



# paving

for sustainability

A GUIDE TO SUSTAINABLE PAVING  
WITH PRECAST CONCRETE



**Interpave**

THE PRECAST CONCRETE PAVING  
AND KERB ASSOCIATION



# Precast Concrete Sustainable Paving

A widely used and accepted definition of sustainable development is: "...meeting the needs of the present without compromising the ability of future generations to meet their needs" (the Brundtland report, 1987). The UK Government, Scottish Executive, Welsh Assembly Government and the Northern Ireland Administration have agreed upon a set of principles that should be respected:

- Living within environmental limits
- Ensuring a strong, healthy and just society
- Achieving a sustainable economy
- Promoting good governance
- Using sound science responsibly

All these principles are centred around the three known pillars of sustainable development. These pillars are Environmental Protection, Social Progress and Economic Growth. In order to focus efforts to improve, the UK has identified these four priority areas for immediate action:

- Sustainable Consumption and Production
- Climate Change and Energy
- Natural Resource Protection and Environmental Enhancement
- Sustainable Communities

This document aims to show that precast concrete paving and kerb products from Interpave manufacturers meet all these demands and other sustainability requirements. It provides an overview, with links or downloads for further detail, covering:

**INTERPAVE AND ITS MEMBERS** – commitments and procedures for environmental improvement

**A LOCALLY BASED INDUSTRY** – national coverage while minimising transportation and supporting local economies and communities

**A SUSTAINABLE MATERIAL** – precast concrete benefits and improvements

**SUSTAINABLE PAVING PRODUCTS** – special environmental characteristics of precast concrete paving from Interpave manufacturers

**ENVIRONMENTAL IMPACT** – independent assessment with the BRE Green Guide

**SUSTAINABLE PAVING IN USE** – including sustainable drainage systems (SUDS) and impacts on BREEAM assessment

**PAVING FOR SUSTAINABLE COMMUNITIES** – playing a major role in shaping external spaces for the enjoyment of all

Further Information -

[www.defra.gov.uk/sustainable/government](http://www.defra.gov.uk/sustainable/government)



# Interpave and its Members

Interpave is the Precast Concrete Paving and Kerb Association, promoting and providing the central information resource for concrete block paving, paving flags and kerbs – ranging from domestic uses to the most taxing heavy industrial applications. Interpave represents the UK's leading manufacturers and is a product association of the British Precast Concrete Federation Ltd (BPCF). It works closely with The Concrete Centre – the central development organisation for the UK cement and concrete industry.

Interpave's primary role is to communicate with the building industry, providing definitive guidance – in the case of sustainability issues, working closely with BPCF's own in-house sustainability team, as well as the Concrete Centre. Interpave also contributes to the development of British Standards, and industry guidance (via organisations such as CIRIA), training and improving health and safety, in liaison with the Health and Safety Executive.

All Interpave block paving manufacturers have committed to the **British Precast Concrete Federation Sustainability Charter**, a copy of which can be downloaded via [www.paving.org.uk/sustainability-interpave-members.php](http://www.paving.org.uk/sustainability-interpave-members.php). This is supported by key performance indicators which provide an overview of the precast industry. The first review demonstrates that it is being managed responsibly and it is envisaged that the set will be expanded in time to include all of the sustainability issues facing the industry.

Interpave manufacturers all have senior managers and directors specifically tasked with executing sustainability policies and continue to explore ways of improving performance in all areas and demonstrating that performance to stakeholders. Recycling, reducing waste and responsible use of resources all form part of this ethos, as demonstrated in this area of the website. Ongoing investment in plant, automation and processes not only improves efficiency but also continues to improve the health and safety of Interpave manufacturers' workers. Interpave manufacturers are working towards or have achieved BS EN 14001 compliance in all manufacturing plants – see individual member's websites for current status.

Full details of Interpave members' sustainability policies can be found on their individual websites. A list of manufacturer members, their products and links to their websites can be found at: [www.paving.org.uk/manufacturer\\_members.php](http://www.paving.org.uk/manufacturer_members.php)



*Investment in state-of-the-art robotic equipment and related processes by one Interpave member avoids workers handling product and has reduced the lost time injury frequency rate by over 65%.*

## Further Information

[www.britishprecast.org/sustainableprecast/index.php](http://www.britishprecast.org/sustainableprecast/index.php)

# A Locally Based Industry

A key principle of sustainability is that a product should be manufactured as close as possible to where it will be used to:

- minimise the need for transport and the associated environmental, economic and social impacts of transportation
- support the local economy and create local employment
- prevent the export of the associated environmental impacts of production to another location with less stringent environmental and social protection legislation.

Interpave manufacturers have production plants located around the UK, offering effective national coverage minimising product transportation. Similarly, production plants have historically been sited to optimise local sourcing of manufacturing materials. Unlike imported precast concrete, granite or sandstone products, or plastic based materials of unknown origin or requiring reprocessing, no trans-world shipping is involved. But Interpave manufacturers are also working on other improvements, for example with truck efficiency including driver training, use of bio-fuels and tyre pressure monitoring.

Interpave manufacturers use the latest, automated plants which are clean and quiet, making them good neighbours. They employ an ethos of responsible materials sourcing, taking particular account of the impact of extraction on the environment. As substantial employers, they play an essential role in the economic and social well-being of local communities throughout the UK.



*An Interpave member is working with The Wildlife Trusts in their part in the BBC's Breathing Places campaign, aiming to mobilise the public to become more actively involved in nature conservation.*



# A Sustainable Material

Precast concrete offers a range of important, inherent material characteristics, being:

- durable – being inorganic it will not rot or burn or need treating with chemicals to maintain it
- inert – it can maximise industrial ecology and does not release harmful substances such as volatile organic compounds (VOCs)
- flexible – it can be engineered to give different properties and can replicate natural materials so that their finite reserves are protected
- long-lasting and durable
- Recyclable – it can be made of recycled materials and the concrete itself can also be recycled
- local – produced in the UK, with locally sourced materials under strict environmental and social legislation, for local supply.

The main industries supplying Interpave manufacturers continue to drive forward with environmental improvements. Many cement companies are aiming for significant reductions in their global CO<sub>2</sub> emissions and all are implementing the Cement Sustainability Initiative developed through the World Business Council for Sustainable Development (WBCSD). The cement industry has also signed up to the UK Government Climate Change Agreement and will deliver an energy efficiency improvement across the sector of 25.6% between 1990 and 2010. The industry also actively recovers the energy from wastes by using them to replace fossil fuels.

The quarrying industry is also keen to address environmental issues and works closely with relevant government

agencies to ensure continuous improvement. All quarries have rehabilitation plans and the aggregates industry operates within tightly regulated environmental planning constraints. Around 25% of aggregates used in the UK are from recycled and secondary sources – the highest aggregates recycling rate in Europe.



*An Interpave member has won 38 awards in 32 years for the quality of its restoration and aftercare of its quarries, promoting biodiversity.*



## Further Information

[www.sustainableconcrete.org.uk](http://www.sustainableconcrete.org.uk) and [www.concretecentre.com](http://www.concretecentre.com)

# Sustainable Paving Products

A precast concrete block or flag pavement comprises a relatively thin layer of concrete supported on a sub-base, compared with the equivalent in-situ concrete pavement requiring a greater thickness of concrete. Also, precast concrete paving and kerbs from Interpave manufacturers use less cement than site-poured concrete pavements and kerbs. This is because products are manufactured on modern, automated plant under factory conditions using concrete with low cement/water ratios that is pressed and vibrated to ensure full compaction of the concrete mix and then cured in controlled conditions, maximising strength and durability characteristics, with minimal waste.

Harvesting and recycling of water for manufacture is a growing trend – in fact some Interpave manufacturers' plants use no mains water. Interpave manufacturers are also reducing cement in their processes and maximising cement replacement products – involving extensive research and testing – with no performance disadvantages.

Recycling is well established in the precast concrete paving industry with reuse of some products where practical, enabled by their long life span. This is particularly common with reinstatement following below-ground work, for example to services without leaving evidence, in contrast to the patched areas always apparent in an asphalt reinstatement. Alternatively, precast concrete paving products can be crushed as aggregate for reuse where it is sustainable to do so – with the aim of saving energy, carbon footprint and waste.



*An Interpave member reduced the use of water from mains and boreholes by 30% between 2003-2005 by greater use of recycled water and harvested rainwater.*



## Further Information

Full details of Interpave members' sustainability initiatives can be found on their individual websites. A list of manufacturer members, their products and links to their websites can be found at: [www.paving.org.uk/manufacturer\\_members.php](http://www.paving.org.uk/manufacturer_members.php)

# Environmental Impact

The BRE 'Green Guide to Specification' provides independent endorsement of the low environmental impact of precast concrete paving, particularly in comparison with imported materials. It rates and compares a range of specifications within various construction elements, with summary ratings ranging from 'A+' for best environmental performance to 'E' for the worst. Three different paving scenarios (together with 'boundary protection') constitute the Landscaping category of the Green Guide and cover: Pedestrian Areas, including communal spaces, walkways and garden paving; Lightly Trafficked Areas, such as car parking; Heavily Trafficked Areas, for heavier vehicles or repetitive traffic. The same three scenarios – with identical results – are applied across the six different building types considered by the Green Guide. But the ratings also provide essential guidance for local authorities to exercise their responsibilities for sustainable materials on roads and public spaces unrelated to particular buildings.

The summary environmental ratings for a range of precast concrete paving specifications – covering blocks, flags and 'grass concrete' units – are generally 'A' or 'A+' across all three scenarios.

These ratings provide independent endorsement of the low environmental impact of precast concrete paving, particularly in comparison with imported materials, helping specifiers and local authorities to make responsible material choices. They also reflect the on-going environmental investments and improvements made by Interpave manufacturer members, as well as by the cement industry generally. Although not considered in the Green Guide, precast concrete kerbs will have similar environmental characteristics to concrete flags, whereas the environmental characteristics of alternative kerbing materials such as plastic remain an unknown quantity.

Local material sourcing and product supply is also a key element of sustainable construction, and equivalent paving products shipped into the country bear a substantial CO<sub>2</sub> emission load over those locally supplied. Some imported stone paving products are also included in the Green Guide – generally with much poorer environmental ratings than their precast concrete equivalents and half with the worst 'E' rating.

Despite a waste level of 0.1% of production volume, an Interpave member is in the process of developing a new corporate waste reduction target of zero waste to landfill by 2012.



*The latest products from Interpave manufacturers make use of the most sustainable resources while retaining impressive performance and visual characteristics. For example, here copper slag – a by-product from copper smelting – is used to create the decorative finish, while china clay stent – a by-product of the china clay industry – is used as an aggregate instead of quarrying virgin materials.*

## Further Information

Download Interpave's 'Environmental Impact of Paving' document via [www.paving.org.uk/downloads.php](http://www.paving.org.uk/downloads.php) or visit [www.thegreenguide.org.uk](http://www.thegreenguide.org.uk)

# Sustainable Paving in Use

There are a number of – perhaps surprising – environmental implications of using precast concrete paving. Precast concrete paving products are inherently thin with a large relative surface area enabling them to re-absorb significant amounts of CO<sub>2</sub> from the atmosphere during their lifetime.

In our towns and cities, using materials with a high albedo, such as concrete block or flag paving, in place of asphalt can reduce the impact of development and reduce the urban heat island effect. Urban heat island occurs where an urbanised area is significantly warmer than its rural surroundings. Precast concrete paving also differs substantially from asphalt in terms of luminance, or the amount of light reflected off the paving. For asphalt, luminance is only about 7% whereas block paving achieves between 15% and 30%. This often-overlooked area has implications for street lighting design and safety in terms of contrasting pedestrians against paving at night.

Undoubtedly, one of the most important environmental benefits is concrete block permeable paving as part of sustainable drainage systems (SUDS) which form part of government planning policy around the UK. Unlike conventional paving which requires runoff collection by gulleys and pipes, concrete block permeable paving acts as the drainage system as well as supporting traffic loads. It allows water to pass through the surface – between each block – and into the underlying permeable sub-base, designed specifically for this role. Here, it is stored and released slowly, either into the ground, to the next SUDS management stage or to a drainage system, or alternatively harvested.

BREEAM (Building Research Establishment's Environmental Assessment Method) and the Code for Sustainable Homes (which will, inevitably, play a major role in the eco-towns currently proposed by government) address the benefits of concrete block permeable paving as a sustainable drainage systems (SUDS) technique. Concrete block permeable paving reduces the amount and rate of runoff, and removes many of the pollutants in that runoff. It can also benefit biodiversity by providing unpolluted water for wildlife, plants and trees, while eliminating the hazards that open gulleys present to wildlife.

Many of these benefits are recognized with credits in BREEAM 2008. For example, one credit is offered where SUDS are used to limit runoff from a development to that of the site's natural state and another where SUDS provide on-site treatment to minimize watercourse pollution. Credits

for beneficial impacts on local ecology are also available, where permeable paving can contribute. Using permeable paving to harvest water for irrigation is also recognized with a credit, as is harvesting for toilet and urinal flushing. Some similar provisions are included in the Code for Sustainable Homes.

In addition, BREEAM specifically recognizes the best ratings from the BRE Green Guide with 1 credit available where at least 80% of the combined area of external hard landscaping and boundary protection specifications achieve a Green Guide A or A+ rating – generally the case with precast concrete paving.



Photo: Denis Jones

*Code Level 6 Barratt Green House (shown here) and the adjacent Level 4 Hanson EcoHouse at the BRE Innovation Park use concrete block permeable paving for rainwater harvesting.*

## Further Information

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document via [www.paving.org.uk/downloads.php](http://www.paving.org.uk/downloads.php) or visit [www.thegreenguide.org.uk](http://www.thegreenguide.org.uk)



# Paving for Sustainable Communities

An essential characteristic of precast concrete products is that they are fully engineered, manufactured and tested to British Standards under modern, controlled conditions. This means that they all exhibit the same slip resistance and many other characteristics, ensuring consistency, safety and accessibility for all users across the whole surface whichever combinations of products is used. Precast concrete paving and kerbs from Interpave manufacturers comply with all aspects of test procedures stipulated in the latest British Standards, designed to replicate performance in use over time, thus ensuring long-term performance and minimal replacement. This reassurance may not be available with imported natural stone or other materials such as plastic.

Interpave manufacturers have completely transformed precast concrete paving and kerb products with a palette of designs, colours and textures offering a visual richness and huge design choice atypical of mass production – and with a quality suitable for the very best in current urban design, whether traditional or modern, as demanded by current planning guidance. Paving blocks, flags and kerbs can undergo secondary processes in the factory to give different textures, some exposing their inherent aggregates. Surfaces can be honed for a flat finish or polished, or products shot blasted to look weathered or tumbled for a more rugged, natural appearance. This design flexibility also enables clear differentiation – particularly within shared surfaces – to help visually impaired people to make full use of the paved environment. Precast concrete is also best-suited for the prescribed range of tactile paving to guide blind and partially sighted people.

Therefore, precast concrete paving offers a unique combination of predictability and a single material with scope for endless variety in shape, scale, colour and texture to enrich the urban environment and facilitate accessibility for all.



*An Interpave member has worked closely with Cardiff City Council to develop a special paving flag finish, adding to a specific local identity.*

## Further Information

Download Interpave's 'Planning with Paving' guidance document via this page:

[www.paving.org.uk/planning\\_with\\_paving.php](http://www.paving.org.uk/planning_with_paving.php)



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