

# An ultra-reactive low CO<sub>2</sub> binder for mortar



To help reduce the carbon footprint of the cement and concrete industry, Imerys offers a low CO<sub>2</sub> ultra-reactive mortar binder technology solution.

<b>Starting date of the project</b>	2019		
<b>Project Localisation</b> Places of implementation of the project at this stage and targeted geography if replicable.	Lyon and Fos Sur Mer, France		
<b>Project objectives</b> Type of climate innovation of the project with a description of the problem/issue addressed	Reducing the carbon footprint of concrete by developing a new range of bindings.		
<b>Detailed project description</b>	<p>Carbon emissions of the cement and concrete industry represents around 8% of the world CO<sub>2</sub> emissions. To contribute to the reduction of cement carbon footprint, Imerys is developing an ultra-reactive and low CO<sub>2</sub> concrete.</p> <p>The innovation is Imerys advanced range of specialized calcium aluminate's binders. It dissolves much more rapidly in water than traditional calcium aluminate. This ultra-reactivity enables Imerys clients to adjust their formulations, and to reduce the global quantity of binder used in fast concrete setting, and dry mortar, while keeping the same performance level.</p> <p>Diminishing the binder content can reduce CO<sub>2</sub> emissions by 40% in technical mortar application. This contributes to reducing the global impact of the construction sector.</p>		
<b>Main project's drivers for reducing the greenhouse gas emissions</b>	<b>Reduction levers</b>	<b>Details on the aspects of the project</b>	
	<input type="checkbox"/> Energy and resource efficiency (including behaviour)		
	<input type="checkbox"/> Energy Decarbonisation		
	<input type="checkbox"/> Energy efficiency improvements		
	<input checked="" type="checkbox"/> Improving efficiency in non-energy resources	Reducing the quantity of binder needed in fast setting concrete and dry mortar with the same performance level.	
	<input type="checkbox"/> Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)		
	<input type="checkbox"/> Financing low-carbon producers or disinvestment from carbon assets		
<input type="checkbox"/> Reduction of other greenhouse gases emission			
<b>Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope</b>	<b>Aspects of the project contributing to the reduction of emissions by emission category</b>		<b>Quantification of associated GHG emissions by emission category</b>
	<b>Please follow the quantification methodology used in the Afep guidelines.</b>		
	<b>Reduction of the company's carbon dependency</b>		
	<b>Scope 1</b> <i>Direct emissions generated by the company's activity.</i>	Manufacturing of U-Technology binder	775 kgCO <sub>2</sub> e/t of mortar
<b>Scope 2</b> <i>Indirect emissions associated with the company's electricity and heat consumption.</i>		95 kmCO <sub>2</sub> e/t of mortar	

	<b>Scope 3</b> <i>Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.</i>		30 kmCO <sub>2</sub> e/t of mortar
	<b>Increase of carbon sinks</b>		
	<b>Emissions Absorption</b> <i>Carbon sinks creation, (BECCS, CCU/S, ...)</i>		
	<b>GHG emissions avoided by the company at third parties</b>		
	<b>Avoided Emissions</b> <i>Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.</i>	Reducing need of binder for concrete and dry mortar	90 kmCO <sub>2</sub> e/t of mortar
<p><b>Clarification on the calculation or other remarks :</b> The solution contributes to reducing downstream emissions of Imerys clients. Thanks to a reduction of the binder ratio from 25% to 15%, the carbon footprint CO<sub>2</sub> (kg CO<sub>2</sub>/t mortar) will be reduced by 40%, compared to a technical mortar formulated with ordinary Portland cement (OPC). CO<sub>2</sub> emissions linked to the binder manufacturing are based on the first prototype data, and will be actualized as the project progress.</p> <p>To compute emission reduction linked to the decrease in binder's ratio in the formulation, an emission factor of 896 kgCO<sub>2</sub>e/t of OPC (CEM 1) has been used.</p>			
<b>Modality of verification of the quantification.</b>	<b>Calculation standard used (ADEME base, GHG protocol, etc.):</b> Life Cycle Analysis (ISO 14040 and ISO 14044)		
	<b>Verification of the calculation (internal or external):</b> computation done by external experts and internal verification		
<b>Other environmental and social benefits of the project</b>	This project contributes to SDG goal 12 "Ensure sustainable consumption and production patterns". In fact, the binder's ratio in the formulation is reduced. It thus contribute to the SDG target 12.2 : " By 2030, achieve the sustainable management and efficient use of natural resources".		
<b>Project maturity level</b>	<input type="checkbox"/> Prototype laboratory test (TRL 7) <input type="checkbox"/> Real life testing (TRL 7-8) <input checked="" type="checkbox"/> Pre-commercial prototype (TRL 9) <input type="checkbox"/> Small-scale implementation <input type="checkbox"/> Medium to large scale implementation		
	<b>Remarks:</b> <a href="#">click here to enter the level of maturity of the project</a>		
<b>Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential</b>	This technology has a wide range of potential applications. Research continues to develop additional applications.		
<b>Amount of investment made (in €)</b>	€10 m of investment (preliminary amount) – financed by Bpifrance : <ul style="list-style-type: none"> <li>- Financing industrial research and development of new technologies for production of calcium aluminate production technology (ultra-reactive cements manufacturing process).</li> <li>- Financing the development of ultra-reactive materials and the use of these materials in three application developments.</li> </ul>		
<b>Economic profitability of the project (ROI)</b>	<input type="checkbox"/> ST (0-3 years) <input checked="" type="checkbox"/> MT (4-10 years) <input type="checkbox"/> LT (> 10 years)		
	<b>Remarks:</b> Developing solutions enabling reduction in downstream emissions for the cement industry presents business opportunities for Imerys.		
<b>Engaged partnerships</b>	Partnerships with private actors (major manufacturers of ready to use mortar industry) have been engaged.		
<b>Open comments from the project owner</b>	The project is currently in its pre-commercial prototype phase, and will continue through to full scale commercial development.		

<b>More about the project</b>	
<b>Contact the company carrying the project</b>	<a href="mailto:gaelle.rodary@imerys.com">gaelle.rodary@imerys.com</a>
<b>Project URL links</b>	/
<b>Illustrations of the project</b>	