicator]	[scenario]
	Urban metabolism indicators (6_URB_)	Miscellaneous urban metabolism indicators, stocks, flows, capacities, ...	Mass, energy, monetary value, pieces, area	[layer] in [city/region] in [time]	
	Flow prices (6_FPR_)	price information for flows (not products: 3_PR)	price (value per mass/energy)	[material] from [origin_process] in [origin_region] to [destination_process] in [destination_region] for [time] period and [layer]	Here, [Layer] is a price layer. [scenario]
Correspondence tables (7) between different classifications	Correspondence table (7_CT_)	Contains the links (correspondence) to a different classification	Correspondence	[aspect1 classification item] corresponds to [aspect2 classification item]	
Non-numeric data (8) , such as Boolean values or flags	Boolean data type, flag (8_FLG_)	Flag, indicating whether a certain property is true for a given set of aspects or not	Various layers possible	Various aspects possible	Specific meaning of aspects must be explained in data layer or semantic string. Coded as 0 (False) and 1 (True) in the IEDC