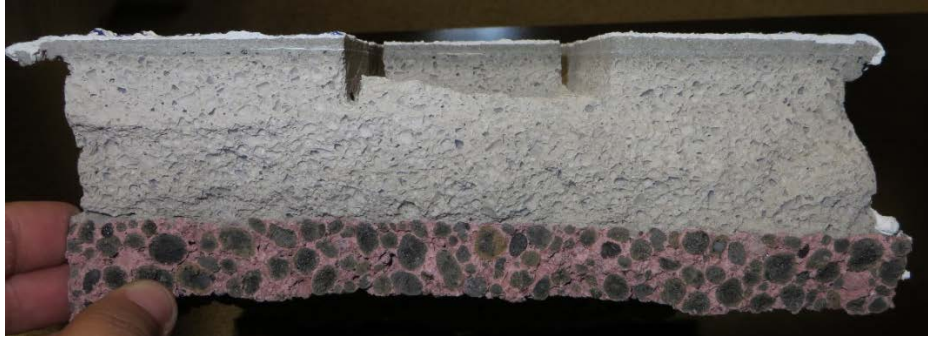


**PEP\_SG WEBER - Efficient Wall Plus Saint-Gobain Weber (POCI-01-0247-FEDER-017417, 2016-2018)**



Partners: Saint-Gobain Weber and the Construction Institute (IC) of University of Porto  
CERIS subcontracted team by Saint-Gobain Weber

CERIS Principal Investigator (subcontracted team): **I. Flores-Colen**

CERIS subcontracted Research Team: J. D. Silvestre; M. G. Gomes; L. Ilharco; M. Pedroso

Funding: COMPETE 2020, Portugal 2020,  
FEDER

Total budget: 268.302€ CERIS: 56.000€

Period: 07/03/2016-31/05/2019

<https://www.pt.weber/blog/atualidade/pep-parede-eficiente-plus>

**Summary description:** this project intended to develop an energy-efficient multifunction exterior wall solution with environmental sustainability concerns. The solution comprises the development of a new thermal block (composed by cement and expanded clay aggregates), lighter than the existing solutions, and a finishing thermal mortar with improved insulating properties. The wall system is an innovative solution, characterized by a low coefficient of thermal transmission, U, lower or equal to  $0.35 \text{ W/m}^2\cdot\text{K}$ , assuming masonry with a maximum thickness of 250 mm and an insulating render with a maximum thickness of 55 mm. A solution capable of complying with the new thermal regulatory requirements is ensured and contributes to the reduction of energy consumption and resources of the building's envelope.

**CERIS participation:** the research team was responsible for developing the new thermal insulating render formulation and characterise its physical, mechanical, and microstructural performance. The team was also responsible for executing the Life Cycle Assessment (LCA) of all the individual products used in the wall solution.

**Output:** the research team developed an aerogel-based thermal insulating render with a thermal conductivity lower than other classic thermal insulating materials (around  $0.0293 \text{ W m}^{-1} \text{ K}^{-1}$ ) while being easier to apply (through mechanical projection) than such materials. The aerogel-based render formulation also showed promising results in terms of mechanical and physical performance, where its overall performance and compatibility could be verified in terms of its microstructural aspects. Moreover, the LCA study (cradle to gate) findings showed that this solution presented a potential of CO<sub>2</sub> footprint reduction compared with other currently available solutions, while also indicating potential improvements to the individual material's formulations to further lower environmental impacts.

**Illustrations:**



Testing on-site applications and mechanical spraying machine.

**Indicators:** 6 articles published; 1 national paper; 5 papers in international conferences; 5 papers in national conferences; one PhD Thesis - 36 months from the Portuguese Foundation for Science and Technology (FCT) - SFRH/BD/132239/2017 - Marco Pedroso; 2 MSc dissertations; 14 research reports.

**PEP\_SG WEBER - Efficient Wall Plus Saint-Gobain Weber (POCI-01-0247-FEDER-017417, 2016-2018)**

1. Contribution to the "1<sup>st</sup> Report of project activities: Efficient Wall Plus" (in Portuguese), Report related to the time period from 07/03/2016 until 31/12/2016, P2020, Saint-Gobain Weber Portugal and IC/FEUP.
2. Pedroso, M.; **Flores-Colen, I.**; Silvestre, J. D.; Gomes, M. G.; da Silva, F.; de Brito, J.: "State of the art of thermal renders and their sustainability. Preliminary studies" (in Portuguese), CERIS DTC 06/2017 report, IST.
3. Pedroso, M.; **Flores-Colen, I.**: "Experimental study of thermal render's formulations" (in Portuguese), FUNDEC PS 02/2017, IST.
4. Contribution "2<sup>nd</sup> Report of project activities: Efficient Wall Plus" (in Portuguese), Report related to the time period from 01/01/2017 until 31/12/2017, P2020, Saint-Gobain Weber Portugal and IC/FEUP.
5. Pedroso, M.; **Flores-Colen, I.**; Silvestre, J. D.; Gomes, M. Glória; de Brito, J.: "Development of super-insulating thermal mortar's formulations: Study, development, test and application" (in Portuguese), CERIS DTC 05/2018 report, IST.
6. Contribution "3<sup>rd</sup> Report of project activities: Efficient Wall Plus" (in Portuguese), Report related to the time period from 07/03/2016 until 31/08/2018, P2020, Saint-Gobain Weber Portugal and IC/FEUP.
7. Pedroso, M.; Silvestre, J.D.; **Flores-Colen, I.**: "Life Cycle Assessment (LCA) report of the lightweight concrete thermal block developed by Saint-Gobain Weber, IC and Previcon for the PEP project" (in Portuguese), CERIS DTC 14/2018 report, IST.
8. Pedroso, M.; **Flores-Colen, I.**; Ilharco, L.; Júlio, M., "Thermal render's microstructural study" (in Portuguese), integrated in the PEP Project, FUNDEC PS 02/2019 report, IST.
9. Pedroso, M.; **Flores-Colen, I.**; Silvestre, J. D.; Gomes, M. G.; de Brito, J.: "In situ application and test of the developed thermal render and LCA of the lightweight block, render and PEP system" (in Portuguese), integrated in PEP Project, Report ICIST, DTC 05/19, CERIS - IST - UL, Lisbon, Portugal.
10. **Flores-Colen et al.** - Contribution "Project PEP final report" (in Portuguese), report related to the complete project, P2020, Saint-Gobain Weber Portugal.
11. Pedroso, M.; Silvestre, J.D.; **Flores-Colen, I.**: "Life Cycle Assessment (LCA) report of the super-insulating thermal render SIM developed under the PEP project" (in Portuguese), CERIS DTC 43/2019 report, IST.
12. Pedroso, M.; Silvestre, J.D.; **Flores-Colen, I.**: "Life Cycle Assessment (LCA) report of a multilayer coating system for facades' thermal insulation" developed by Saint-Gobain Weber (in Portuguese), FUNDEC PS 20/2020 report, IST.