# Demonstrating the low environmental impact of zircon in ceramic tile production

ZIRCON INDUSTRY ASSOCIATION

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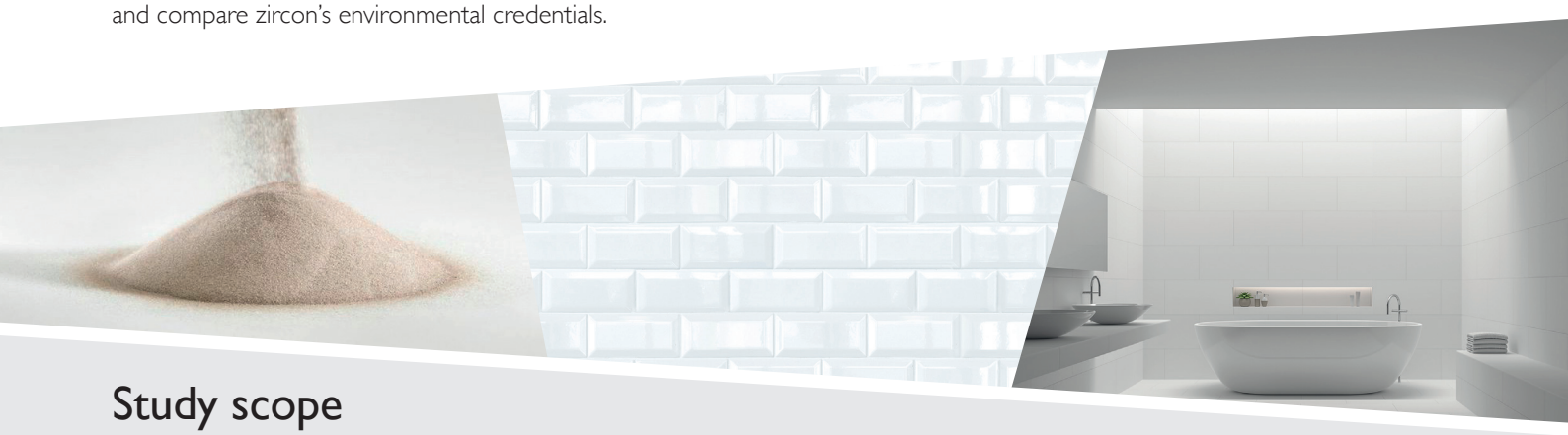
## Zircon sand LCA

Zircon is an important ingredient in ceramic tile manufacture. Used as an opacifier, it makes tiles shine whiter and brighter and helps interior designers create innovative lifestyle trends and finishes through the use of up-to-the-minute printing techniques. Further, because of its high hardness (7.5 on the Mohs scale), zircon makes tiles more resilient and resistant to scratching. Now the Zircon Industry Association (ZIA) has completed the first Life Cycle Assessment (LCA) of zircon sand production to quantify and compare zircon's environmental credentials.



## Study scope

**The LCA was conducted in two stages:**

1. The **cradle-to-gate** production of zircon sand, including mining and mineral separation.
2. **A comparison between zircon and alumina** in the preparation of ceramic tile mixtures and the associated environmental impacts, not including tile production, use stage or end-of-life stages.

## Standards and safeguards

thinkstep CENTRO CERAMICO ISO

The LCA (and connected ISO standards) is a scientific approach, recognised as the best tool for assessing and comparing the environmental performance of products. The LCA and comparison studies were conducted using the latest lifecycle engineering and impact assessment methodologies.

The LCA study was undertaken by thinkstep in collaboration with Centro Ceramico di Bologna. Each step of the study was peer-reviewed by an independent panel of three experts to ensure conformity to the ISO 14040/44 standards.

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# LCA results at a glance

The environmental impact of producing zircon sand is:

predominantly associated with **upstream mining processes**

largely linked to **local electricity consumption**

In addition to the proven technical benefits of using zircon rather than alumina in the tile mix, zircon means **significantly lower environmental impacts.**

**16%** less

**Global Warming Potential**
(climate change)

**21%** less

**Acidification Potential**
(acid rain)

**23%** less

**Eutrophication Potential**
(airborne emissions)

**50%** less

**Abiotic Depletion Potential**
(the use of non-biological resources)

The Abiotic Depletion Potential (fossil), Photochemical Ozone Creation Potential, and Primary Energy Demand were all found to be about 20% lower when using zircon-containing tile mixes. The impact for Ozone Layer Depletion Potential was similar for both products.

# Benefits for users

## Efficiency

The LCA can be used as a benchmark for zircon producers to develop targets and monitor progress in priority areas such as energy efficiency.

## Environment

Tile producers can use zircon with confidence because of its low environmental impact. It also enables manufacturers to reduce their own environmental footprint by specifying zircon as the whitener in preference to alternatives.

## Impact

Architects, designers, and building contractors can specify zircon-containing tiles to support their efforts to construct buildings with minimal direct and indirect impacts on the environment compared with alternative products.

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