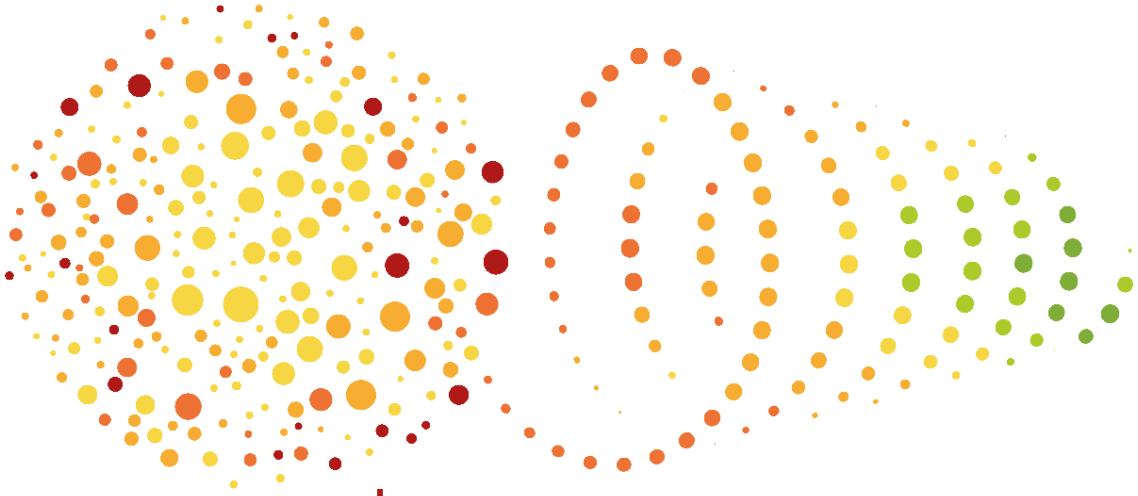

powder2power

MW-scale fluidized particle-driven CSP prototype demonstration

Grant Agreement n° 101122347

D2.1 Report on Particles Properties and Behavior

WP2 – Particle Behavior, Transport and Handling

Due date of delivery:	30/09/2024	**Leading institution:**	EPPT
Actual delivery date:	30/09/2024	**Contributor(s):**	KUL

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101122347.

Deliverable Information

Deliverable Identification	POWDER2POWER_WP2_D2.1	
Deliverable title	Report on Particles Properties and Behavior	
Related WP(s)	WP2 – Particle behavior, transport and handling	
Responsible Beneficiary	EPPT	
Author(s)	EPPT	Jan BAEYENS, Yimin DENG
	KUL	Raf DEWIL, Heidi LIEKENS, Lise APPELS
Reviewer(s)	CNRS	Gilles FLAMANT, Alex LE GAL, Sergio MARIN ZAPATA, Emmanuel GUILLOT
Due delivery date	30/09/2024	
Actual delivery date	30/09/2024	
Version - Date	V1.0 – 30/09/2024	
Deliverable type	R – Report	
Dissemination level	SEN – Sensitive	
Repository	Online repository	

Document History and Approval

Version	Date	Action	Name & Organization
V0.1	15/09/2024	Draft created	Jan BAEYENS (EPPT) Yimin DENG (EPPT)
V0.2	21/09/2024	Modifications	Yimin DENG (EPPT) Raf DEWIL (KUL)
V0.3	30/09/2024	Final scientific and technical version	Jan BAEYENS (EPPT)
V1.0	30/09/2024	COORD edition	Gilles FLAMANT, Alex LE GAL, Sergio MARIN ZAPATA, Emmanuel GUILLOT (CNRS)

Acknowledgment and legal disclaimer

This report is part of the project that has received funding from the European Union's Horizon Europe research and innovation programme under the grant agreement No 101122347. The content of this publication is the sole responsibility of the POWDER2POWER project.

POWDER2POWER Project Factsheet

Grant Agreement n°	101122347	Project Acronym	POWDER2POWER	
Project Full Title	MW-scale fluidized particle-driven CSP prototype demonstration			
Call identifier	HORIZON-CL5-2022-D3-03 "Innovative components and/or sub-systems for CSP plants and/or concentrating solar thermal installations"			
Funding instrument	Innovation Action			
Project start date	01/09/2023	**Duration**	48 months	
Website	www.powder2power-project.eu			
Partners Short Name	• PROMES-CNRS • EDF	• EPPT • JCR	• B2Z • POLIMI	• KTH • CSPB	• SEI • KUL

Public summary

As part of the POWDER2POWER (P2P) project, Deliverable D2.1 — developed under Work Package 2 (Particle Behavior, Transport, and Handling) — presents a comprehensive analysis of particle properties and behavior, with a focus on their temperature-dependent characteristics. This report is essential for the design and optimization of the P2P process, which relies on the use of olivine particles as a heat transfer medium.

Key Focus Areas:

- **Physical and Thermal Properties:** The deliverable examines critical particle properties such as density, size distribution, specific heat, and thermal conductivity, which influence the thermal and hydrodynamic behavior of the system.
- **Flow and Hydrodynamic Properties:** It provides insights into flowability, angle of repose, and minimum air velocities for pneumatic conveying, which are vital for the design of silos, receivers, and conveying systems.
- **Impact on P2P Design:** The findings directly inform the engineering and operational aspects of the POWDER2POWER prototype, ensuring efficient and reliable performance.

The research was conducted with the support of KU Leuven's laboratory staff.