BURNT CLAY PRODUCTS

APPLICATIONS

- brick block as facade walls, partitions, internal load-bearing walls
- floor blocks for block and beam slab system

PRODUCTION PROCESS

The raw material for brick making and tile production is clay.
Production processes: selection of raw material, extraction, preparation, wetting, shaping, drying and firing.
The extracted clay is transported to the preparator where it is crushed fine while adding water to it.

Brick and floor blocks

During preparation, the additive is mixed with clay, which burns out leaving pores that play an important role in the thermal and physical properties of the brick. The prepared raw material acquires its shape by passing through the press machine. Leaving the press, the cutting machine wire cuts the "brick snake" to the right size and then the raw bricks are taken to the dryer. At a temperature between 40 and 100 °C it loses the vast majority of the moisture content. The bricks are transferred from the dryer to special kiln, where firing, the most important process, takes place. In the production of bricks used for polished production technology, another phase follows the firing. Cut-to-size bricks pass between large grinding wheels, making masonry units millimeter-accurate.

MAIN ENVIRONMENTAL IMPACTS

Clays are extracted using conventional mining techniques, which can have a profound impact on the local environment. Brick kilns use a large amount of energy.
Firing has polluted the environment not so long ago, but as a result of technological developments, modern brick factories now use energy-saving and environmentally friendly methods, such as filters in chimneys to reduce harmful substances and to recycle waste heat from firing, which used to be released into the air.

MATERIALS

TECHNICAL DATA	
Thermal conductivity (W/mK)	1,00
Density (kg/ m^3)	1000 - 2400

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IS-SusCon

ADOBE BRICK

APPLICATIONS

Frame-filling masonry, internal, non-load-bearing partition wall

PRODUCTION PROCESS

The adobe brick is made of different qualities of clay, granular aggregate (sand, clay soil) and fibrous aggregate (straw, chaff, possibly reed). It can be formed well in the wet state, it is plastic, strong enough after drying, but it shrinks. Fibrous additives increase the cohesiveness of the brick, reduce cracks due to shrinkage, and increase the thermal insulation capacity of the wall. Bricks can be produced both by hand and by machine. The traditional manual adobe brick was produced with a so-called seed frame. Fresh clay is filled into this pre-moistened form before use, compacted, the excess is peeled off with a trowel, and finally the seed frame is raised vertically. The adobe bricks thus prepared are dried in the sun in a natural way, rotated several times.
The mechanical adobe brick production is done by pneumatic, or hydraulic adobe press machines. These adobe presses are mobile, low-capacity machines that can be installed anywhere. The advantage of machine clay is that it allows you to make even and better quality clay bricks.

MAIN ENVIRONMENTAL IMPACTS

Adobe brick is an environmentally friendly, natural building material. The earth that is used can often be dug from the site of the building itself, providing a lower embodied energy.
It creates a pleasant, healthy indoor air condition. It requires less energy and produces negligible carbon dioxide compared to conventional building materials. It is almost uniquely reusable among structural building materials, it does not burden the environment after the building is demolished. Its user-friendliness is also reflected in the fact that it does not cause injury or allergic symptoms in contact with human skin.

MATERIALS

Source: http://forrastegla.hu/

TECHNICAL DATA	
Thermal conductivity (W/mK)	0,55
Density (kg/ m^3)	1420

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CALCIUM SILICATE BRICK

APPLICATIONS

Facade walls, partitions, internal load-bearing walls

PRODUCTION PROCESS

The raw materials (lime and sand) are added by weight (mixing ratio is about 1:12) and intensively mixed with water. The mixture is formed with fully automatic presses. This is followed by solidification of the raw bricks in an autoclave with steam aging at approx. 200 °C for four to eight hours, depending on the type of masonry unit. During the manufacturing process, bricks created from the mixture have a solid bond. After solidification and cooling, the lime sand bricks are ready for use, no pre-storage in the factory is required.

MAIN ENVIRONMENTAL IMPACTS

During the manufacture of lime sand bricks, no harmful substances are generated.
Even if the specific energy consumption of the production process is relatively low (in MJ/kg), the high density of lime sand brick can lead to significant weights of wall constructions with relevant total embodied energy.

MATERIALS

Source: https: www.ytong.hu

TECHNICAL DATA	
Thermal conductivity (W/mK)	0,75
Density (kg/ m^3)	2000

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AERATED CONCRETE BLOCKS

APPLICATIONS

Facade walls, partitions, internal load-bearing walls, floor and roof planks

PRODUCTION PROCESS

The main raw materials are quartz sand, lime, cement and water. Aluminum paste is the pore-forming additive. To achieve the correct grain fineness, the sand is ground in a ball rolling mill. The mixture poured into the mold reaches its final volume during pre-maturation, during which millions of closed pores are formed. The pre-solidified aerated concrete blocks coming from the heat tunnel having a temperature of 60 °C are lifted out of the molds and transferred to the cutting machine. The desired elements are cut to size with an accuracy of mm. The cut blocks coming from the heat tunnel are heated to 100 °C to solidify in the autoclaves during steam aging. The building blocks gain their final physical properties at the end of this process.

MAIN ENVIRONMENTAL IMPACTS

85% of the water vapor required for solidification is reused. Manufacturing waste is usually recycled during the process.
Although only used in small quantities here, aluminium is a very high embodied energy material.
Even if the specific energy consumption of the production process is not particularly low (in MJ/kg), it is compensated by the low density of aerated concrete blocks. This can lead to lighter weights and relatively advantageous total embodied energy of wall constructions.
Aerated concrete with its open texture does absorb a significant amount of CO2 from the atmosphere. This can reduces the overall global warming impact if the blocks are used on long term (150 yr). On the other hand, this effect is not advantageous for the technical performance of aerated concrete.

MATERIALS

TECHNICAL DATA	
Thermal conductivity (W/mK)	0, 134
Density (kg/ m^3)	600

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GYPSUM PLASTERBOARD

APPLICATIONS

Lightweight buildings, partitions, attics, cladding

PRODUCTION PROCESS

The basic materials of gypsum plasterboard are gypsum ($CaSO_4 \cdot 2H_2O$) and paper.
Natural gypsum is present in the earth's crust and it is mined in open pits by blasting and digging. Gypsum is also a by-product of industrial processes (flue-gas gypsum). Natural gypsum is crushed and sorted. The gypsum is calcinated in a kiln at different temperatures depending on the final product, ground and stored in silos.
Paper is usually made from recycled materials. The drywall sheets have a length of 2; 2.5; 2.75; 3 m and a width of 0.6; 1.2; and 1.25 m.

MAIN ENVIRONMENTAL IMPACTS

Mining of gypsum results in dust emissions. For the calcination, natural gas and fuel oil is the usual energy carrier.
During production, only steam is emitted, and during usage, as a built-in material, it has no emissions or radioactive radiation, since heavy metals and soluble salts are removed during the production of gypsum and it has no emissions or radioactive radiation during usage.
It has to be remembered that for the application of gypsum plasterboard, relevant metallic structures are needed, which increases the overall environmental impact.

MATERIALS

TECHNICAL DATA

Thermal conductivity (W/mK)	0,21
Density (kg / m3)	700

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