

RECARBONATION



Concrete absorbs CO₂ from the atmosphere over its lifetime, in a process known as recarbonation

Recarbonation is a natural process, occurring when concrete reacts with CO₂ in the air.

The actual amount of recarbonation will depend on a range of parameters including the concrete type, exposure conditions, thickness of the concrete element, recycling scenario and secondary use. A conservative estimate of the cement carbonation sink provided by all concrete is 20% of the process CO₂ emissions released during cement production. Cement process CO₂ emissions account for approximately 55% of the embodied CO₂ of concrete.¹

The United Nations (UN) has acknowledged that the process of recarbonation over the lifecycle of concrete elements absorbs a proportion of the process CO₂ emissions released during cement production, and estimates that approximately 200 million tonnes of carbon are absorbed worldwide annually by this “cement carbonation sink”.^{2,3}

The recarbonation process happens at different speeds, occurring relatively quickly in non-reinforced products or thin/porous applications (renders, mortars, concrete blocks and mineral foams), but more slowly in reinforced concrete and thicker elements. Non-reinforced porous applications, such as masonry, that are exposed to air, may fully recarbonate within a few years.

A significant portion of the total recarbonation occurs when reinforced concrete structures are demolished, as the increased surface area and exposure to air accelerates the process. The amount of recarbonation is even greater when stockpiles of crushed concrete are left exposed to the air before reuse.

Environmental Product Declarations (EPDs) for concrete products allow the recarbonation process to be fully accounted for in the lifecycle of these products including the end-of-life phase.⁴

- [1] [Decarbonisation Pathways for the Australian Cement and Concrete Sector. VDZ. \(2021\)](#)
- [2] [IPCC Climate Change 2021. The Physical Science Basis. Working Group 1 contribution to the Sixth Assessment Report \(2021\) The International Panel for Climate Change \(IPCC\). Sixth Assessment Report. \(2021\)](#)
- [3] [Friedlingstein P. et al. Global Carbon Budget 2020. Earth Systems Science Data Volume 12 3269 – 3340 \(2020\)](#)
- [4] [EN 16757:2022 - Sustainability of construction works - Environmental product declarations - Product \(iteh.ai\)](#)

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