



SOLPART

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

European funded project - Grant Agreement number 654663

Deliverable D4.2

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

Deliverable D4.2 Detailed design of the 30 kW solar reactor

Date of Delivery: July 31st, 2018

Deliverable Author(s): F Pron, F Devin



Introduction and Objectives

The objective of deliverable D4.2 is to define the detailed design of the solar reactor for the SOLPART pilot scale power plant. This include solar reactor and its the solar cavity, hot storage, referral system and product cooler.

The major challenge to be addressed by the reactor design, the hot storage and referral system is the extreme operating conditions, notably the high temperature in a range of 800 – 1100 °C. In view of these extreme operating conditions, attention was paid to the choice of material.

Given that the choice of solar reactor has been done on a fluid bed technology, operating conditions was determined by experimental cold tests in COMESSA's laboratory on different particles. These tests provide relevant information on fluidization parameters but also on the selected particles behaviour, that led to modify several times the design of solar reactor and discard some powder. Moreover, due to the high temperature, a referral system without any mechanical pieces in movement was selected: air-valves.

The entire loop and more precisely the reactor and the cavity have to be implemented into an existing solar tower with its specific constraints such as the height of the focal point or the available space into the aperture.

For more information, please contact SOLPART Coordinator (CNRS-PROMES):
gilles.flamant@promes.cnrs.fr