Life Cycle Assessment
Delivering sustainable construction
The construction industry, and therefore British Gypsum, has a big role to play as it shapes our built environment. In recent years the construction industry has seen many changes, including a focus on health, safety and well-being, climate change and workforce development.

At British Gypsum we ensure that our solutions don’t just meet the needs of the industry today, but that they meet all of its needs for tomorrow too. This means that we need to embrace the challenge of balancing our responsibilities to employees, customers, suppliers and our local communities.

Our commitment is to minimise the impact of our products and systems on the environment. We achieve this in a number of ways:

— Manufacturing at multiple sites across the UK to ensure our materials are close to our customer and are transported in the most environmentally, efficient and safest method possible
— We continually monitor the environmental impact of our products from raw material extraction through to the end of their life at demolition and recycling via industry recognised and independently verified Life Cycle Assessment (LCA) methods. This gives our customers transparent and relevant environmental information to be able to make informed business decisions
— Consistently setting resource efficiency targets to reduce our energy and water consumption, as well as aiming to eliminate all non-recyclable waste going to landfill from our operations
— Implementing an eco innovation strategy to consider all of the environmental impacts of any potential new products to ensure British Gypsum continually innovate responsibly by minimising the impact of our systems and services for our customers

Mike Chaldecott
Managing Director

Understanding the environmental performances of construction products is a growing expectation for professionals in the construction industry. In British Gypsum, we strongly believe that Life Cycle Assessment (LCA) is the most reliable tool available to assess the green credentials of our construction products. LCA provide fact-based environmental impact information for our customers via more manageable Environmental Product Declaration documents that are available on the British Gypsum website: british-gypsum.com/about-us/sustainability

Our ‘EPD verified’ policy

When the results of an LCA are checked by an independent third party (called an Environmental Product Declaration or EPD), it is said to be ‘verified’. British Gypsum verify their EPD independently, as this demonstrates the results our customer see are unbiased, reliable and not false environmental claims. This is why British Gypsum are committed to have verified EPD that can be easily identified thanks to our ‘EPD Verified’ pictogram.

What is a Life Cycle Assessment (LCA)?

LCA is a comprehensive methodology to evaluate the environmental impacts of a product over its whole life cycle according to specific ISO or EN standards (ISO 25930 and EN 15804).

— Multi-criteria tool: consumption of natural resources, air, ground and water emissions, waste generation, global warming potential
— Multi-step tool: ‘from cradle to grave’, meaning from the extraction of raw materials to the product’s end-of-life

The results of an LCA are presented in the form of an Environmental Product Declaration (EPD), which is published.

Museum of Transport in Glasgow, Scotland
Plaster and plasterboard the most modern of old materials

Gypsum is a natural resource, a mineral rock, embedded in the ground. It has been widely used in construction for over five thousand years and is proven to be not only durable but also easy and safe to use. Ancient Egyptians used gypsum to build the great pyramid of Cheops and in modern times the material was also used as arabesque decoration—stucco in Alhambra, Spain.

Gypsum is an inherently sustainable material as it can be completely recycled an infinite number of times. Removing water from gypsum rocks through dehydration at around 160°C produces a plaster powder used to make both plasters and plasterboards and is scientifically known as calcium sulphate. This process is totally reversible: adding water reproduces gypsum.

Gypsum has many environmental qualities:
- Sustainable material
- Fire resistant
- Contains no hazardous substance i.e. non-toxic
- Infinitely recyclable

Gypsum is mixed mainly with water and starch to create a paste (slurry) which is introduced between two layers of paper. Glue is not necessary as starch is acting as a binder between both materials.

After rapid setting, plasterboards are able to be pre-cut before entering the dryer.

The board is dried at temperatures from 90 to 300°C to evaporate excess water and get strength.

Finally plasterboards are resized, stacked on pallets, warehoused and dispatched.

Dry lining versus traditional solutions

A comparison between plasterboard and conventional brick walls clearly favours our gypsum solutions.
- Lightweight
- Fewer natural resources per m²
- Low energy consumption in production
- Low CO₂ emissions over whole life cycle
- Time-saving during installation
- Performance ranges according to the application
- Flexible design
- Recyclable

Description of plasterboard manufacturing process steps

1. Gypsum (either from a natural, synthetic or recycled source) is crushed and dehydrated at around 160°C to produce the plaster powder.
2. The plaster powder is mixed mainly with water and starch to create a paste (slurry) which is introduced between two layers of paper. Glue is not necessary as starch is acting as a binder between both materials.
3. Paper used for our plasterboards is almost 100% recycled.
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At British Gypsum we think that a life cycle approach is key

Not only do we want to offer products with high levels of performance in use but also products that respect the environment throughout their whole life, from raw material extraction through to recycling.

**Raw materials — p.8**
Gypsum, a sustainably extracted natural resource from mines but is also recycled and is a by-product from power stations.

**Manufacturing — p.9**
A manufacturing process with low emissions and measured water consumptions.

**Logistics — p.10**
We continuously improve the transportation of our raw materials and finished products, using the most environmentally and economically efficient methods.

**Recycling — p.14**
Gypsum is 100% recyclable, indefinitely.

**Installation — p.11**
Flexible and lightweight solutions limiting waste generation on jobsite.

**End-of-life — p.14**
Easy to dismantle and recycle solutions.

**Building lifetime — p.12**
Comfortable, efficient and healthy buildings.
Limiting our impact on natural resources

Raw materials

Key assets

At British Gypsum, we use either natural gypsum, synthetic gypsum (from desulphurising the flue gas of coal-fired power plants) or recovered gypsum from the waste-recycling chain.

— Extracting natural gypsum does not require much energy. In addition, mines in use are continuously restored in order to preserve the natural site and its biodiversity.

— We also work to minimise the effects on local communities and the environment. This includes the visual impact of operations, dust, noise and vibration, added road traffic, and any repercussions on the natural surroundings.

— At the same time, the desulphurisation process represents an opportunity to tackle natural resource depletion and decrease sulphur dioxide emissions.

— Recycling gypsum is an opportunity to preserve natural resources.

— Almost 100% of the paper used to manufacture our plasterboards is recycled paper.

Paper sourcing

Through ongoing work with our paper suppliers, in Europe we are able to provide plasterboard with 97.4% to 100% of recycled paper. In cases where the paper is not from a recycled source, we ensure that it comes from sustainably managed forests in Europe. One way to guarantee that commitment is the FSC label.

We work closely with the neighbourhood around our mines, throughout their operational life, taking care to avoid any acoustic and visual pollution.

Sustainably producing plaster and plasterboard

Manufacturing

Key assets

— Manufacturing plasterboard is a very low energy-consuming process as the calcination, transformation of gypsum into plaster, and drying stages only require low temperatures, around 160°C and 90-300°C respectively.

— The other main plasterboard production input in the process is water. We strive to increase the percentage of reused water in our process (rainwater or steam).

— Even if on the whole this is a low consumption and emission process, we have a threefold target to reduce our energy consumption, CO₂ emissions and waste generation by 5%. We support Saint-Gobain’s policy to purchase green electricity wherever possible and cost effective to do so.

— We have also introduced a ‘zero landfill waste’ policy to avoid sending production waste to landfill and, at the same time, consume fewer primary raw materials by directly recycling scrap.

— All of British Gypsum’s sites are certified to ISO 14001 and our manufactured products to BES 6002.

Our environmental targets for 2014 are:

— Zero environmental incidents
— Reduce energy performance index by 1%
— Reduce waste per tonne by 5%
— Reduce water withdrawal by 5%
— Zero non-recovered waste by 2015
— Zero gypsum waste to landfill
Minimising CO₂ emissions during transport

**Logistics**

Many projects are already implemented to optimise our logistics and decrease transport-related carbon emissions.

- We optimise truck loading to avoid vehicles leaving our plants less than full.
- We arrange different transport means for our raw materials and finished products wherever possible. For example, boat transportation leaves less environmental impact than road freight. Mine to plant electric strip conveyors enable us to take a large number of trucks off the road every year!
- We rely on our local manufacturing facilities to ensure that materials are produced as close as possible to the end-user.

- In our logistics centres, we work with haulage companies to develop better transportation practices (eco-drive training courses, natural gas).

Locating manufacturing facilities close to quarries minimises the transportation of gypsum for processing, just as working with our local distribution partners helps shorten the distance when shipping finished products to installers and building sites.

Minimising waste by design

During the design stage, British Gypsum’s specification team works with architects and consultants on the building design to minimise waste. Together, they review the location of doors, windows, etc. to define solutions with the right dimensions to fit the building layout. Thanks to this collaborative phase, off-cuts and waste are limited.

**Installation**

- British Gypsum works directly with installers to train them and ensure that our solutions are installed in the best conditions. There is a need for trained workers skilled in sustainable products and technologies. We can fulfil these training needs through our technical academies around the country.
- Gypsum solutions generally offer a number of key benefits over traditional brick, block, sand and cement solutions.
- As a dry solution there is less mess on the jobsite and their light weight (10 times lighter in the case of plasterboard partitions vs. traditional partitions) reduces transportation, crane activity and even the depth and material involved in foundation design.
- This huge weight saving also translates into less manual handling by installers and less material weight in the building when it is eventually deconstructed.

Construction waste to landfill is reduced by bespoke board sizes to minimise cut-offs.

The building market is evolving very quickly when it comes to environmental issues. British Gypsum provides training to its customers, enabling them to keep their skills up-to-date with the latest regulations and technologies.
Improving user’s comfort, safety and health

Building lifetime

During buildings’ lifetimes, our solutions contribute to the comfort, safety and health of people living there. The occupants’ comfort is associated with several benefits, which can be provided by:

— Acoustic comfort: better sound insulation between spaces and enhanced sound absorption within a room
— Thermal comfort: insulation complex and high level of air-tightness
— Flexibility: easy to install and products can be easily reconfigured or removed during their lifetime
— Easy maintenance
— Visual comfort: aesthetic ceilings solutions and smooth walls finishing
— Fire safety is embedded in our products and we offer solutions with high fire resistance performance
— Finally not only will our products not deteriorate the building’s indoor air quality but, thanks to ACTIVair technology, our plasterboards can actually improve the indoor air environment by capturing and locking away VOCs* (volatile organic compounds) present in the air.

Indoor air quality

Our products contain a very low quantity of VOCs and our ACTIVair technology removes 70% of VOCs* in the air.

Acoustic insulation

A 100mm-thick drywall system can achieve up to $R_w = 50\text{dB}$ (audible voices are not heard) sound insulation, while a half-brick wall (plastered both sides) provides an average sound insulation of $R_w = 40\text{dB}$ (audible voices are heard).

Speech intelligibility

British Gypsum systems can be specified to improve sound absorption properties within a given space to improve speech intelligibility.

Stability

Our solutions can be specified for use in conditions exposed to mechanical stress in the building. They provide stiffness to statically loaded walls and are suitable for flooring elements.

Impact resistance

Systems can be specified to offer the highest level of impact protection in high traffic areas such as hospitals and schools. They will provide increased resistance of damage to walls over the building lifetime.

Fire resistance

Lightweight partition and ceiling systems using a range of different gypsum boards can be specified to provide excellent fire performance for up to 4 hours within all building types.

Benefits of British Gypsum solutions

*formaldehyde

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Energy efficient

British Gypsum solutions can help meet air-tightness and building thermal performance targets to help reduce energy consumption and lower bills.

Easy maintenance

Whether damage to the plasterboard system is minor or more extensive, the system can be easily repaired using gypsum products... and it always delivers an excellent finish.

Moisture resistance

Our systems can provide moisture resistance for the lifetime of the building from domestic bathrooms to dedicated wet room areas.

Living today in tomorrow’s habitat

Living in a healthy, efficient, comfortable and affordable house is already a reality. The “Saint-Gobain Multi-Comfort House” projects show that this is possible. These energy positive homes produce more energy than they consume, and involve every one of the Group’s business sectors...

Knowing that people spend 90% of their time indoors, we think that our solutions should not only guarantee occupants a healthy environment but also contribute to improving indoor air quality, thanks to ACTIVair technology.

*formaldehyde
Avoiding landfilling and giving a new life to gypsum-based waste

Recycling

To preserve natural resources, we are working to improve the recycled content of our products. Firstly, our plasterboards use almost 100% recycled paper (see p.8). The proportion of recycled gypsum depends on a variety of local parameters and ranges from between 10 and 25%. To increase this proportion we are actively promoting this to our customers to help them track waste, project by project, and identify and address waste hotspots.

We have a dedicated Plasterboard Recycling Service (PRS). This service provides major benefits to our customers, helping them to manage site waste effectively and improve site safety, track waste project by project, and identify and address waste hotspots.

Recycling services follow the steps after below:

— First, big-bags or skips are made available on site either directly by us or through our partners
— Once filled with waste, the collection is organised and the scraps are sorted to meet recycling specifications
— Next, plasterboard scraps are sent to recycling units to obtain a recycled gypsum powder

— Finally, this powder is re-introduced into our process as raw material to manufacture new plasterboards

Thanks to these services, our customers can comply with statutory environmental obligations, manage site waste more effectively and improve site safety.

Depending on the project size, we offer different kind of recycling solutions. We provide bags, bins or skips to answer the specific ‘Up to 25% of recycled content needs’ of our contractors.

At British Gypsum, we are very proud to contribute to a more sustainable habitat

We have been working in the plaster and plasterboard fields for years and are committed to maintain a strong position thanks to our innovative and sustainable products and services. Sustainability is a core value for British Gypsum and we follow this long-term vision to deliver benefits for people and their environment.

Transparency can make the difference

Our strategy is based on transparency and openness. By providing accurate data on the environmental aspects of our products, we give our customers the information they need to make an informed choice. This information takes the form of externally validated Environmental Product Declarations and our Corporate Social Responsibility.

Our goal: being exemplary in our actions

Setting a good example is part of our role as market leader in gypsum products. We try to do the best in all our actions: increasing the recycled content of our solutions, continuously restoring our mines, finding alternative means of transport to minimise our CO2 emissions, encouraging recycling services on jobsites.

Eco-innovation is the future

Eco-innovation refers to British Gypsum’s policy to develop innovative products and solutions that help reduce the environmental impact of buildings and infrastructure over their whole life cycle. Our eco-innovative products and solutions help reduce the operational use of resources (particularly energy and water) in buildings and infrastructure and/or have reduced environmental impacts over their own life cycle.