

Detailed description of data types defined for the IEDC prototype.

The industrial ecology data commons (iedc) data model currently [December 2024] contains 31 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]
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]

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_)	m.c. 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.	

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]
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 inecoinvent	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	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]	