

# Digital Product Passports: Safety and Sustainability Aspects Integration

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# Overview of DigiPass CSA project



# DigiPass CSA accelerates Innovative Advanced Materials Development

- **Environmental Impact**
- **Circularity**
- **Materials & Product Design Optimization**
- **Data re-usability & interoperability**
- **Involving whole Value Chain**
- **Sustainability of Materials and Products**
- **Innovation by Design**



## DigiPass CSA contributes to:

- **Digital tools** for creating and utilizing **DMPPs**
- **Interoperable** data management system
- **Standardized** data formats and protocols
- **Harmonized** materials modelling and characterization methods
- **A common language** and method for data documentation
- **Collaboration environment** open innovation framework – digital platform
- **Training** for stakeholders

## DigiPass CSA partners

### 12 PARTNERS:

3 SMES

3 UNIVERSITIES

4 RESEARCH INSTITUTIONS

2 INDUSTRIAL ASSOCIATIONS

### 7 COUNTRIES:

AT, BE, DE, GR, LU, NO, UK



## Demonstrators

### CASE 1



ADVANCED  
COMPOSITE  
MATERIALS

Industrial Association



### CASE 2



ADVANCED MATERIALS  
FOR RENEWABLE  
ENERGY SOURCES

Industrial Innovation Hub



### CASE 3



HEALTH & SAFETY OF  
ADVANCED  
NANOMATERIALS

Innovation in Research and  
Engineering Solutions



### CASE 4



INNOVATIONS IN  
PRE-PAINTED METALS  
SUPPLY CHAIN

Industrial Association



# Data categories of DMPPs – DigiPass CSA

# Main data categories for DMPP

## Material information

detailed information on the materials used, mass fractions

## Manufacturing and process data

production methods, material processing, performance-related manufacturing factors

## Performance information

key performance indicators related to the demo-case, useful for maintenance planning

## Safety information

potential hazards during manufacturing, handling, and end-of-life phases

## Circularity information

data and recommendations on reuse, disassembly, recycling, and recovery methods

## Sustainability information

life cycle environmental impacts, sustainability metrics





# Nanosafety data

# Data Requirements – General Information (REACH)

Since 2020, explicit nanoform registration has been included in REACH

## Intrinsic properties

- Substance identity
- Physico-chemical properties
- Applications
- Chemical categories

## Physico-chemical endpoints

- Flammability
- Explosivity
- Oxidising
- Boiling point
- Vapour pressure
- Water solubility
- Partition coefficient

## Human health endpoints

- Toxicokinetics
- Irritation and corrosion
- Skin and respiratory sensitisation
- Acute toxicity
- Repeated dose toxicity
- CMR

## Hazard data sources

- Test data (e.g., in-vitro)
- Non-test data (e.g., QSAR)
- Human data (e.g., epidemiological)

## Exposure assessment

- Target group (e.g., worker, consumer)
- Route of exposure (e.g., inhalation, dermal)
- Type of effect (acute or chronic, local or systemic)
- Duration

# Data Requirements – Established Methodologies

- ISO/TS 12901-2: *Nanotechnologies – Occupational risk management applied to engineered nanomaterials*

## Hazard band

- Occupational exposure limit
- Acute toxicity (LD50)
- Hazard statements
- Chronic study dose for adverse effects
- Water solubility (high or not)
- Fibre shape (yes or no)
- Analogous or bulk substance

## Exposure band

- Manufacturing process
- Process energy
- Handling form
- Amount of NOAA and matrix
- Aerosolisation or dust generation

## Controls

- Impact at the source (e.g., modification of product form)
- Impact around the source (e.g., local exhaust ventilation)
- Affecting worker's surroundings (e.g., general ventilation)
- Adaptation of worker's situation (e.g., use of work cabins)
- PPE

- OECD ENV/JM/MONO(2015)19: *Harmonised tiered approach to measure and assess the potential exposure to airborne emissions of engineered nano-objects and their agglomerates and aggregates at workplaces*

## Information Gathering

- Workplace characteristics
- Nano-object characteristics
- Workplace activities

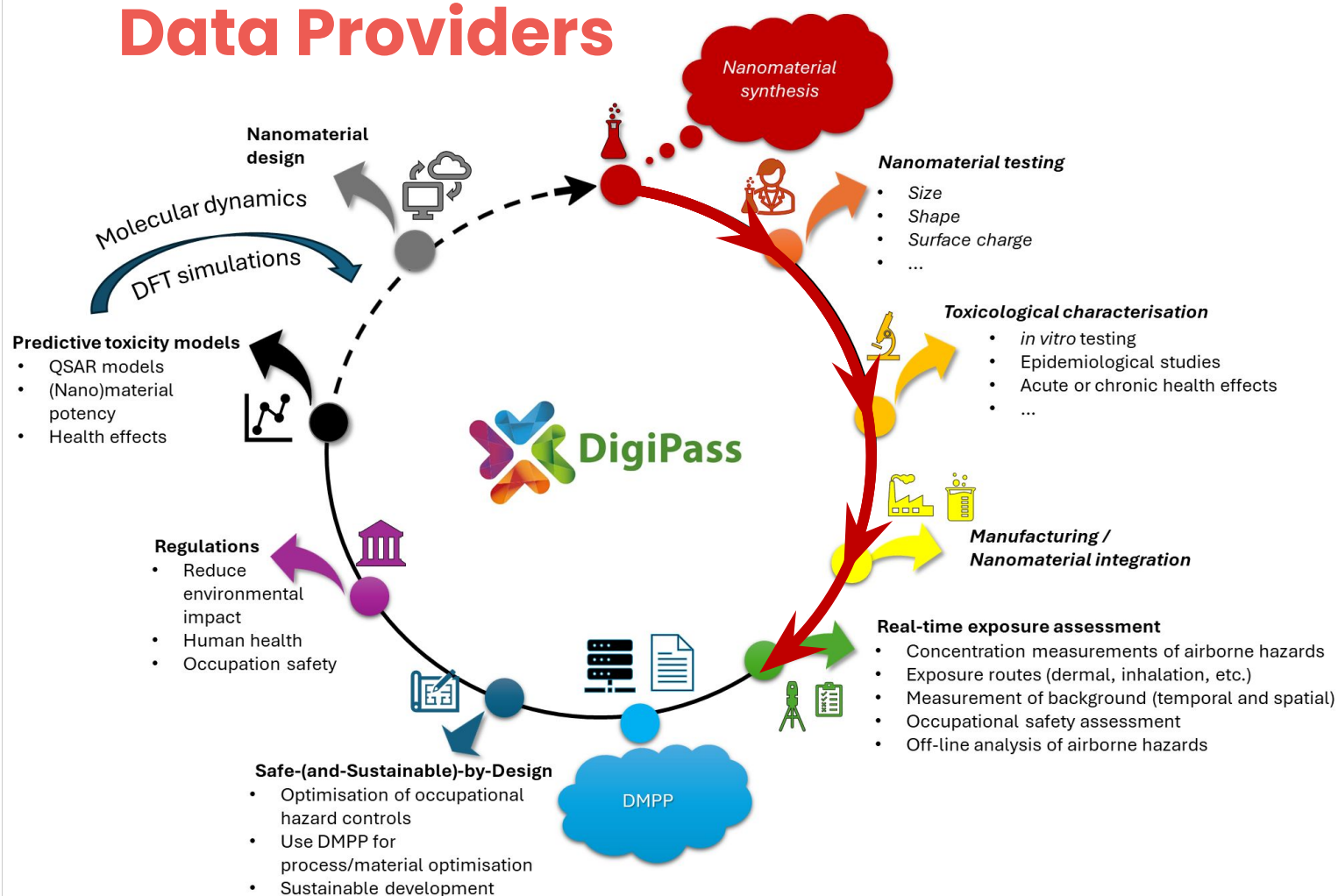
## Basic Exposure Assessment

- Assessment characteristics (metadata)
- Results

## Expert Exposure Assessment

- Measured metrics
- Results

# Data Providers



## Physico-chemical properties

- Generated by nanomaterial manufacturers during initial testing

## Hazard information

- Generated by toxicologists during material characterisation

## Preliminary exposure information

- Generated by process designers during material integration

## Exposure measurements

- Generated by exposure experts during on-site process assessment

# Sustainability data – LCI stage

# LCI stage – Challenges & data gaps in DigiPass use cases

## LCI Literature review highlights

### Recurring concerns:

- **Exclusion** of use phase
- Low TRL on **production** & **recycling** technologies
- **Need for transparency** in advances materials **performance** (representative FUs)
- Need **for transparency** of **assumptions**
- Lack of advanced materials inventories in **commercial databases** – higher uncertainties
- Low data quality

### Additional specific points:

- **Nanomaterials:** Need for toxicology studies of NMs for emission releases
- **Pre-painted metals:** High confidentiality concerns

### Limitations in data collection

- Lack of **primary data**
- **Confidentiality** issues
- **Insufficient** data reporting

### LCIs evaluation

- **Relevance** to objectives,
- **Accuracy**,
- **Quality**.

### LCI mapping in the four areas of DigiPass

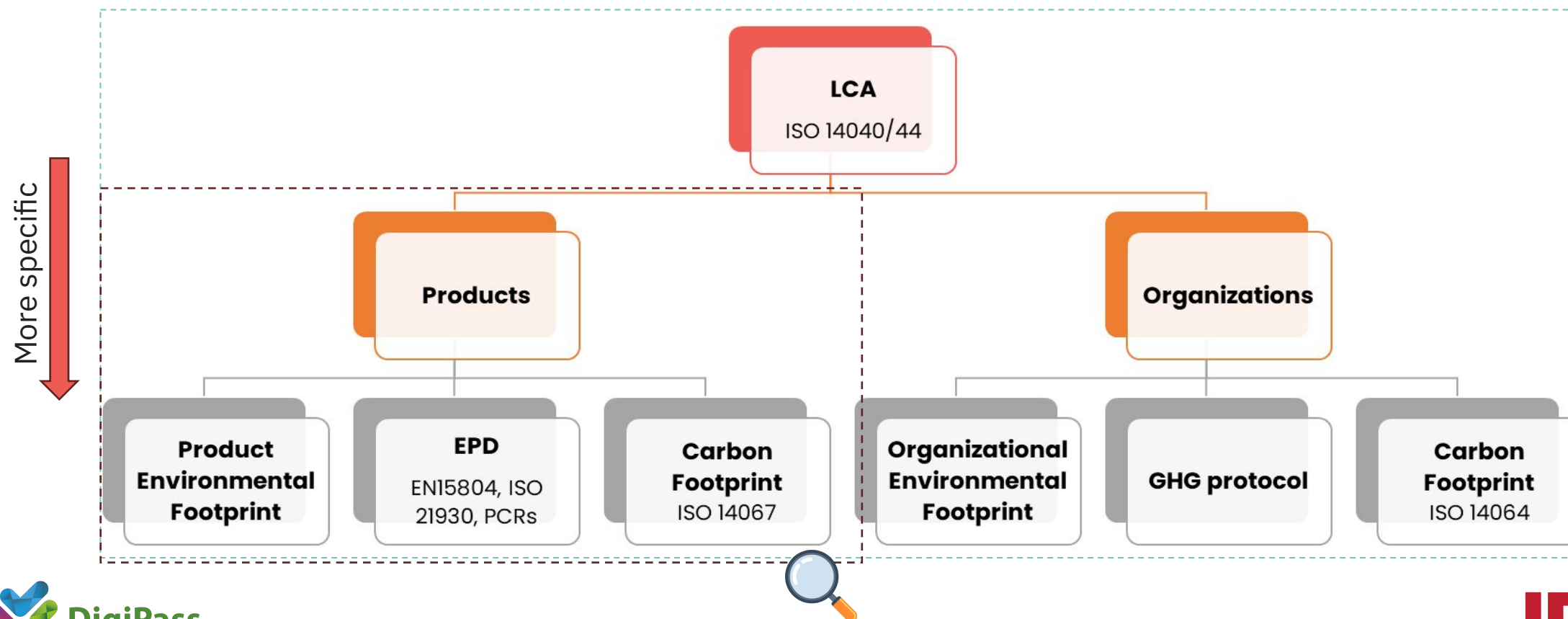
Scientific literature, EPDs, Survey

- Identification: **Challenges & data gaps**
- Categorization: **Accessibility, IPR considerations, data quality**

# Sustainability data – LCIA results documentation

# LCIA stage – calculation and documentation (1/2)

## Standards and regulations – Building upon ISO 14000 standards





# LCIA stage – calculation and documentation (2/2)

## Standards & frameworks: implications & LCIA indicators

### LCA – ISO 14040/44

- Does not define mandatory LCIA indicators

### EPDs – ISO 21930

- 5 mandatory LCIA indicators
- Applied mostly outside Europe
- Reporting for biogenic carbon, carbonation, radioactive waste, VOCs and product emissions

### EPDs – EN15804

- 19 mandatory LCIA indicators
- Mandatory reporting of biogenic carbon & EoL scenarios
- Applied in Europe

### PEF

- 16 LCIA indicators □ Not all categories mandatory
- PEF Category Rules (PEFCRs) specify mandatory indicators per product group.

### Carbon footprint – ISO 14067

- Specifies requirements for quantifying & reporting product carbon footprint.
- Separate non-biogenic and biogenic emissions.

Should be aware of **delicate acts**:

- Which data must be included in the DPP?
- Which methods and standards must be used?
- Which environmental indicators must be calculated and disclosed?

# Digital Platform – DigiPass CSA

# DMPPs Digital Platform – DigiPass CSA



Under initial development stage; feel free to explore and share your feedback.



Scan here or <https://digital-passport.io/>



Collection of information

## Create a DPP step

GENERAL INFO

FORM INSTANTIATION

\* Product Name

Material Information

+ Fiberglass Content

+ Carbon Fibre Content

+ Resin Systems

+ Metallic Inserts

+ Adhesives

+ Coatings

+ Lightning Conductor

+ Component Material

+ Manufacturing Origin

+ Performance Information

+ Product Information

+ Sustainability Information

+ Circularity Information

+ Safety Information

Exported DPP identifier

### A list of your current DPPs


DPP identifier: 0dff04c9-8694-49ae-9dbc-a4e1c0f0f65f



<https://digital-passport.io/dpp/link/0dff04c9-8694-49ae-9dbc-a4e1c0f0f65f>


# Thank you!

## Innovation in Research & Engineering Solutions – IRES

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