



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

European Funded Project – Grant Agreement Number 654663

Deliverable 3.2 Summary

This deliverable report (D 3.2) was elaborated with the objective of determining the appropriate and most viable high temperature particle handling system and possible mass flow control designs for the European funded project SOLPART. This assignment involved the active collaboration from three consortium members, these are: CEMEX Research Group AG, as lead beneficiary, along with DLR and ABENGOA as supporters.

Since the main goal was to evaluate the possible conveying solutions for a high temperature solar industrial process there were several activities that needed to be carried out in order to prepare the document. One of the most important ones involved a thorough investigation on different material handling systems; this was done with the purpose of acquiring knowledge about the different conveying methods and to research any novel technologies pertaining to this industry. Additionally, this same investigation was helpful in narrowing down the most convenient particle handling methods, which consequently led to a searching and reaching out process with the potential equipment suppliers. Afterwards, the most viable ones were contacted with the purpose of evaluating the feasibility of designing small scale (pilot size) equipment that would be suitable for the material handling process. Regarding the mass flow or volume flow control designs, it was discussed that the ideal place for such equipment would be below the raw meal and storage silos so that the material flow into the high temperature particle handling system can be monitored and controlled.

There were three main conveying methods that were researched, these are: Mechanical, Spray Dried Slip Ceramic and Pneumatic. Main focus and effort was put into Mechanical conveying since Spray dried slip ceramic conveying and pneumatic conveying were deemed unsuitable for this specific particle handling system. Moreover, Mechanical conveying was divided into more specific material handling methods, these were: Belt, Pipe, Screw and Drag Chain Conveying. From which screw and drag chain were the most likely transportation methods for this high temperature solar industrial process since they have ideal features and possible configurations.

Innovation has become a necessity and key asset for a lot of industries, the cement one is no exception, and even though there has been almost no alteration in the cement manufacturing process for some time, this project, along with its renewable/clean energy adaption for industrial processes approach, is a perfect example of the initiatives that need to be taken into account in order to make revolutionary industry changes.



The research and efforts done by the industry partners on this deliverable provided knowledge for the high temperature handling system in SOLPART so that the ultimate goal of producing cement in an environmentally friendly and efficient way can be accomplished.