



## SOLPART

High Temperature Solar-Heated Reactors for Industrial Production of  
Reactive Particulates

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### Deliverable *D4.1*

**WP4 - Design, construction and implementation of the pilot scale solar unit**

**Deliverable D4.1** Report on the pre-design of solar reactor, storage and particle handling system for pilot unit

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## Introduction

In this work package, the results of the lab-scale analysis are used to design and build a pilot system suitable for the solar calcination of calcium carbonate and to simulate at prototype scale a 24h/day industrial process. The pilot unit will be installed and tested at the solar facility at CNRS-PROMES (Figure 1). The 1 MWth solar furnace is able to operate at variable power (from 20 kWth to 1000 kWth) and temperature (from some hundreds °C to about 3000°C).

The pre-design of the pilot unit started in parallel with the lab-scale experiment. Results obtained from the two specific work packages (WP2 and WP3) are resumed in some guidelines to design the pilot unit. The solar reactor selection derives from a previous discussion, which is described in details in the specific deliverable (D2.4).

In this task the pre-design of the main components will be achieved. In particular, the size of the units will be defined, together with the intended mass flows and temperatures. All sub-units are connected through interfaces that are described through their basic design parameters. A pre-design of the measuring and control system concludes this study.

After an overview of the whole system and the operating conditions, a detailed description of each component is shown. These considerations will be match with the last achievements of the previously mentioned work packages and with the available space at the focus of the solar furnace of Odeillo to define with more details the pilot design.



**Figure 1:** Heliostats field and focal point of the 1MW solar furnace at PROMES-CNRS in Odeillo, France

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