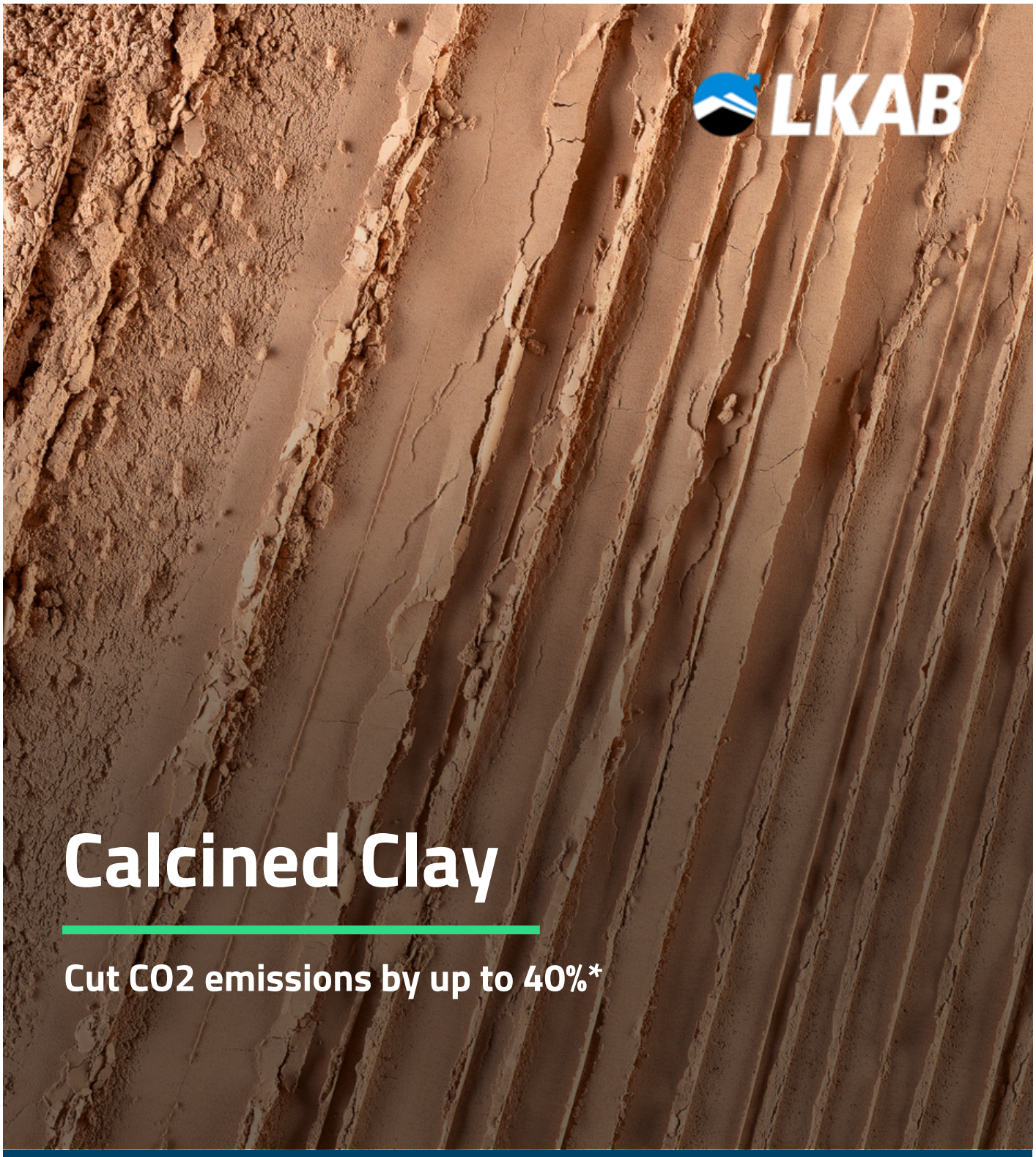


Calcined Clay

Cut CO2 emissions by up to 40%*

This clay-based material aligns with UK concrete standards for blended cements and provides a low-carbon alternative for cement replacement in concrete. With its potential to replace up to 35% of Portland cement in concrete, Calcined Clay represents a practical, UK-sourced solution for infrastructure, precast and ready-mix concrete producers looking to reduce embodied carbon without compromising on performance.

*Depending on your mix design

LKAB Minerals

Calcined Clay

LKAB Minerals' ground natural calcined clay pozzolana is an advanced supplementary cementitious material (SCM) designed to reduce the environmental impact of concrete without compromising its strength or durability. It is produced by recycling fired bricks, originally part of the UK clay brick manufacturing process, that are finely ground to create a reactive pozzolanic powder. The use of this clay-based material aligns with UK concrete standards for blended cements and provides a low-carbon alternative for cement replacement in concrete.

What is Calcined Clay?

Calcined Clay is a natural calcined pozzolanic material derived from fired clay bricks rejected during quality checks in brick manufacturing.

Traditionally, the process of producing calcined clay involves heating raw clay to high temperatures (typically above 800°C).

Sustaining these high temperature, creates significant carbon emissions - but our approach does not require this superheating stage, as the rejected bricks have already been fired.

The material is crushed and finely ground to achieve a consistent, cement-compatible particle size distribution.



Using Calcined Clay

LKAB sells Calcined Clay as a separate product, but it can be added at the concrete batching plant along with cement, aggregates, water and admixture as a direct replacement for cement.

Due to the slower strength development, total powder contents may need to be increased with higher addition levels where 28-day strength is a requirement.

Typically, 25-30% cement replacement levels can be achieved in most applications, although they can be higher with the use of specialist admixtures.

Chemical composition

SiO_2	%	55.00
Reactive SiO_2		39.60
Al_2O_3		18.30
Fe_2O_3		5.70
CaO		11.10
Free CaO		0.16
MgO		1.70
P_2O_5		0.18
SO_3		2.30
Na2Oeq		2.60
TOC		0.03
Clay Content	g/100g	0.17

LOI = 1.40%
Chloride = 0.01%

Key mineral properties

- High silica (SiO_2) and alumina (Al_2O_3) content: Essential for pozzolanic reactivity.
- Low levels of free lime (CaO), chlorides, and TOC (Total Organic Carbon): Improves long-term stability and safety.
- Low loss on ignition (LOI).
- Fine particle size (45µm fineness at 25.0%) for optimal dispersion in concrete mixes.
- "Salmon pink" in colour

Compliant with BS 8500 concrete standards for the following designations:

- CEM II/A-Q
- CEM II/A-M (with limestone)
- CEM II/B-M (with limestone)
- CEM II/B-Q
- CEM II/B-Q +SR (sulfate resistance)

Typical physical characteristics

Activity Index	28d	≥75%
Fineness	45µm	25.0%
Initial setting time		1.1
Declared relative density	kg/m^3	2750
Expansion	mm	1.0
Water requirement	%	106

BSI BS 8500-1

BSI BS 8500-2

BSI BS 8615-1



Blended cements

Calcined clay supports combinations such as:

- CEM II/A-Q
- CEM II/A-M (ternary blend with limestone)
- CEM II/B-Q
- CEM II/B-M (ternary blend with limestone)

These cement combinations provide more environmentally responsible alternatives to traditional CEM I and are BS 8500 compliant.

Cement combination designation

BS 8500-2	Calcined Clay (%)	
designation	minimum	maximum
CEM II/A-Q	6	20
CEM II/B-Q	21	35
CEM II/B-Q +SR	25	35
CEM II/A-M*	12	20
CEM II/B-M*	21	35

*Ternary cements, the minimum/maximum values are achieved by blending Calcined Clay with limestone

Applications

Ready-mix concrete
Ideal for general construction projects looking to reduce carbon footprint while maintaining structural performance.

Precast components
Used in modular and off-site construction, calcined clay helps reduce shrinkage and thermal cracking in factory-made elements.





Infrastructure & civil engineering
Roads, tunnels, railways, and public sector infrastructure benefit from the long-term durability and low carbon profile of the material.

Large-scale pours
The extended setting time and reduced heat of hydration make it suitable for mass pours such as basements, bridges, or foundations where temperature gradients must be controlled.

Logistics

Our Calcined Clay is produced at our Flixborough production plant (DN15 8SF) and is readily available to the UK market.

Available in:

- Bulk tankers
- 1 tonne bulk bags
- 25kg bags

To place an order or speak to our technical team, please use the below contact details:

Mobile: 07977 361028
Office Tel: 01332 673131
Email: ben.bland@lkab.com

Environmental impact

Low embodied carbon
At 66kg CO_2 per tonne, this calcined clay delivers a substantially lower carbon footprint than traditional binders such as CEM I (840kg CO_2/t) and GGBS (155kg CO_2/t), based on LCA data and MPA Factsheet 18 benchmarks.

Diverted from landfill
Manufactured from surplus clay bricks that would otherwise be classed as waste, helping to reduce landfill and recover value from existing materials.

UK manufactured, no virgin extraction
Produced entirely in the UK from recovered material, with no new quarrying required, supporting local industry while preserving natural resources.

Supporting low-carbon construction
Ideal for low clinker cement formulations in line with BS 8500 and PAS 2080 principles, helping projects reduce embodied carbon and progress towards UK net-zero targets.



LKAB Minerals is a leading supplier of high-quality industrial minerals, offering a diverse range of products and services to industries such as construction, steel manufacturing, and agriculture. LKAB Minerals focuses on delivering innovative solutions that meet the highest environmental and performance standards. As a part of the LKAB Group, the company leverages cutting-edge technology and expertise to provide reliable, value-added products that support the global transition to a better future.

For more information, visit **www.lkabminerals.com**