

PIPELIFE NORWAY'S EXPERIENCE WITH THE DIGITAL TRANSFORMATION OF ENVIRONMENTAL PRODUCT INFORMATION

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WHO WE ARE

PIPELIFE NORWAY:

NORWEGIAN MANUFACTURER AND SUPPLIER OF PLASTIC PIPE SYSTEMS FOR INFRASTRUCTURE, BUILDINGS, AND INDUSTRIAL APPLICATIONS



KNUT JØSSANG:

MANAGER DIGITAL BUILT ENVIRONMENT AT PIPELIFE NORWAY

MASTER OF SCIENCE IN ENERGY & ENVIRONMENT

PRODUCT DOMAIN LEADER IN BUILDINGSMART NORWAY





Environmental Impact		Unit	A1-A2	A4	B1	C1	C2	C3	C4	D
	WAP total	kg CO ₂ -eq	1,071.00	1,845.42	6,443.42	0	0	0.00E+00	0	0
	GWP fossil	kg CO ₂ -eq	1,132.00	1,932.42	7,102.01	0	0	0.00E+00	0	0
	GWP biomass	kg CO ₂ -eq	6.55E-02	6.76E-06	6.11E-02	0	0	0.00E+00	0	0
	GWP total	kg CO ₂ -eq	9.49E-04	3.81E-06	2.69E-07	0	0	0.00E+00	0	0
	GWP	kg CO ₂ -eq	1.88E-07	3.70E-09	1.80E-10	0	0	0.00E+00	0	0
	AP	mol H ⁺ -eq	4.67E-02	4.66E-05	3.27E-06	0	0	0.00E+00	0	0
	D ⁺ FreshWater	kg P ₂ -eq	2.20E-04	1.71E-07	1.32E-09	0	0	0.00E+00	0	0
	EP-Mining	kg Fe ₂ -eq	1.78E-03	2.25E-06	7.84E-08	0	0	0.00E+00	0	0
	EP-Sewerage	mol N ₂ -eq	1.21E-02	1.94E-04	6.06E-01	0	0	0.00E+00	0	0
	POCP	kg AMVOC ₁₀ -eq	4.98E-03	3.90E-05	1.05E-05	0	0	0.00E+00	0	0
	ADP mineral resources ¹	kg Si ₂ -eq	1.37E-09	4.11E-07	1.01E-06	0	0	0.00E+00	0	0
	ADP fossil ¹	kg	3.64E+07	2.44E+01	1.33E-02	0	0	0.00E+00	0	0
	ADP ¹	m ³	6.71E+00	2.29E-07	2.08E-02	0	0	0.00E+00	0	0

Site-specific data for production of PVC feedstock at Inuvik Herbya are used

3

WHAT IS THE PURPOSE OF EPD?

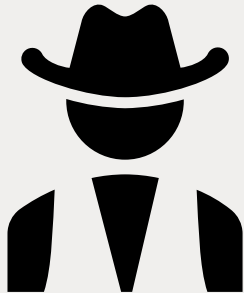
TO ENABLE

COMPARISONS

BETWEEN PRODUCTS FULFILLING THE SAME FUNCTION

ISO 14025

Look at me! I have collected
EPDs for all products used at
my construction site. Cool!



2024



I want to take data
driven decisions and
lower my projects
environmental footprint.
Which products shall I
use?



2025?



EPD IN PDF: TRUSTED BUT LIMITED

☑ ADVANTAGES OF EPDS IN PDF FORMAT

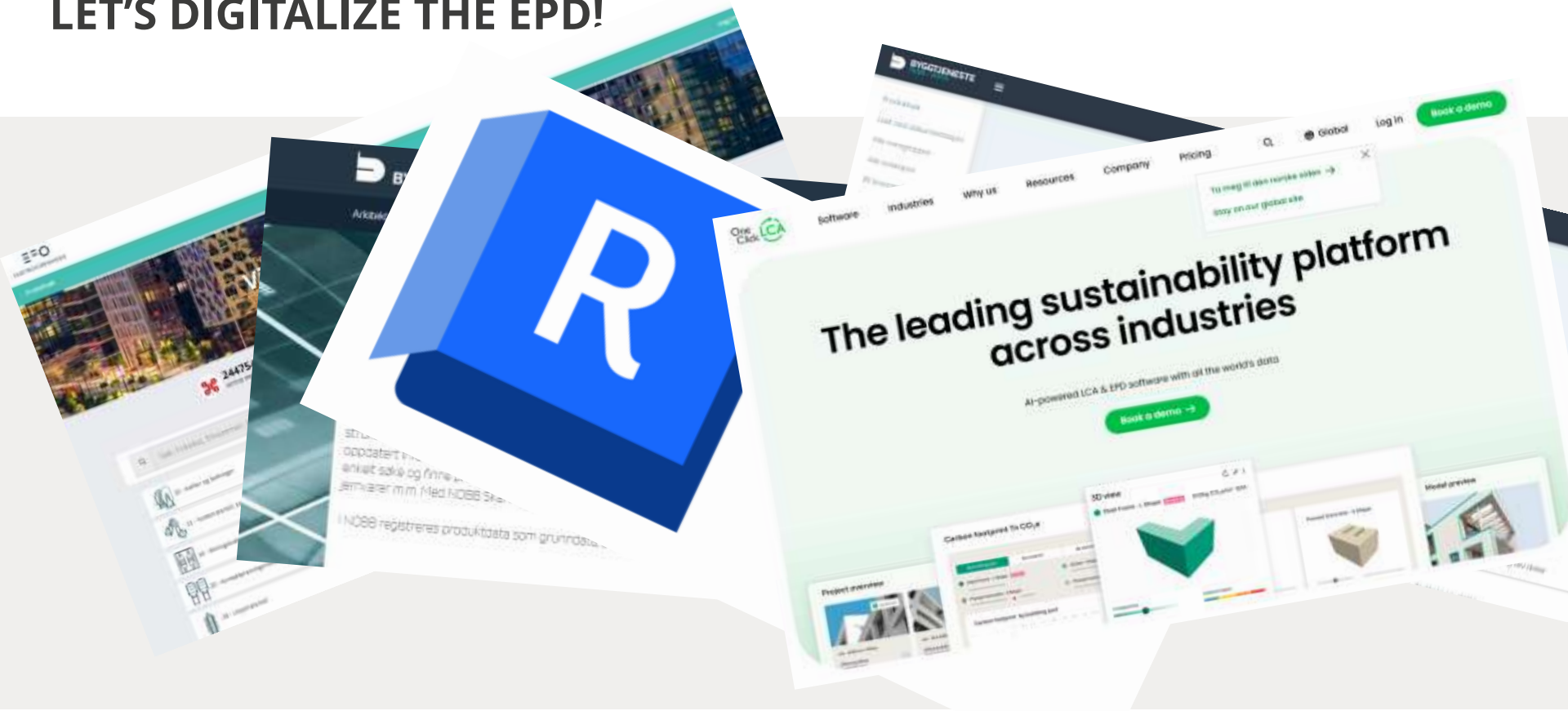
- STANDARDIZED AND VERIFIED
- WIDELY ACCEPTED
- HUMAN-READABLE
- STATIC REFERENCE

✗ DISADVANTAGES OF EPDS IN PDF FORMAT

- NOT MACHINE-READABLE
- MANUAL USE
- LACKS TRACEABILITY IN DIGITAL WORKFLOWS
- POOR UPDATE VISIBILITY
- LIMITED PRECISION
- NOT SCALABLE FOR DIGITAL CONSTRUCTION:
HINDERS AUTOMATION, CLIMATE CALCULATIONS,
AND LIFECYCLE ASSESSMENTS

DOES EPD AS PDF SERVE THE PURPOSE OF ENABLE COMPARISONS?

LET'S DIGITALIZE THE EPD!



A BEST GUESS

5 databases/factory
 x 60 factories =
300 databases



LE... THE P...

Kort beskrivelse

CO2eq - Vegvedlikehold midt

Beregning klimagassutslipp for utvalgte innsatsfaktorer

Firma
Prosjekt
Dato
Veg. budsjett/vegskap

Innsatsfaktor	Utslipp totalt	Utslippfaktor	Menge	Enhet	SUM A3-A5			Kort kommentar
					Materialproduksjon n	Transport	A5: Konstruksjons- fase	
	1000 t/100	kg CO2e/m³	m³	m³	kg CO2e/m³	kg CO2e/m³	kg CO2e/m³	
1. Konstruksjonsbetong	887		1.400 m³					
- kontrollert betong S30	134	240,04	404 m³		240,00	15,04		
- trykkolet betong S30	33	280,04	125 m³		240,00	15,04		
- trykkolet betong S30	68	280,04	194 m³		240,00	15,04		
- Ø-konkret betong S30	14	240,04	42 m³		240,00	15,04		
- Markstunderbetong S30	12	210,04	35 m³		200,00	15,04		
- Markstunderbetong S30	148	288,04	811 m³		210,00	15,04		
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
2. Betongplaster - prefabrikkert	286		1.728 t/m²					
- Substrat Type 1	28	397,24	140 t/m²		141,40	15,84		
- Substrat Type 2	260	347,24	1.404 t/m²		141,40	15,84		
- Overflatebehandling (ulike typer)	13	121,43	92 t/m²		105,00	15,84		
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
- (fyll inn beskrivelse)	0							
3. Stål, armering (betong)	284		178 t/m²					
- Konstruksjon	40	372,58	51 t/m²		364,30	206,89		

Vegvedlikehold midt

A001 Forberedende og generelle arbeider

Priser for følgende dimensjoner

Stikkrenne		Leveringsadresse	kg/m
Innvendig diameter	Menge (meter)		
500 mm	52	erkehusveggen 2	15.433.333
600 mm	52	erkehusveggen 2	19.910.000
800 mm	52	erkehusveggen 2	32.633.333
1000 mm	52	erkehusveggen 2	51.260.333
1200 mm	52	erkehusveggen 2	72.853

Prosess	Prosessstadium	Enhet	Menge	Omrigningsfaktor kg/m, kg/m² (%)	Kg	Tonn	A1	A2	GWP-total A1-A3	GWP-total A4	A5	C1	C2	C3	SUM (kg CO2eq pr. kg betong)
1	45.23	Innvendig diameter 500 mm	m	52											
2	45.24	Innvendig diameter 600 mm	m	52	15.433.333	803	1		2,03	0,153					
3	45.25	Innvendig diameter 800 mm	m	52	19.910.000	1.030	1		2,03	0,153					
4	45.26	Innvendig diameter 1000 mm	m	52	32.633.333	1.697	2		2,03	0,153					
5	45.27	Innvendig diameter 1200 mm	m	52	51.260.333	2.660	3		1,99	0,019					
6	Totalt			52	72.853	3.780	4								

(*) Omrigningsfaktor for stikkrenner skal dokumenteres fra materialeleverandør.

A BEST GUESS

10 spreadsheets/factory
 x 60 factories =
600 spreadsheets



LINKING THE DOTS

VISION



European Green Deal

- Climate-neutral Europe by 2050

REGULATION



Ecodesign for Sustainable Products Regulation (ESPR) from July 2024

- Sustainable design requirements

TOOL



Digital Product Passports (DPPs)

- Tracking the product lifecycle. Enables data integration in BIM

REGULATION



Construction Products Regulation (CPR) from December 2024

- Ensuring compliance, safety, and performance of products in the construction sector

STANDARDS



Product standards

- Ensuring safe, functional, and compatible products, while also providing a foundation for efficient trade, documentation, and sustainable use

HORIZONTALS AND VERTICALS



Green Deal



ESPR



DPP

Construction



Clothes



Battery



???

?

...

(NEW) CONSTRUCTION PRODUCTS REGULATION

Implementing digitalization through the use of **data dictionary** and **machine- readable format**

*It is necessary to establish well-functioning information flows, including via electronic means and in a **machine-readable format***
Whereas: (4)

*To improve machine readability, it is necessary to establish **a common data dictionary based on European standards**, a tool to govern and publish the data structure and their meaningful definitions and descriptions for all relevant construction products. **For each product family or category, the data dictionary should include all the essential characteristics and other properties as set out in the harmonised technical specifications as well as other information required according to this regulation.** A data dictionary harmonised at the EU level allows for the classification and use of structured definitions by both competent national authorities and in the further digitalisation of the construction sector, in particular in Building Information Modelling, building logbooks, digital passports and registries.*
Whereas: (84a)



European
Commission

(NEW) CONSTRUCTION PRODUCTS REGULATION

Digital Product Passport

Article 75

Construction digital product passport system

The construction digital product passport system shall:

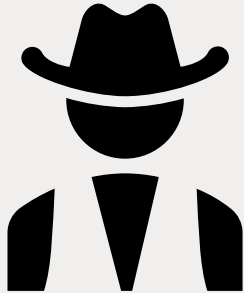
- *be compatible, interoperable and built on the digital product passport established by the regulation (EU) .../... [Regulation on eco design for sustainable products], without compromising interoperability with Building Information Modelling (BIM) while taking into account the specific characteristics and requirements related to construction products;*

Article 77

General requirements for the product passport

all information included in the product passport shall be based on open standards, developed with an interoperable format and shall be, as appropriate, machine-readable, structured, searchable and transferable

Couldn't care less...



So, I can get machine
readable product
information straight into
my software?



WHAT IS A DATA DICTIONARY?

A *data dictionary* according to ISO 12006-3 is a structured database of metadata that standardizes concepts and properties, ensuring that information in construction projects can be exchanged and understood unambiguously across systems and stakeholders.



Standards supporting data dictionaries



TC 442



TC 59

Describe,
author and
maintain
properties

EN ISO
23386

Data model
for data
dictionaries

EN ISO
12006-3

Data
templates

EN ISO
23387





TC 442

EN ISO
23386

EN ISO
23387



Environmental indicators for BIM



TC 59

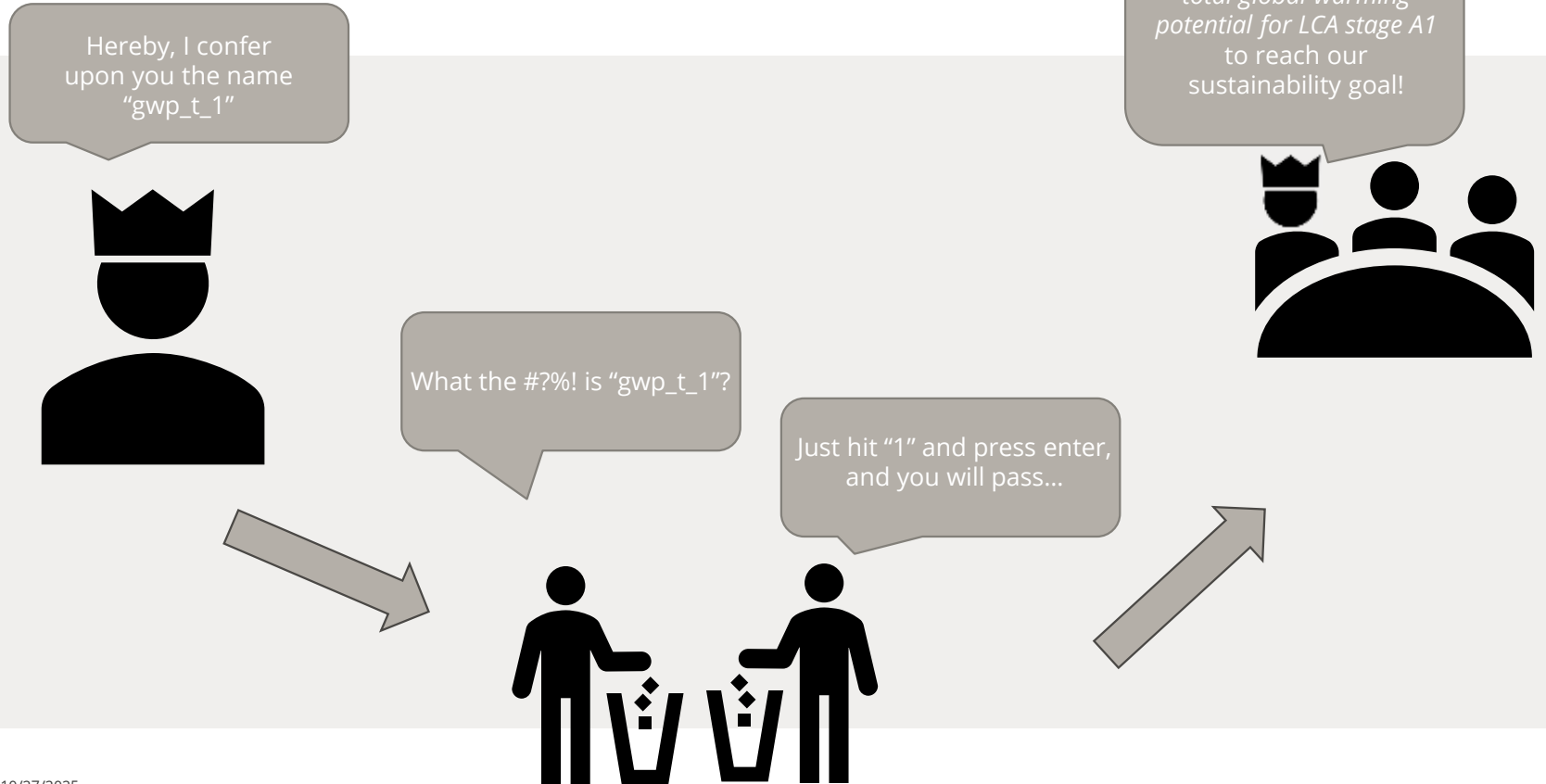
EN ISO
22057



Made by sustainability
experts in CEN and ISO



DATA QUALITY vs INFORMATION QUALITY



DEMO – DEFINITION IN A DATA DICTIONARY

Home > Properties > Details

global warming potential - total V.1.2

Property Approved Approved

DESCRIPTIONS

ATTRIBUTES

REFERENCE

CONTEXT ATTRIBUTES

Descriptions

Full names

global warming potential - total
 English (International)

globalt oppvarmingspotensial - totalt

 Norwegian (Bokmal)

Technical definitions

It accounts for the total global warming potential arising from fossil, biogenic and land use and land use change emissions.

 English (International)

potensialet står for det totale globale oppvarmingspotensialet som oppstår fra fossile, biogene og utslipp av arealbruk og endringer i arealbruk

 Norwegian (Bokmal)

DEMO – DEFINITION IN A DATA DICTIONARY

Home > Properties > Details

global warming potential - total V.1.2

Priority Approved Addressed

DESCRIPTIONS

ATTRIBUTES

REFERENCES

Attributes

Domain

EPD indicators, general information

Data type

Float Number

Measure

← mass V.1.1b

Generalised by

← climate change V.1.1

Units

← kg CO₂ eq (100 years) V.1.2

Required approvals

1

Creator

rumela.stanasova@gmail.com (17.06.2020)

Creator context

EN ISO 22057

Owner context

EN ISO 22057

GUIDs

System GUID 

2DsqzdgQ1EAPLopuFKK5MD

COPY

Major GUID 

0q80ITYA9AMQ26ZTdHwLUy

COPY

Minor GUID 

1vzmVck9BxvhFkq9qzV

COPY

EN 15804:2012+A2:2019
Mandatory LCIA
Indicators

compartment	a measure of the eutrophication caused by emissions reaching marine water	0jKuk8tDF38VedTVvK1z	kg N eq
global warming potential - biogenic	covers carbon emissions to air (CO ₂ , CO and CH ₄) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfiling) and CO ₂ uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood	11ITyaTP5AAjWwYxKj8	kg CO ₂ eq(100 years)
global warming potential - fossil fuels	it covers greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfiling, etc.)	2madygVA3088kpTzfluxd8	kg CO ₂ eq(100 years)
global warming potential - land use and land use change	emissions (CO ₂ , CO and CH ₄) originating from carbon stock changes caused by land use change and land use over a given period of time	0LUVsLL 117w6 kQbr3wYH	kg CO ₂ eq(100 years)
global warming potential - total	it accounts for the total global warming potential arising from fossil, biogenic and land use and land use change emissions	0q80ITYA9AMQ26ZTdHwLUy	kg CO ₂ eq(100 years)
tropospheric ozone concentration increase	a measure of the amount of ozone in the troposphere (at the earth's surface) where it causes summer smog	2K0nimp58Txv6Pppock8a8	kg NMVOC eq



DEMO – DEFINITION IN A DATA DICTIONARY

Home > Properties > Details

global warming potential - total V.1.2

Property ● Approved ↩ Approved

DESCRIPTIONS	ATTRIBUTES	REFERENCE	CONTEXT ATTRIBUTES
Reference			
Name			Reference type
↩ Product Environmental Footprint, v.3.0, EN 15804 V.1.2			Standard

DEMO – DEFINITION IN A DATA DICTIONARY

Home > Groups of properties > Details

EN ISO 22057:2022 – EN 15804:2012+A2:2019 Properties V.3.0

Group of properties: Approved Approved

DESCRIPTIONS	ATTRIBUTES	PROPERTIES	REFERENCES
Properties			
Name		Dependencies	Values
global warming potential - sand use and land use change V.1.2		information module V.1.3	0 
global warming potential - total V.1.2		information module V.1.2	0 
hazardous waste disposed V.1.3		information module V.1.2	0 
in-use condition grade according to ISO 15698-8 V.1.0			7 
mass conversion factor V.1.1			0 
materials for energy recovery V.1.3		information module V.1.2	0 
materials for recycling V.1.3			0 

Show 10 of 11

1 2 3 4 5 6 7 8 9 10 11

POSSIBILITIES WITH DIGITAL PRODUCT PASSPORT

HELLOOOO!
Can I get machine
readable product
information straight into
my software?



IS SAP “DPP-READY”?

WHAT IS DPP-READY?

WHAT ARE THE POSSIBILITIES?

DOCUMENTATION OR COLLABORATION?

TOGETHER OR ALONE?

POSSIBILITIES WITH DIGITAL PRODUCT PASSPORT

**LET THE HUB OF
YOUR
ORGANIZATION
BE A DATA
DICTIONARY.**

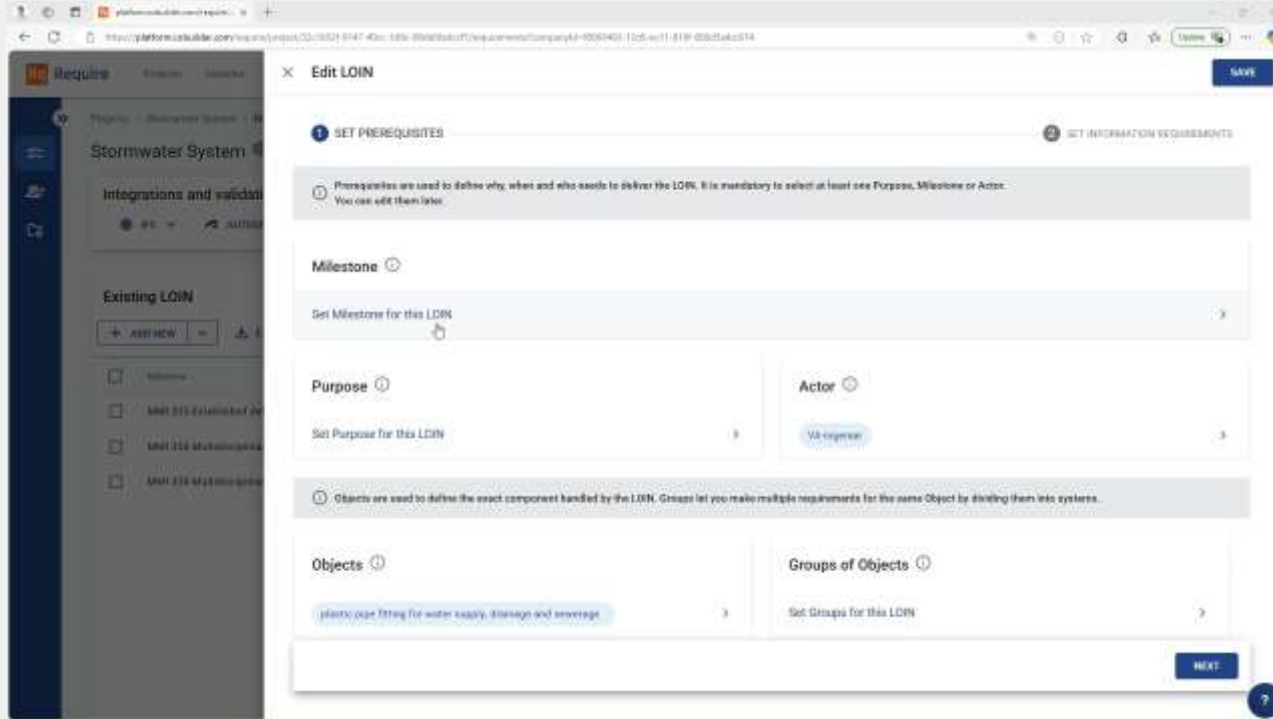


DATA FLOW

SOFTWARE

**USE OF
CONTENT IN A
DATA
DICTIONARY**

DEMO – APPLICATION IN EARLY PROJECT PHASES



Edit LOIN [SAVE]

1 SET PREREQUISITES **2 SET INFORMATION REQUIREMENTS**

Prerequisites are used to define why, when and who needs to deliver the LOIN. It is mandatory to select at least one Purpose, Milestone or Actor. You can edit them later.

Milestone ⓘ
 Set Milestone for this LOIN

Purpose ⓘ **Actor** ⓘ
 Set Purpose for this LOIN VA-engineer

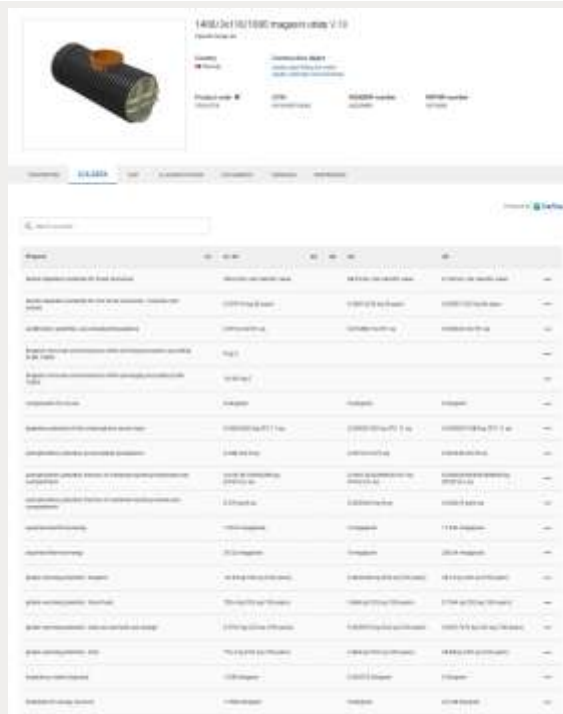
Objects are used to define the exact component handled by the LOIN. Groups let you make multiple requirements for the same Object by dividing them into systems.

Objects ⓘ **Groups of Objects** ⓘ
 plastic pipe fitting for water supply, drainage and sewerage Set Groups for this LOIN

[NEXT] ⓘ

**WHY?
WHO?
WHEN?**





POSSIBILITIES WITH DIGITAL PRODUCT PASSPORT

HELLOOOO!
Can I get machine
readable product
information straight into
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IS SAP “DPP-READY”?

DPP will hopefully become the mechanism that finally aligns the industry around a common framework for structured, standardized, and interoperable product data.

NO NEW DATA ADDED...



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