



D6.3

Data management plan

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Coordinator:	Saint-Gobain Finland Oy

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Dissemination level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	

PU=Public, CO=Confidential, only for members of the consortium (including the Commission Services),
CI=Classified, as referred to in Commission Decision 2001/844/EC.



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Modification Control

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Data management plan (DMP)

ADMINISTRATIVE DETAILS

Plan Name: WOOL2LOOP Data management plan

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Plan Description: The project aim is to close the material loops of mineral wool at the end of its lifecycle by introducing novel technology and value chain to CDW sorting, analysis, pre-treatment, processing, novel products development, market introduction and commercialization. Data is collected and formed at every stage of the aforementioned project phases: for instance, physical, chemical, and microbial characterization data of mineral wool waste, best practices and methods for mineral wool sourcing, instructions for milling, mix designs for alkali-activated binders, methods to manufacture products, market surveys etc.

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DATE OF THE PLAN

31.10.2019

1. General Description of Data

1.1 What is the purpose of the data collection/generation and its relation to the objectives of the project?

Data is collected to understand chemical, physical, and mechanical behavior of mineral wool waste as a raw material for re-use in alkali activation. Data is also generated from interviews and discussions with stakeholders in, for instance, industry, public authorities, and end-users (building and construction sector) - this is required to understand, for example, barriers in legislation, standards, and attitudes to use such materials. Data is also collected / generated to evaluate the circular economic feasibility of the value chain and commercial mineral wool waste exploitation possibilities.

In WOOL2LOOP, the Coordinator Saint-Gobain Finland is responsible for leading the data management activities.

1.2 Will you re-use any existing data and how?

Some data about the composition and properties of mineral wools can be obtained from the manufacturers of mineral wools. It will be ensured with the companies before obtaining the data that it does not contain any trade secrets or other sensitive information. Otherwise, the data used in the project will be primary data, that is, it is collected during the project.

1.3 What is the origin of the data?

Origin of the primary data in the project are measurements and observations done by partners involved in the project. Origin of the possible existing data are also partners in the project.

1.4 What kinds of data are collected or reused?

In the following, types of data are being listed per work packages and tasks:

WP1 Concept validation

Task 1.1 Analysis and pre-treatment of mineral wool

- **Sampling records:** the following information is filled on a template: when, where, and by whom the mineral wool waste samples have been collected. Type of mineral wool, manufacturer, and age. From what kind of building the mineral wool sample has been collected from. How the sample was collected. Photographs of sampling site and mineral wool waste sample on-site.
- **Characterization data of mineral wool samples:** laboratory notebooks, raw data files from physical and chemical characterization (such as XRF, XRD, TGA, fibre length and width, TG-Raman, etc.), experimental analysis data files, and microscopy images. Similar kind of data is obtained after milling and pretreatment experiments. Photographs.

Task 1.2 Mix design development

- **Description of required properties for alkali-activated binders:** memos, emails, and reports from industrial partners of the project (who are involved in product manufacturing demonstrations), which describe the required properties (such as mechanical strength, setting time, workability, allowed curing conditions etc.) of products (i.e., concrete slabs, pavement materials, acoustic panels, dry-mix concrete, façade elements, and 3D-printed materials). Photographs.
- **Mix designs and characterization of obtained binders:** laboratory notebooks describing how to mix mineral wool powders, possible co-binders, aggregates etc. Raw data files describing fresh and hardened state properties (such as setting time, workability, compressive and flexural strength, abrasion resistance etc.), microstructure (such as XRD, TGA, SEM-EDS, MAS-NMR, ultrasound pulse velocity etc.), and results after durability experiments (same methods as already mentioned and also shrinkage, chloride diffusion, carbonation, water resistance and permeability, porosity etc.). Subtask 1.2.4 (Validation of alkali-activated mineral wool recyclability) will result similar kind of raw data as described above but from crushed mineral wool concrete. Photographs.

Task 1.3 Evaluation of health and environmental aspects of mineral wool wastes and products

- **Evaluation of health and environmental aspects of mineral wool wastes and products:** Data will be collected from two phases: 1) during handling of mineral wool waste and manufacturing of products and 2) from final products. Data in the phase 1) will consist: raw data describing airborne particles (such as particle size distributions; EDXRF analysis; microscope images; analysis of silica content etc.), organics (total VOC and GC/MS analysis), microbial analysis, and noise and vibration measurements. Data from the phase 2) will consist: same as in the phase 1) and leaching test results (ICP-OES data) and radiological parameters (^{238}U , ^{226}Ra , ^{210}Pb , ^{232}Th , and ^{40}K to be measured by γ -ray spectrometry). Photographs.

WP2 Demonstration of advanced sorting, pre-treatment, and alkali-activation

Task 2.1 Demonstration of mineral wool waste sourcing and processing

Deliverable 6.3 Data management plan

- **Notes from pre-demolition audits** describing, for instance, amounts, types, best approaches for separating mineral wools, and other relevant observations. Photographs.
- **On-site characterization raw data of mineral wool** using a handheld XRF and tabletop TG-Raman units.
- **Specifications for the required properties of robotized demolition and separation units**, notes from operational experience, technical drawings and descriptions of the units.
- **Notes from mineral wool pre-treatment at industrial scale:** what kind of mills are suitable and what are optimal running parameters.

Task 2.2 Demonstration of product manufacturing from mineral wool waste

- **Notes from product manufacturing demonstrations:** how the industrial scale manufacturing was conducted, what were observed challenges, was it necessary to change the laboratory-scale mix designs etc.
- **Electronic data from online 3D printing platform:** 3D designed structures uploaded by users.

WP3 Business models and exploitation strategy**WP4 Benchmarking and standardization***All tasks within these WPs:*

- Notes of interviews and email exchanges with stakeholders throughout the value chains, summaries of legislation and standards, and result data from models describing economic viability, life cycle assessment etc. These WPs will utilize data generated in WP1 and WP2.

1.5 What file formats will the data be in?

The data collected in the project will be originally in various formats. All data is compiled in tables and saved in the CSV format (.csv, comma-separated values) when possible. The CSV format is viewable with all spreadsheet programs. Image files will be saved in the generally used formats (such as JPG or TIFF). The data, which is not possible to convert in the CSV format will be stored in its original format.

1.6 What is the expected size of the data?

Some of the analytical techniques utilized in the project can generate large data files. The total expected size of data is from few gigabytes to few terabytes.

1.7 To whom might it be useful ('data utility')?

Data generated in the project will be useful to the whole value chain within the project: parties operating with mineral wool wastes (such as demolition and waste management companies), mineral wool manufacturers, companies interested in developing products based on alkali-activated materials, building product and materials suppliers, architects, designers, building owners, contractors, and distributors.

2. Documentation and Quality

2.1 How will the data be documented?

To ensure easy accessibility, metadata information and actual data will be saved in repositories (such as Etsin and IDA, respectively, which are used in Finland). Metadata will be described using, for instance, tools Qvain or Qvain light (<https://etsin.fairdata.fi/qvain>), which allow a uniform format for metadata.

2.2 How will the consistency and quality of data be controlled and documented?

Data will be collected according to international or national standards always when possible to ensure quality. Also traceable calibration standard materials are used when applicable. Statistical methods will be applied for quality control. Lists of files, scanned documents, variables, abbreviations etc. will be prepared applying the above-described metadata format and saved in txt files accessible to the whole consortium.

3. Data security

3.1 How will the data be stored and backed up?

Stored research data is located in the Microsoft Teams folders, which are backed up on a daily basis to a separate password protected secure server maintained by the University of Oulu. On this server, data will be available for several years. During data analysis, the data will be accessible only by certified members of the consortium.

3.2 How will you control access to keep the data secure?

Data will be protected by password to be only accessible to the consortium.

4. Ethics and Legal Compliance

4.1 How will ethical issues be managed?

The following description is from the project plan (Annex 1 - Description of Action (part B):

WOOL2LOOP involves ethics issues as specified by the Horizon 2020 Programme concerning involvement of humans, protection of personal data and human & environmental protection and safety. Ethics issues will be addressed with full compliance with GDPR (general data protection regulation) and human and environmental health & safety regulation and deliverables during the project as follows. There are two Data Protection Officers (DPO) appointed for the project -one in the Coordinator organization (SG), Mrs. Sarianna Tervonen and the second person Mr. Niilo Vähäsarja in UOULU, a partner being also the leader of WP5 (Dissemination, communication and clustering). The Coordinator has also recently adopted the "OneTrust" Privacy

Deliverable 6.3 Data management plan

Management Software for dealing more effectively with GDPR requirements. GDPR compliant privacy policy will be developed and communicated to all project stakeholders DPO's being the main contact point for any occurring personal data protection issues.

Processing of personal data of project personnel, any personal data related to dissemination activities through third parties e.g. social media processors and any collaboration tool processors shall be done adhering GDPR and only with processors providing sufficient guarantees of GDPR compliance. All the procedures, technical and organizational measures, templates, Data Protection Agreements are kept in file, included in submitted as deliverables according to Ethics (D 7.1 and 7.2) and Data Management Plan (D 6.2). Environmental, health and safety (EHS) risk assessment of product manufacturing and final products are addressed in Task 1.3 and D7.3. There are further EHS risks identifiable with processing of waste, by-products and their final deposit as well personnel on industrial plants, demolition and demonstration sites and research staff.

Appropriate Safety Guidelines and Waste Management Plans will be included in deliverable Risk Management Plan (D6.1). Furthermore, all the operations and consortium partners are compliant with national and European EHS regulations and legislation. Given the nature of industrial partners' businesses also certified, voluntary EHS management systems (ISO 14001 and OHSAS 18001 / ISO 45000) are in use. All research and development work carried out in the WOOL2LOOP project will respect fundamental ethics principles, including those reflected in the Charter of Fundamental Rights of the European Union, principles of responsible research and innovation (RRI), European Code of Conduct for Research Integrity and other relevant ethics rules of H2020, and national and European laws and safety regulations and guidelines for work safety. The Consortium's research organisation members apply the general principles and requirements on researchers/employers/funders of researchers and ethical guidelines, as defined in the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers.

4.2 How will ownership, copyright and Intellectual Property Right (IPR) issues be managed?

Details of the IPR questions are detailed in the Grant Agreement of the project.

5. Data Sharing and Long-Term Preservation

5.1 How, when, where and to whom will the data be made available?

Relevant data will be supplemented in scientific publications (which are open access) or a link to the repositories will be provided. Data will be made available at the same with the publications. All published data will be open access.

Non-public data that includes e.g. business secrets and needs to be kept confidential / for the project consortium only, will be available to the consortium at the Microsoft Teams folders for three years after the project. After that, it will be maintained in secure servers of the University of Oulu.

Data in repositories will be findable through the metadata descriptions. However, most likely the most important way to find the data is first find the published scientific articles, which contain the links to the related data.

Data will be published as open access (suitable creative commons license will be applied).

5.2 How and where will the data with long-term value be made available?

The data repositories are used to ensure a long-term access to the data. The repository will generate DOI's (digital object identifiers) that can be used to access the data sets via persistent links.

5.3 Have you estimated costs in time and effort to prepare the data for preservation and sharing?

Each researcher will upload the raw data to the Microsoft Teams. Leaders of WPs will ensure that this will happen. All researchers have allocated one hour per week working time for preparing data and documentation for archiving. This is included in the salary in the budget of the project. Some WOOL2LOOP partners have also allocated funds for publication costs in their project budgets.