



NEW STORAGE LATENT AND SENSIBLE
CONCEPT FOR HIGH EFFICIENT CSP PLANTS



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

H2020 Grant Agreement N°:
720985

H2020 Grant Agreement N°.: 720985

Project acronym: NEWSOL

Project full title: NEW StOrage Latent and sensible concept for high efficient CSP plants

Deliverable D3.7 - New insulating materials solutions

ABSTRACT

This Deliverable D3.7 tackles the development of new insulating materials. WP3 addresses the materials development implied in the prototypes to be built on NewSol project, such as the thermocline concrete tank and the concrete module. This deliverable points out which material options seem to correspond better to the requirements defined in WP2 as High Thermal Insulating storage material. The insulating materials must be applied on tank and module walls and on their foundations. To guarantee an insulation of the structure and minimize thermal losses to the environment.

For that purpose, two types of thermal insulating materials have been designed and characterized, Foam Concrete without and with aerogel in order to insulate the walls of the tank and the module and Structural Lightweight Thermal Aggregate Concrete (LWTAC) to insulate foundations of the tank and the module. To design foam concrete, 23 dosages were tested, density, consistency, compressive strength properties and type of binder were optimized. The two best designed dosages were Sample one with OPC plus Fly Ash as binder and a mix that includes aerogel. Although they did not withstand required thermal cycles at 500°C of maximum temperature, sample with aerogel reached higher thermal resistance than sample without aerogel. To design structural LWTAC, 12 dosages were tested; density, consistency, compressive strength properties and type of binder were also optimized. The two best designed dosages were one with CAC cement and one with OPC plus Fly Ash as binder. Both dosages are composed for lime aggregates and expanded clay as lightweight aggregate and both also withstood thermal cycles required at 200°C and at 450°C. Nevertheless, mix with OPC plus Fly Ash as binder showed better strength results after thermal cycles.