LASTING QUALITY FOR SUSTAINABLE BUILDING

DUTCH CERAMIC TILES

KNB
Royal Dutch association
For Building Ceramics

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CERAMIC TILES

SUSTAINABILITY...

Sustainability is increasingly important in our lives and also affects the construction sector. Sustainable building is a broad concept. Its goal is to construct buildings in a responsible way so people can live and work in healthy surroundings. After a long service life, the components of these buildings are suitable to be recycled. We expect that in the long term, only responsibly produced building materials will be available which can be gainfully recycled and pose no health-risk when used: buildings as depositories for raw materials.

...AND CERAMIC TILES

The Dutch ceramic tile industry devotes a lot of attention to the environmental qualities of its products. Together with the skilled tiler and ultimate consumer, it strives to give form to social responsible entrepreneurship. This publication highlights the 'sustainability profile' of ceramic floor- and wall tiles and sums up ten reasons why the ceramic tile - in real and social sense - has 'lasting quality'.

SUSTAINABLE USE OF MATERIALS

When assessing the sustainability performance of products and buildings, all stages of a life cycle must be taken into account:

- winning of raw materials and reserves
- production process
- transport
- design and construction
- use phase
- demolition, recycling and waste phase

Such a ‘Cradle to Grave’ life cycle analysis (LCA) forms the basis for determining the material-based environmental performance of building products and buildings.

TEN REASONS WHY THE CERAMIC TILE HAS ‘LASTING SUSTAINABLE QUALITY’

1. Use of natural raw materials
2. Clay, a raw material in plentiful supply
3. Clay extraction with respect for flora and fauna
4. Responsible production process
5. Favourable environmental profile
6. Long, maintenance-free life span
7. For applications with a popular, highly-valued appeal
8. For a healthy and hygienic living environment
9. Resistant and non-flammable
10. Good recycling potential

The following pages give more detailed information about the 10 points listed above and the added value of Dutch ceramic tiles.

1

NATURAL RAW MATERIALS

The main ingredients of ceramic tiles are clay and sand; natural raw materials that are widely available and sourced locally. The raw materials are compressed before being fired. The material properties of clay change during the production process and a non-deformable, colourfast and sustainable ceramic product is created.

Wall tiles are glazed to ensure their surface is waterproof and chemically resistant and/or to give them a certain colour. A glaze is a vitreous layer that consists of a silica-based substance mixed with a small quantity of metalliferous pigments. These pigments contain no lead, mercury or cadmium nor other toxic substances.

2

CLAY, A RAW MATERIAL IN PLENTIFUL SUPPLY

There are plentiful clay resources to be found nearly all over the world. Nature ensures there is a continual supply. However, clay is not the same everywhere. There are many different types, each with their own potential use.

Suitable clay is selected on the basis of the use conditions of the tiles and taking into account the forces occuring. Raw materials for Dutch tiles nearly all come from the Benelux region which means transport distances are short.

CLAY MINING WITH RESPECT FOR FLORA AND FAUNA

3

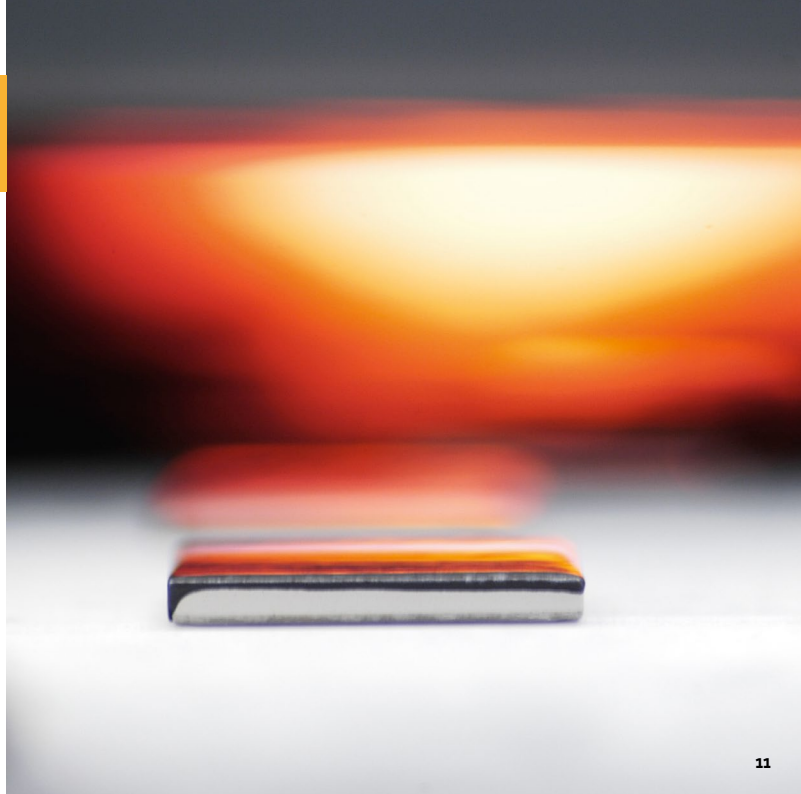
Clay extraction is undertaken conscientiously with respect for flora and fauna. After excavation, clay pits gain a new function - often as nature reserve. In areas that follow European Bird and Habitat guidelines and Natura 2000, clay miners always undertake action to restore the environment after ending exploitation.

Nature protection agencies and biologists confirm that the biodiversity in such restored areas is often remarkably higher than in the surrounding region.

4 RESPONSIBLE PRODUCTION PROCESS

The ceramic industry continually strives to optimize its energy system. The implementation of modern technology processes has resulted in significantly lower energy consumption. In addition, residual heat from ovens is used in the drying process of unfired products. As early as 1993, multi-year agreements (MJA) were made with the Dutch government to progressively improve energy efficiency.

Water is recycled as much as possible. Factories first purify waste water that needs to be discharged.
In the Dutch tile industry environmental care along with health and safety aspects have the highest priority.



FAVOURABLE ENVIRONMENTAL PROFILE

5

The environment-oriented Life Cycle Analysis (LCA) derived from the European standard EN15804, forms the basis for determining material-based environmental performance. Thanks to the efficient production process and the very long technical lifespan along with factories near important North European markets, Dutch tiles have a favourable environmental profile.

The final material-based environmental performance is determined at building level. For that purpose LCA data of tiles have been entered in the Dutch National Environmental Database for building materials (www.milieudatabase.nl). The environmental database is used as basis for calculating the environmental performance of a building. This calculation is compulsory as sanctioned by the Dutch Building Act but is also necessary for voluntary sustainable building labels like BREEAM-NL or GPR building.

6

LONG MAINTENANCE-FREE LIFE SPAN

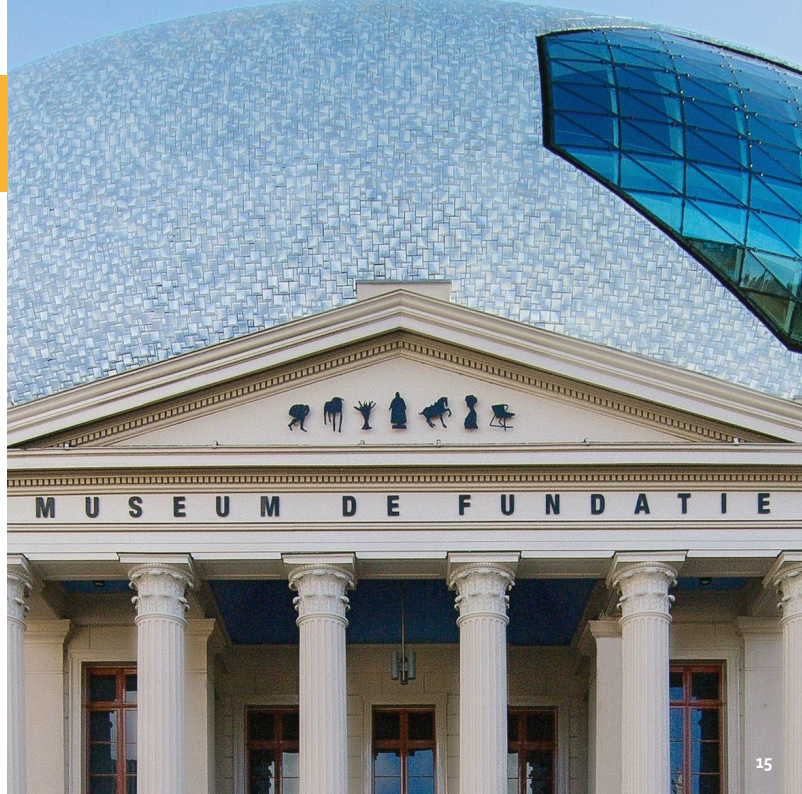
Thanks to the firing process, ceramic tiles have an exceptionally long life-span. The products are durable, wear resistant, colourfast and need practically no maintenance whatsoever. Therefore during their service life, no extra energy is needed. That's good news for the environment but also economically sound.
In environmental assessments of material alternatives, the life expectancy of a product plays a crucial role. With a technical life span of 50 years minimum, ceramic tiles have a considerably longer service life than most alternatives for floor and wall finishes.

FOR APPLICATIONS WITH A POPULAR, HIGHLY-VALUED APPEAL

7

Ever more buildings obtain a sustainable environment label, but that doesn't necessarily endear them to the public. Creating a well-liked good quality living environment with attractive, enduring architectural space is an important aspect of sustainability alongside energy use. A positive perception of products and buildings is decisive for their longevity. As opposed to user- and technical- value, emotional appeal is the only value that can increase with the passing of time.

Ceramic tiles stimulate the senses. They are attractive, have a pleasant feel and are used to realize very attractive and functional public amenities.



FOR A HEALTHY LIVING ENVIRONMENT

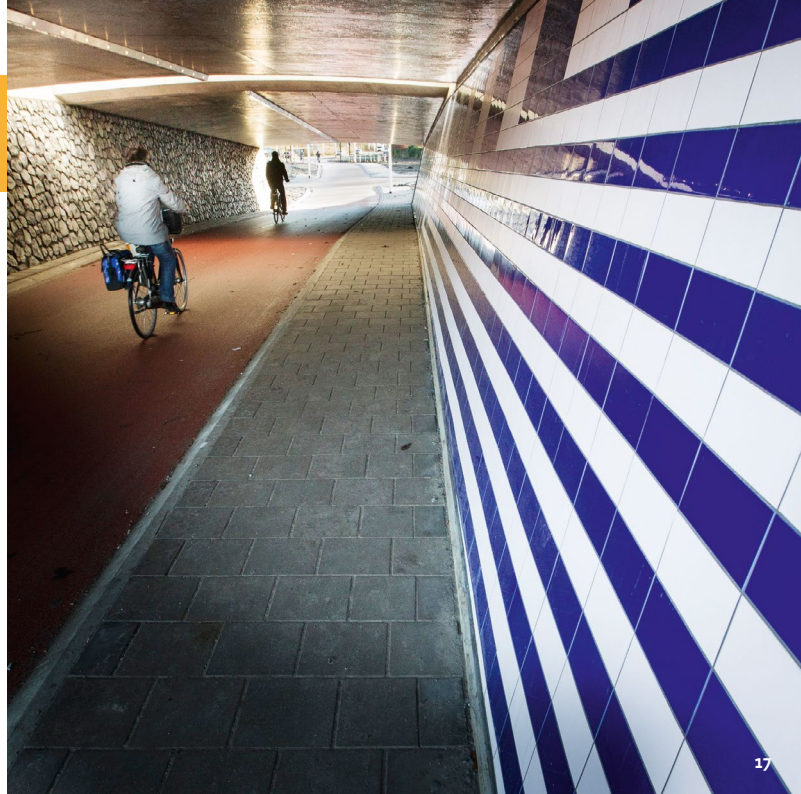
8

Besides aesthetic value, the special characteristics of a product also influence the health and comfort aspects of the living environment. Ceramic tiles for example, are highly suitable for floor heating and can contribute considerably to a comfortable and energy-efficient house. They emit no toxic or allergenic substances. Ceramic tiles are hygienic because they are antistatic, non porous, waterproof and simple to clean.

RESISTANT AND NON-FLAMMABLE

9

Ceramic tiles are robust, non-flammable and resistant to severe conditions, like UV light, temperature fluctuations and corrosive substances.
Product properties are adapted to suit a particular application. Where needed, tiles are highly abrasion resistant and resistant to severe mechanical and/or chemical corrosion. If a building catches fire, tiles used in the construction will not release toxic fumes because they are non-flammable.



10

GOOD RECYCLING POTENTIAL

Ceramic tiles that during or immediately after the production process do not meet the highest quality demands are crushed and reintroduced into the production process. This lowers the necessary firing temperature and prevents waste. Tiles from demolished buildings are often crushed into granulates and used as a foundation layer for road construction.
New products and initiatives are being developed that further optimize the recycling of tiles. At the end of their service life, tiles pose no threat to man or the environment.

CRADLE TO CRADLE

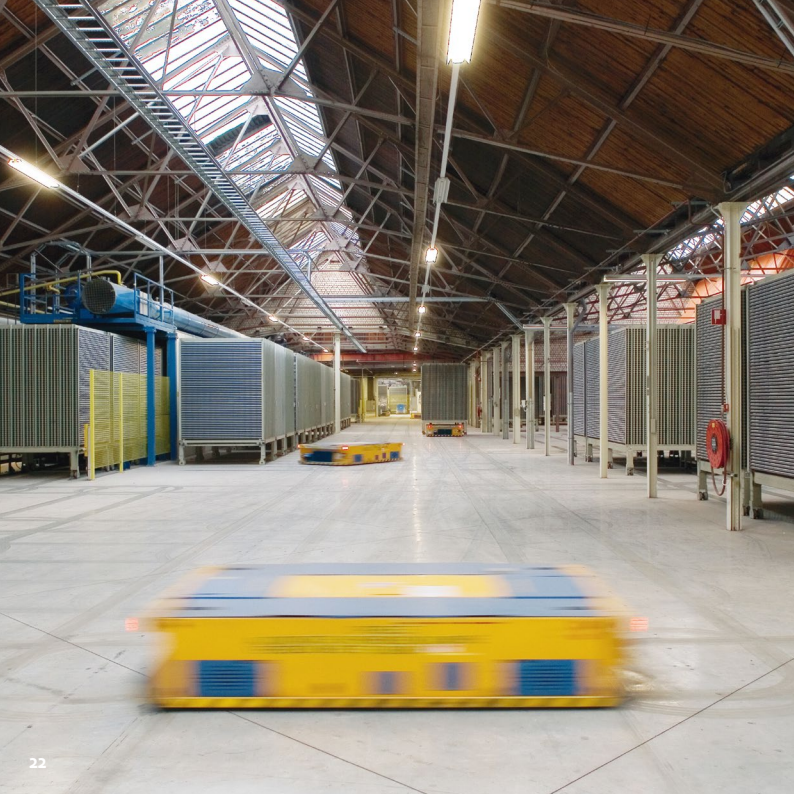
The vast majority of Dutch ceramic tile products are C2C certified. These tiles are suitable for technical recycling. Thanks to a basis of pure raw materials, tiles are environmentally friendly and in no way endanger one's health. They contain no toxic substances like lead, mercury or cadmium nor do they emit any pollutants during or after a lengthy service life. Manufacturing waste, secondary raw materials and off-cuts collected from large projects in The Netherlands are all recycled.

ENVIRONMENTAL CARE

Environmental care is a continuous process that leads to better environmental performance.
Tile manufacturers adhere strictly to specified procedures and follow 'good-housekeeping' rules. Frequent monitoring takes place to see if environmental performance satisfies internal environmental demands and if performance can be further improved. Tile manufacturers are accountable to local authorities. In addition, new products are developed to constantly improve environmental performance.

CSR

The business operation of Dutch manufacturers of ceramic tiles is based on Corporate Social Responsibility guidelines (CSR). This means that besides creating a stable business, attention also focuses on social aspects and how production affects the environment. Each company has its own way of implementing such policies.



SAFETY AND LABOUR STANDARDS

Employers and employees in the ceramic tile industry together take responsibility for a safe and healthy work environment. Their goal is to optimize health and safety on the work floor and building site, reduce sickness absence and staff turnover and enhance employees' work satisfaction. To that end manufacturers pursue an active and age-conscious HR policy.

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