

# Stone Technology for Eco-Efficient Production

**NEWSLETTER (February 2016)**

## CONSORTIUM

Technology and Industry:



Research:



(Until February 2015)

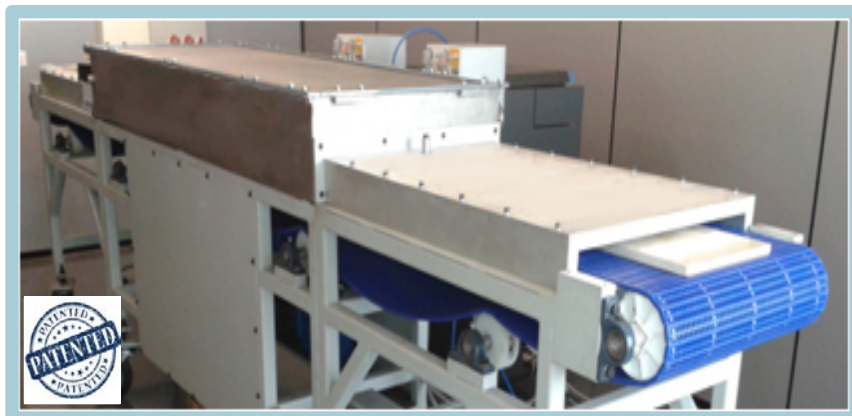


Associations:



(Until March 2015)

The main objective of the STEP project is **the implementation of new eco-efficient technologies in the natural stone (marble) industry**, resulting in significant environmental, financial and sustainability benefits for the construction products sector.



Co-funded by the Eco-innovation Initiative of the European Union



[www.step-stone.eu](http://www.step-stone.eu)

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**Start Date:** 1st September 2013

**Duration:** 30 months

## SCOPE

The STEP project aims at demonstrating the industrial feasibility of an **innovative technology** for the resin curing process of natural stone flat products. The optimum performance of the process is achieved using an **eco-resin free of volatile organic compounds (VOCs)**.

## OBJECTIVES

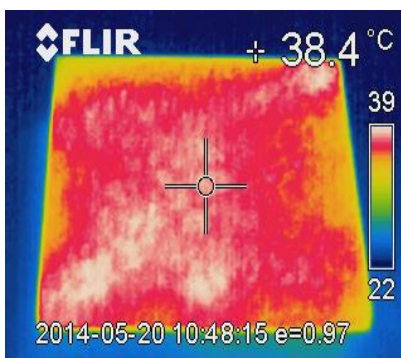
The project pursues the implementation of two **eco-efficient technologies** in the natural stone sector to reach economic, environmental and sustainable benefits in the market of construction products. It seeks **to overcome** certain traditional limitations of this productive sector: **high energy costs, low utilization of the raw materials and emission of VOCs**.

## ECO-INNOVATIONS

- A new **on-line open system** for continuous marble drying and resin curing process by means of **microwave (MW)** technology.
- Development and industrial validation of **new waterborne resins** with zero emission of VOCs.

## BENEFITS

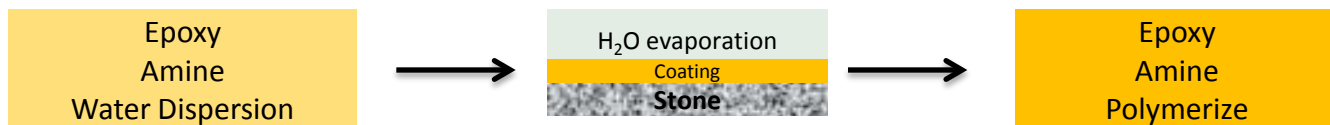
STEP will contribute to achieve significant benefits for the natural stone sector in terms of **efficiency, productivity and use of raw materials**, as well as in **health and safety** aspects for the employees of the production lines.



## ECO – RESINS

## TECHNICAL RESULTS

Natural stone processing resins are used to **improve mechanical properties** of the products. These resins are applied onto the marble surfaces in **liquid state** and afterwards, they are cured in a **curing oven**.



- The **new eco-resin** used as a consolidant is a nanocomposite with **good performance** as structural and adhesive material.
- Epoxy resins are the most used resins, due to their **good mechanical properties**, determined by the high cross-linking density.

## INDUSTRIAL MODULE

Design of a processing line representing the industrial curing stage.

Different product sizes:

TILES / STRIPS / SLABS



Up to 28 mm height

Microwave oven designed for **safe** and **continuous operation**: open inlet and outlet



Speed processing: 0.6 – 2 m/min  
Curing time: 3 – 7 min

## IMPLEMENTATION STUDIES

- Testing of adhesion properties of the **STEP** eco-resin
- Measurement of **dielectric properties** of stone varieties at factory is the first **STEP** towards implementation.
- **STEP** technology (**MW open oven + ecoresin**) is **adaptable** to each marble variety and its production line requirements.

# DISSEMINATION

## STEP website

The web site context is presented in three different languages: **English, Spanish and Greek**. A **project overview** contains information associated with the technical background and issues addressed by STEP. Not only passive information about the project is presented but also active **interaction with potential stakeholders** is feasible.



## Dissemination methods and associated activities

(Social media, Logo, Flyer, Poster, Merchandise)

## Technical Dissemination

- Identification and Classification of potential Spanish and Greek stakeholders. Communication with major Greek stakeholders.
- Participation in conferences, fairs and events



EGU 2016, AMPERE 2015, ECERs 2015, Greek Researcher's Night 2014

