



STEEL INDUSTRY
GUIDANCE NOTES

Sustainable Steel Construction

Growing appreciation of the importance of sustainability is impacting all aspects of our lives. Construction is no exception. Indeed, as an industry responsible for significant CO₂ emissions, high non-renewable resource use and waste generation, construction is facing significant pressure to improve its performance on a number of fronts. This SIGNS explains the BREEAM environmental assessment methodology and shows how steel's sustainability credentials can be used to create sustainable buildings.

Agreed definitions of what constitutes a 'sustainable building' are in short supply. Work is underway in the EU, under CEN, to develop harmonised standards for the sustainable assessment of buildings, i.e. embracing the economic, social and environmental dimensions of sustainability. To date, however, assessment schemes focus mainly on environmental impacts.

BREEAM

In the UK, BREEAM (BRE's Environmental Assessment Methodology) has become the de facto standard for assessing the environmental sustainability credentials of buildings.

A BREEAM assessment considers the building in context (including public transport links, ecological disruption, etc) with the result that location and site strongly influence the overall rating.

Although BREEAM is voluntary, it is now a policy and funding requirement of many clients, particularly housing associations and clients in the public sector, that a certain BREEAM rating is achieved. Furthermore, should a Code for Non-residential Sustainable Buildings be developed, it is highly likely that this will be based on BREEAM, just as the Code for Sustainable Homes was based on EcoHomes.

Buildings assessed under BREEAM are awarded credits according to their performance under nine environmental categories. Credits achieved are aggregated using a set of environmental weightings to produce a single overall score. The building is then rated on a scale of PASS, GOOD, VERY GOOD, EXCELLENT or OUTSTANDING.

Steel construction and BREEAM

A review of the BREEAM assessment criteria reveals that the majority of criteria are independent of the primary structural material. These include all transport, water, land use and ecology and pollution assessment criteria.

Of the remaining categories, materials and waste are particularly relevant and management, health and well-being and energy are indirectly relevant. These categories are briefly described below

Materials category

Under BREEAM, the environmental impacts of construction products are assessed using the BRE's Green Guide to Specification. The Green Guide gives a rating for a range of specifications of major elements of different buildings types. Specifications are rated on a scale of A+ to E.

Steel containing specifications achieve good ratings within the Green Guide enabling top BREEAM credits to be achieved in this category.

Responsible sourcing of construction products is also considered under BREEAM. In the case of steel, this is defined as having a certified environmental management system for both steel production and finishing, e.g. fabricating structural steel or roll-forming purlins, cladding or floor decking, etc.

In its most recent report, the International Iron and Steel Institute (IISI) reported that over 90% of steel production facilities are certified to a registered international environmental management system standard. In the UK, 100% of Corus's sites are certified to the EMS standard ISO 14001.



In addition, many of the UK's leading manufacturers of steel construction products are certified to ISO 14001.

A significant number of UK steelwork contractors have signed up to the BCSA Sustainability Charter which requires companies to commit to a set of sustainability principles. One of the requirements of Charter is to have an accredited EMS to BS EN ISO 14001. This requirement is mandatory for Gold standard Charter Members

Waste

The most challenging waste criterion addresses site waste management. Credits are achieved by exceeding good and best practice benchmarks. All steel construction products are manufactured off-site and therefore site waste is minimal and, for many cases, e.g. structural frame components, is zero; making it easy to achieve these credits using steel construction.

Energy

Operational energy performance and associated CO₂ emissions is the most highly weighted and challenging criteria within BREEAM. Credits are awarded based on the energy performance certificate (EPC) rating of the building assessed using approved software.

The operational energy performance of buildings is a complex function of building orientation, form and fabric and building operation and servicing strategies. Most of which are independent of the primary structure.

Well designed steel-framed buildings provide sufficient thermal mass to take advantage and optimise fabric energy storage. A range of passive and active measures is available.

Steel cladding systems can easily achieve U-values and airtightness that exceed current Building Regulation requirements.

Other sustainability benefits

There are many other sustainability benefits of using steel construction that can help to achieve BREEAM credits. Including:

- Rapid construction minimises site activity and disruption to neighbours
- Fewer site operatives and a shorter programme improves site safety
- Steel construction is quiet and dust generation is minimal
- Fewer wet trades reduces the risk of pollution to watercourses and groundwater
- Just-in-time deliveries reduces site congestion
- Fewer deliveries to site and deliveries outside peak times reduces local traffic congestion
- The versatility and strength-to-weight ratio of structural steel enables the retention and reuse of existing facades
- Steel structures are inherently reusable, both in-situ and via deconstruction and reuse elsewhere
- Steel structures are inherently adaptable and extendable
- Steel is multi-cyclable, being 100% recyclable without down cycling.

Key Points

- 1 BREEAM is the current de facto standard in the UK for assessing the environmental sustainability of buildings
- 2 Steel intensive buildings can easily (and routinely do) achieve high BREEAM ratings
- 3 Common steel specifications used in floors, internal and external walls and roofs achieve excellent Green Guide ratings
- 4 Steel construction has many good sustainability credentials that are not currently or explicitly reflected in BREEAM assessments.

Further sources of Information

1. BREEAM www.breeam.org/
2. The Green Guide to Specification <http://www.thegreenguide.org.uk/>
3. Steel Construction Institute www.steel-sci.org/Innovation/Sustainability.htm
4. BCSA www.steelconstruction.org/steelconstruction/guestLogin
5. Corus in Construction <http://www.corusconstruction.com/en/>