

Fastbuild and Sustainability

Over recent years, the Hanson Heidelberg-Cement group has adopted a number of initiatives to improve sustainability in the manufacture of its cement products, including Structherm Fastbuild®. Hanson UK is now the lowest producer of CO₂ per tonne of cement in the UK, 5% below industry average. This demonstrates an overall drop in energy consumption of nearly 17% per tonne of product since 2005 and the company now uses more waste than it generates.

Key Facts about Structherm Fastbuild®:

- Structherm's Fastbuild system is manufactured to ISO 14001 using responsible sourcing, as required by the MAT 2 section of the Code
- Fastbuild is manufactured in its entirety within the UK, meaning delivery distances are reduced, less fuel is required for haulage and therefore less CO₂ emissions are produced
- Concrete is the first material to gain responsible sourcing accreditation to BES 6001 (*The Concrete Industry Sustainability Report 2010 – The Concrete Centre*) and this will allow products, such as Fastbuild, to achieve the highest tier of responsible sourcing in the Code for Sustainable Homes and BREEAM
- The concrete walls and floors utilised in the Fastbuild system have an excellent Thermal Mass Parameter (TMP) that significantly reduces the energy required for heating and cooling. The new SAP 2009 which becomes mandatory in October 2010 will enable the full benefit of Fastbuild thermal mass to be taken into account
- The off-site construction method and working to a pre-engineered design means less waste is generated on site
- Recycled steel reinforcement is used in all Fastbuild panels
- Fastbuild achieves excellent air tightness and acoustic results consistently
- Has excellent, inherent fire resistance properties
- Toxic chemical treatments are not required to prevent deterioration
- Recycled water is used throughout the Fastbuild manufacturing process
- Fastbuild buildings require +50% less air conditioning over their expected life, therefore reducing CO₂ emissions
- Structures built using the Fastbuild system have a minimum of 60 years design life



Above: Park Central Development, Birmingham

Conclusion

The advances in the manufacturing and sourcing process of concrete/cement production, alongside the associated benefits that the material brings, mean that the Fastbuild system can offer a sustainable solution to building development.

Preconceptions of which building materials should be used to achieve a Code Level 6/Zero Carbon building are questionable. When all of the properties of concrete are taken into consideration, a Code Level 6 building is perfectly achievable using Structherm Fastbuild®, as this document proves.



Table 2: an example of a Code Level 6 building (Zero Carbon) using Fastbuild and the breakdown of the scoring system for each part of the design and construction.

			Score	Credits available	Sub-total	Credits available	% achieved	Weighting factor	Credits Score	
Energy	Ene 1	Dwelling Emission Rate	15	15						
	Ene 2	Building fabric	2	2						
	Ene 3	Internal Lighting	2	2						
	Ene 4	Drying Space	1	1						
	Ene 5	Energy Labelled White Goods	2	2	29	29	100	0.364	36.4	
	Ene 6	External Lighting	2	2						
	Ene 7	ZLC Energy Technologies	2	2						
	Ene 8	Cycle storage	2	2						
	Ene 9	Home Office	1	1						
Water	Wat 1	Internal Potable Water Use	5	5	6	6	100.0	0.09	9.00	
	Wat 2	External Potable Water Use	1	1						
Materials	Mat 1	Environmental Impact of Materials	12	15	24	21	87.5	0.072	6.3	
	Mat 2	Responsible Sourcing of Materials: Basic Building Elements	6	6						
	Mat 3	Responsible Sourcing of Materials: Finishing Elements	3	3						
Surface Water Runoff	Sur 1	Reduction of Surface Water Runoff from Site	2	2	4	4	100.0	0.022	2.20	
	Sur 2	Flood Risk	2	2						
Waste	Was 1	Household Waste Storage and Recycling Facilities	4	4	7	7	100.0	0.064	6.40	
	Was 2	Construction Site Waste Management	2	2						
	Was 3	Composting	1	1						
Pollution	Pol 1	GWP of Insulants	1	1	4	4	100.0	0.028	2.80	
	Pol 2	NOx Emissions	3	3						
Health and Wellbeing	Hea 1	Daylighting	3	3	12	12	100.0	0.14	14.00	
	Hea 2	Sound Insulation	4	4						
	Hea 3	Private space	1	1						
	Hea 4	Lifetime Homes	4	4						
Management	Man 1	Home User Guide	3	3	9	9	100	0.1	10.00	
	Man 2	Considerate Constructors	2	2						
	Man 3	Construction Site Impacts	2	2						
	Man 4	Security	2	2						
Ecology	Eco 1	Ecological Value of Site	1	1	8	8	100	0.12	12.00	
	Eco 2	Ecological Enhancement	1	1						
	Eco 3	Protection of Ecological Features	1	1						
	Eco 4	Change of Ecological Value	4	4						
	Eco 5	Building Footprint	1	1						
									Score:	99.1
									Rating:	Level 6

All information contained in this document is correct at time of printing - July 2010
Structherm Ltd is part of the Hanson-HeidelbergCement Group



The Code for Sustainable Homes & Structherm Fastbuild®

How to achieve Code Level 6





Above: Park Central Development, Birmingham

In December 2006 the Department for Communities and Local Government (DCLG) launched a publication entitled 'The Code for Sustainable Homes'

This introduced a single national standard to be used in the design and construction of new homes in England, based on the BRE's EcoHomes[®] scheme.

The Code for Sustainable Homes is designed to measure the sustainability of the 'whole home' as a complete package, against a set of sustainable design principles covering performance in the nine key areas listed below:

1. Energy and CO₂
2. Water
3. Materials
4. Surface water run-off
5. Waste
6. Pollution
7. Health and well-being
8. Management
9. Ecology

Adoption of the Code is intended to encourage continuous improvement in sustainable home building. In each of the areas, performance targets in excess of the minimum required to satisfy building regulations are proposed; however, these are considered to be sound best practice, technically feasible, and within the capability of the building industry to supply.

The minimum standards required to attain each code level are illustrated in Table 1 below:

Table 1: Minimum Standards:				
Code Level	Energy	Water	Other Points Required	Total Points
	Percentage better than Part L	l/person/day		
Level 1 (*)	10	120	33.3	36
Level 2 (**)	18	120	43.3	48
Level 3 (***)	25	105	46.7	57
Level 4 (****)	44	105	54.1	68
Level 5 (*****)	100	80	60.1	84
Level 6 (*****)	Zero Carbon	80	64.9	90

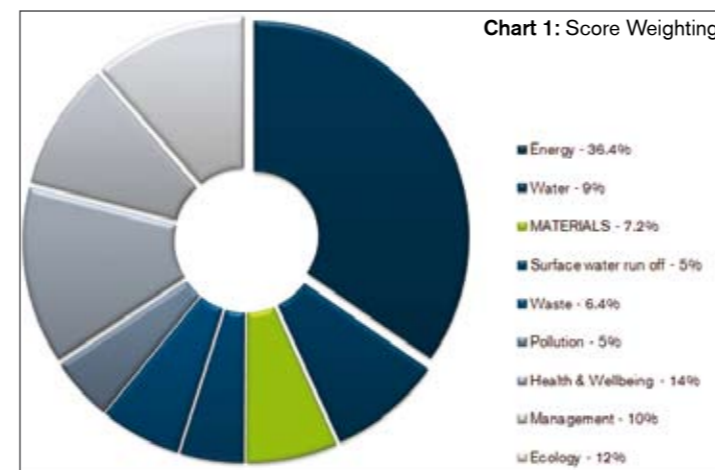
Score Weighting

The Green Guide to Specification suggests that the use of concrete products does not enable a particularly 'green' construction methodology. The Green Guide is not, however, a service life planning tool. The guide adopts a study period of 60 years for the Life Cycle Assessment (LCA) of concrete based products, such as Fastbuild, and takes repair and maintenance into consideration. It is widely accepted that the majority of concrete and masonry buildings will last far longer than this, and so are disadvantaged as the embodied impacts of such buildings reduce over time. It is important to note the relatively small weighting placed on the material used in construction according to the Code – only 7.2% (see Chart 1).

Therefore, even though the Green Guide may not consider concrete the most eco-friendly construction material, a Code Level 6 building can be achieved – as illustrated in Tables 2 and 3, below.

Energy & CO₂ Emissions (Ene 1 & 2)

The Fastbuild system can greatly assist in achieving a good points score within sections Ene 1 & 2. Fastbuild has achieved excellent air tightness results due to its consistent build method, which significantly limits uncontrolled air leakage. The high thermal mass parameter (TMP) achieved using Fastbuild floor and wall elements enables a building to be designed and constructed using passive ventilation and cooling, therefore avoiding the need for forced ventilation and air conditioning.



Materials Section (Mat 1, 2 & 3)

A project utilising A+ materials for Mat 1 would achieve 100% of the points available. In comparison, a typical 4 storey Fastbuild construction is illustrated in Table 2 below:

Table 2: Element specification of a typical Fastbuild 4 storey structure:					
Element	Type	Specification	% elemental area	Green Guide rating	
Roof	1	Main Part	100%	A+	3
External walls	1	External wall	100%	A	2
Internal walls	1	Load bearing 200mm Fastbuild Party Walls	34%	D	2.065
	2	Non load bearing partitions by others	66%	A+	
Floor – upper and ground	1	Upper floor/hollowcore planks with suitable finishes	75%	A	2.25
	2	Ground Floor	25%	A+	
Windows	1	Windows	100%	A+	3
					Total

A maximum points score of 15 can be achieved in the Mat 1 section of the Code. The Fastbuild system is assumed to achieve a score of 12. When taking into consideration the further two parts of the Materials section of the Code the following assumptions are made:

Table 3: Scoring of the Materials section:								
		Score	Credits Available	Sub-total	Credits available	% achieved	Weighting factor	Credits score
Materials	Mat 1	12	15	21	24	87.5	0.072	6.3
	Mat2	6	6					
	Mat 3	3	3					

The credit score achieved by the Fastbuild system is 5.7 compared to a maximum of 7.2, meaning only 0.9 points are lost - only 0.9% of the overall score. Assuming all other key areas of the Code were specified to A+ standards, and full points gained, a Code Level 6 is easily achieved using Structherm Fastbuild[®] with a final score of 99.1.



Above: Ground breaking eco-development at Primrose Hill in Huddersfield

Health and Well-being Section: Sound Insulation (Hea 2)

The 'Health and Well Being' section of the Code places an emphasis on Sound Insulation. The Fastbuild system contains many inherent benefits, including excellent acoustic properties, which have been proven time and again during testing.

The credits awarded for final acoustic values achieved are as follows:

Airborne Sound Insulation Values at least x dB higher and impact sound for floors x dB lower than buildings regulations approved document E (2003 edition with amendments 2004)	Credits Awarded
3	1
5	3
8	4

The Fastbuild system consistently achieves scores of over 8dB higher than required by Building Regulations, giving the full credits available in the Code.

The 'Health and Wellbeing' section contains 4 sub sections overall (Hea 1 - 4) allowing 12 credits, which, with a weighting of 1.17, totals 14 available points. Due to the high weighting for sound insulation, the difference between gaining no points and achieving 4 points accounts for 4.67% of the final score. This demonstrates that the Code places more emphasis upon 'Health and Wellbeing' than on the materials utilised.

By choosing to use Fastbuild, high levels of sound insulation are achievable and this can therefore easily offset any small reduction incurred under the Materials section.

Health and Well-being Section: Lifetime Homes (Hea 4)

Further points can be accrued in section Hea 4 as a result of the ability to modify internal partition layouts easily as only the primary separating walls are load bearing. Typically, a timber framed construction has load bearing internal partitions, making it harder to modify the layout in the future.