EDENHALL

BTB 3

BRICK TECHNICAL BULLETIN

ENVIRONMENTAL CHARACTERISTICS

ENVIRONMENTAL PERFORMANCE SUMMARY

- Edenhall bricks can be considered as a net absorber of CO_2 due to the continuous carbonation of concrete, or to give it a more accurate name, recarbonation, which is the reaction between carbon dioxide gas (CO_2) in the atmosphere, weak atmospheric acid, and calcium oxide. Calcium oxide is an alkaline product of cement which reacts with CO_2 to reform calcium carbonate ($CaCO_3$) as concrete ages.
- Concrete Bricks are 100% recyclable and suitable for, and indeed are reused as crushed aggregates.
- The aggregates used in the manufacturing process utilise materials that are often classed as a waste product of quarrying, being a by-product of manufacturing primary clean graded aggregates.
- Most aggregates used are from sources local to Edenhall's plants and brick delivery points are typically within 100 miles, therefore reducing the environmental impact and associated carbon footprint.
- Edenhall bricks are manufactured at a number of locations throughout the UK and have reduced environmental impacts compared with imported products, eg. imported bricks from Europe, which may travel 500 miles from factory to site and generate nearly 700kg/CO_2 per delivery, equivalent to 24kg/CO_2/Tonne. This compares with the more local deliveries from Edenhall of 8kg/CO_2/Tonne, approximately one third of that of clay imports.
- The high energy firing of kilns in clay production processes is not required for the curing of Edenhall bricks. We simply use the natural exothermic reaction of the cement with little additional energy input. This means minimal additional natural resources are consumed and overall emissions are reduced.
- Cements used in the production of Edenhall's bricks are supplemented by replacement materials such as blast furnace slag. Additionally Edenhall supports UK cement production facilities rather than the high carbon footprint associated with overseas and imported products.

CARBON FOOTPRINT OF EDENHALL BRICKS

The embodied CO_2 of dense concrete masonry products is estimated as 84kg/CO_2/Tonne*. This is assumed to be an "ex works" figure which takes into account the manufacture of the product itself, but not the transportation to site.

On a typical return journey of 160 miles a 44 tonne vehicle carrying 28 tonnes will produce about 8kg/CO_2/Tonne**. Hence the average total embodied carbon content of Edenhall bricks is estimated at 92kg/CO_2/Tonne manufactured and delivered to site.

By comparison clay bricks have an embodied carbon content of 244kg/CO_2/Tonne from quarry to site***.

Taking into account a typical end of terrace house of 31m^2 floor area using 3840 bricks and assuming 20% openings, the embodied carbon of a clay brick is 2202kg/CO_2/Tonne which over a design life of 100 years equates to 22kg/CO_2 per year.

The equivalent figure for a concrete brick is 1095kg/CO_2/Tonne or 11kg/CO_2 per year over the same design life. Therefore an Edenhall brick has 50% of the embodied carbon content of a clay brick thus halving the overall impact.

The recarbonation or CO_2 absorption characteristics of Edenhall bricks, as described above, can also offset any embodied carbon over the life of a building.

In addition, the slightly heavier mass of a concrete brick can contribute to improved sound reduction from external sources and can also add to the thermal mass of a building.

Finally, with their low cement content, locally sourced aggregates, use of cement replacements and natural exothermic curing regimes, along with local production factories which minimise haulage distances to site, Edenhall bricks are particularly environmentally friendly.

Copies of Edenhall's Environmental Policy, CPS4 and Sustainable Development Policy, CPS6 are available to download from the website – **www.edenhall.co.uk**

ENERGY CONSUMPTION TO PRODUCE EDENHALL BRICKS

Apart from power used by production equipment, little additional energy is required to manufacture and cure the bricks. Typically <5Kw hours are consumed for every tonne of finished brick product. The exothermic reaction of the cement is sufficient to cure the bricks to a condition where they can be handled and after that natural curing takes place to age harden the product, a process which continues to take place over the life of the brick.

Furthermore, minimal amounts of water are required in the process with usage averaging less than 0.00006 cubic metres per 1000 bricks

RECYCLABLE MATERIALS

All packaging materials, which are mainly in the form of plastic banding, shrinkwrapping and/or timber pallets or skids, are responsibly sourced, contain recycled material and are suitable for recycling.

ENVIRONMENTAL ASSESSMENT

As well as having a full set of policies which include; Health and Safety, Quality, Environmental, Equal Opportunities, Sustainable Development, Anti Bribery, Ethical Trading and Corporate and Social Responsibilities, Edenhall is also independently assessed against recognised environmental standards equivalent to ISO 14001.

ENVIRONMENTAL ISSUES

The key aspects pertaining to both environmental and sustainability issues are outlined below:

- Concrete brick is 100% recyclable and would be suitable for use as a crushed aggregate. It contains no deleterious salts or materials which could affect their future use. Edenhall recycles almost all in process material wastage during manufacture.
- The key materials used in the production of our bricks are generally from suppliers who are ISO 14001 compliant, demonstrating our commitment to the responsible sourcing of materials
- Generally our source of raw materials is within the locality of our works and our delivery points are on average within 100 miles of a factory, thus **minimising the impact, and associated carbon footprint, of transportation**.
- The geographical locations of our factories enable us to supply a similar product from any works to any location within the country with the minimum of haulage. **Concrete bricks are not imported**.
- **Concrete is an inherent CO_2 absorber** and a recent article published by the Concrete Centre demonstrates that concrete based homes take advantage of their inherent **thermal mass** to save a significant amount of energy over their lifetime compared with a lightweight construction.
- Our extensive network of stockists ensures that smaller, regular supplies to contractors can be made on a local basis rather than having to transport partial loads long distances.
- Our production method does not require any additional energy for curing over that of the normal exothermic reaction when concrete hardens. **No additional energy is required in the curing of the product thus saving natural resources (fuel/water) and reducing emissions (CO_2/NO_2)**.
- **Excellent thermal capacity and insulation properties**. The mass of concrete adds to the potential for solar gain which evens out variations in temperature within a building. In addition the 'U' values of a typical wall construction using concrete bricks compared to clay is similar (ref. CBA 'U' Value calculations where concrete brick can be substituted for dense aggregate block).

REFERENCES:

* ***Data derived from British Precast Fact Sheet - "Generic Carbon Footprint of Aggregate Blocks". (Note: Aggregate blocks and concrete bricks have similar densities and cement contents)***

** ***Data derived from Road Haulage Association Document - "Carbon Footprint Explained"***

*** ***Data derived from Brick Development Association Document - "Sustainability"***

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