

## ANNEX IV – JOB DESCRIPTION OF GROUP 1

### 1. GENERAL INFORMATION

Calucem d.o.o. is implementing "Development of a new innovative ECO<sub>2</sub>Flex product" project, in accordance with the project application submitted to the Call for Proposals *"Increasing the development of new products and services that derives from R&D activities – Phase II"* (ref No: KK.01.2.1.02), implemented by the Croatian Agency for Small Business, Innovation and Investment; HAMAG BICRO and the Ministry of Economy and Sustainable Development.

**The project is co-financed by the European Regional Development Fund under the Operational Program Competitiveness and Cohesion 2014 - 2020.**

The Company plans to develop an innovative technological solution in the construction industry, for reduction of CO<sub>2</sub> and usage of energy in production, called ECO<sub>2</sub>Flex, which is based on a combination of patented calcium aluminate cement (CAC) with selected CO<sub>2</sub> neutral cementitious materials (SCM). Partners on a project that will contribute to the successful implementation of the project and the development of an innovative technological solution in the construction industry called ECO<sub>2</sub>Flex are the University of Zagreb Faculty of Civil Engineering and Calucem GmbH, Germany.

The total value of the project is HRK 34.926.624,69; eligible costs amount is HRK 27.764.236,85, and the expected aid is HRK 14.900.633,24. The estimated duration of the project is 36 months.

### 2. TECHNICAL DESCRIPTION / JOB DESCRIPTION

**The subject-matter of procurement: Procurement of external services for process mathematical and CFD modeling**

**Group 1** – External services for process mathematical modeling

**Procurement number: 04/2021**

#### 2.1. INTRODUCTION

Calucem is a producer of calcium aluminate cements. Clinker is produced by continuous process of melting raw materials (limestone and bauxite) in an L-shaped shaft kiln at temperatures > 1400°C. Energy source is combustion of coal dust in a mixture with air. Combustion gases exit the kiln through the shaft, this way preheating the raw materials that are loaded at the top of the shaft. Temperature critical parts of the kiln are protected by installing steel boxes cooled by high flow of sea water.

Calucem has launched an EU funded ECO2FLEX project to develop a novel high performance calcium aluminate cement with reduced energy and CO<sub>2</sub> footprint. The goal is to reduce CO<sub>2</sub> emission of the production process by 25%. Possible routes to this goal include heat recovery (reuse of the recovered heat at adequate location(s) of the kiln production process) and/or use of the recovered heat outside

the process. As the first step, a service of mathematical modeling of the kiln production process steady-state is required to quantify heat streams, identify potential for heat recovery and provide data for further process analysis. All critical data needed for modeling are measured continuously as part of production control system and will be made available to the selected tenderer. Missing data needed for model set up will be measured additionally.

## 2.2. JOB DESCRIPTION

### Phase 1 – Industrial

1. Develop and validate a mathematical physico-chemical model to describe steady state heat and mass balance of the kiln production process. Minimum one visit to Calucem during the first month after the signing of the contract is required.
2. Define required input process data that needs to be provided by Calucem.
3. Collect required property data from literature for materials in the process or define appropriate approximation methods or determine missing data by experimental methods.
4. Deliver a full report with description of the process model and work performed (in MS Word and PDF format).
5. Deliver an overview summary report of item no. 4 for presentation purpose (MS Powerpoint format).
6. Deliver process model in open code in MS Excel format suitable for simulation of process steady-state depending on input data change.

### Phase 2 – Experimental

1. After delivery as per point 6, occasional availability will be required for model improvement and consultation until July 2023: not more than 1 man-day per week, not more than 10 man-days in total is expected.

## 3. TENDER

Tenderer confirms that he offers the required services described in item 2. TECHNICAL DESCRIPTION / JOB DESCRIPTION of Annex IV – Job description for Group 1, by submitting signed and certified Annex IV – Job description for Group 1.

FOR TENDERER:

At \_\_\_\_\_, on \_\_\_\_\_

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*(first name, last name, title and signature of authorized person)*