



**SOLUTIONS FOR
SUSTAINABLE BUILDINGS**
THE GUIDE TO BREEAM

R
REYNAERS
aluminium

Architect: Make Architects

Reynaers Aluminium develops innovative and sustainable aluminium solutions

We develop aluminium solutions for windows, doors, curtain walls and sun screening that increase the architectural value of buildings and enhance people's living and working environment. Integration of Reynaers Aluminium products in buildings can contribute to the overall sustainability level of the building, thus achieving credits for building certificates such as BREEAM.

BREEAM (British Research Establishment Environmental Assessment Method) is a certification system that recognises sustainable buildings that exceed national standards. As a quality label, it encourages the market to focus on sustainability in building design as well as the environmental impact of products in buildings.

As this label assesses the overall building concept, BREEAM specifies 10 main categories, with multiple issues, on which the building is evaluated. Credits are awarded and weighted for each category in order to generate the final score for the building, in levels from pass to outstanding.

The maximum amount of credits available can differ slightly depending on building type.



Architect: Taylor Young Architects

Using Reynaers Aluminium solutions in combination with other building components, up to 22 credits can be gained on the following issues (according to BREEAM International New Construction 2016):



Category	Issue	Max. Credits	Window Door	Sliding door	Curtain wall	Sun screening
● Health & Wellbeing (HEA)	HEA1 - Visual comfort	max 4	2	2	2	1
	HEA2 - Indoor air quality	max 5*	3	3	3	-
	HEA4 - Thermal comfort	max 3	2	2	2	2
	HEA5 - Acoustic performance	max 2	2	2	2	-
	● Energy (ENE)	ENE1 - Reduction of energy use and carbon	max 15*	5	4	6
● Materials (MAT)	ENE4 - Low carbon design	max 3	1	1	1	1
	MAT1 - Life cycle impacts	max 6*	3	3	3	2
● Pollution (POL)	MAT3 - Responsible sourcing of construction products	max 4*	1	1	1	1
	Reduction of noise pollution	max 1	1	1	1	-
● Innovation (INN)	Innovation	max 10	1	0	1	1

* For these issues, it is possible to gain one extra innovation credit based on exemplary performance, as described in the assessment criteria.

The data in this brochure is specifically linked to office and industry buildings. For other types of buildings, the achievable number of credits may be slightly different.

Health & Wellbeing (HEA)



Lead architect: Ron Arad Architects - Executive architect: Jaspers & Evers

HEA1 Visual comfort



- Shading control for all 'relevant building areas'
- Areas where lighting and resultant glare could be problematic for users
- Workstations, projector screens,...
- Specifications of shading systems and controls required as evidence
- View out = window surface $\geq 20\%$ of the surrounding wall area

Product range analysis		Credits
Windows & Doors	CS Series	2
	MasterLine 8	2
	SlimLine Series	2
	ES 45-Pa	2
	TS Series	2
	CD Series	1
Sliding systems	CP Series	2
	Hi-Finity	2
Folding systems	SlimPatio 68	2
	CF Series	2
Curtain wall systems	CW Series	2
	CW 60 solar	1
Sun-screening	BS 40	1
	BS 30, 100 solar	1



Aim

- To ensure daylighting, artificial lighting and occupant controls are considered at the design stage to ensure best practice in visual performance and comfort for building occupants

Assessment criteria

- Daylighting - max 1 credit
 - Provision of daylight designed in compliance with national best practice
 - Daylight simulation study required
 - Minimum 80% of the total floor area must meet the average daylight factor requirement
- Glare control - 1 credit / View Out - 1 credit
 - Provision of shading systems with possibility to control

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Good access to daylight is one of the major benefits of completely glazed curtain walls or roofs and sliding doors. This credit can therefore be readily achieved by integrating these solutions into the building. The correct integration of windows can also provide building users with uniform daylight illuminance exactly where needed.

In general, people spend more than 90% of their time indoors and more than 30% of the time in offices in front of a computer screen. Looking through a window allows them to refocus their gaze from the intensive work on a screen or other detailed work, preventing tired eyes or headaches. All Reynaers systems provide building occupants with this external view. The use of sun screening systems such as BS 100 or BS 30 will not obstruct the view and gives the perfect combination of light, view and shading.



Architect: Libor Hrdousek & Radek Lampa (Atelier 15)

HEA2 Indoor air quality



Aim

- To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes

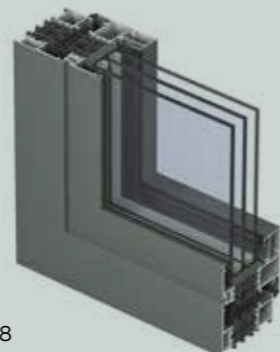
Assessment criteria

- Emissions from building products (1 credit)
- Natural ventilation strategy (1 credit)
- Indoor air quality measurement (1 credit)
Measurement by external party in the building

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The best way to get fresh air into a building is by opening a window or sliding element. The turn and tilt position of a window gives the user two levels of fresh air supply. These windows can also be integrated in curtain wall systems, achieving natural ventilation in the building. Based on the ventilation study, the total natural ventilation needs to be set-up correctly in order to gain the BREEAM credit. With the Ventalis system, available in Eco system, CS 68, CS 77, CP 130 and CP 155, an adequate cross air flow strategy can be achieved, although a ventilation study on the building will be required.

To ensure a basic level of indoor air quality, Reynaers Aluminium products use low VOC powder coating and low VOC gaskets. This contributes to the health and well-being of building users by minimizing pollutants.



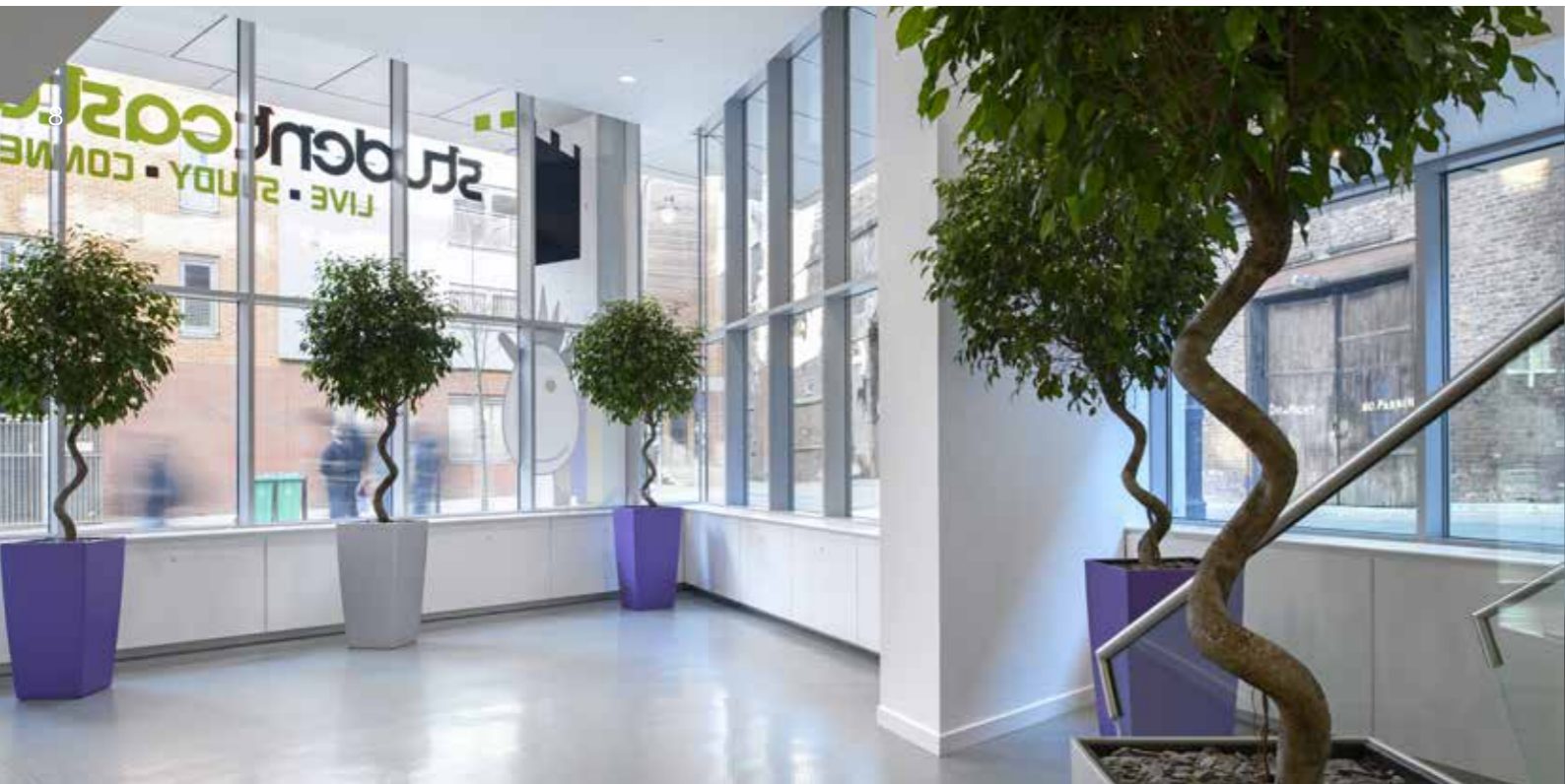
MasterLine 8

Product range analysis		Credits
Windows & Doors	CS Series	3
	MasterLine 8	3
	SlimLine Series	3
	ES 45-Pa	3
	TS Series	3
	CD Series	2
Sliding systems	CP Series	3
	Hi-Finity	3
	SlimPatio 68	3
Folding systems	CF Series	3
Curtain wall systems	CW Series	3
	CW 60 solar	3

Remark

- Emissions from building products = Low levels of VOC from powder coatings and gaskets
- Natural ventilation strategy = operable window strategy OR combined ventilation strategy.
BREEAM considers a strategy based only on opening doors insufficient to satisfy ventilation requirements. It can however form part of a more extensive natural ventilation strategy.
- Indoor air quality measurement = Low levels of VOC from powder coatings and gaskets





Architect: Hodder + Partners

HEA4 Thermal Comfort



Option 2 - Adaptability for a projected climate change scenario (1 credit)

- Option 1 must be achieved
- Thermal modelling demonstrates that the relevant requirements from option 1 are achieved for a projected climate change environment

Aim

- To ensure that appropriate thermal comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building.

Assessment criteria

Option 1 - Thermal modelling (1 credit)

- Analysis of thermal comfort level using Predicted Mean Vote (PMV) and Predicted Percentage of Dissatisfied (PPD)
- Thermal comfort levels in accordance with European Standard EN ISO 7730

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A comfortable temperature will greatly improve people's well-being and productivity. Reynaers Aluminium solutions, in combination with suitable glazing, provide the required insulation to achieve the right level of thermal comfort. Reducing draughts and improving thermal comfort also depends on the correct installation of airtight elements. A high quality production system and the use of Reynaconnect will guarantee the air tightness of the total solution.

Beside the thermal insulation aspect, an effective shading system will also greatly improve thermal comfort during summer.

To achieve these BREEAM credits, dynamic thermal analysis is required to guide design decisions.

HEA5 Acoustic performance



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All Reynaers Aluminium systems can achieve acoustic results (Rw) ranging from 40dB up to 60dB, depending on the system and the glass specifications. We can offer an appropriate acoustic insulating system to achieve low internal noise levels in most situations, in line with the BREEAM credit.

Aim

- To ensure the acoustic performance of the building meets the appropriate standards for its purpose

Assessment criteria

- Sufficiently low internal noise levels
- Adequate sound insulation between rooms
- Demonstrate that the reverberation time or equivalent absorption area for relevant spaces complies with targets
- Noise study by qualified acoustician required



Energy (ENE)



Architect: Webb Gray Architects

Architect: Leach Rhodes Walker

More than 40% of the energy used within the European Union goes towards heating, cooling, lighting and managing the buildings in which we live and work. This figure must be reduced by at least 60% before 2050 in order to meet current global climate change targets. Reynaers Aluminium is uniquely positioned to help reduce the environmental impact of new and existing buildings. Our declared intent and philosophy is to continue innovating towards a greener planet and the objective of zero-energy building across Europe.

ENE1 Reduction of energy use and carbon emissions



Aim

- To recognise and encourage buildings that are designed to minimise their operational energy consumption

Assessment criteria

Option 1: Use of approved building energy calculation software (15 credits)

- Calculation of the Energy Performance Ratio for International New Construction (EPRINC) by comparing the energy requirements of the assessed building with a notional equivalent and comparison of EPRINC with the BREEAM benchmarks
- The building is modelled to demonstrate compliance with local building regulations by a qualified energy modelling engineer using approved building energy calculation software

Option 2: Energy efficient design features (10 credits)

- Defining the building energy performance using checklist A5: Energy Design Features which covers issues such as U-values, lighting efficiency, renewable technologies
- Requirements dependent on building location

Product range analysis		Credits
Windows & Doors	CS Series	4
	MasterLine 8	5
	SlimLine Series	4
	ES 45-Pa	4
	TS Series	5
	CD Series	5
Sliding systems	CP Series	4
	Hi-Finity	4
	SlimPatio 68	4
Folding systems	CF Series	4
Curtain wall systems	CW Series	6
	CW 60 solar	6
Sun-screening	BS 40	5
	BS 30, 100 solar	6
Balustrade	RB 10 Solar	2

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Our window and door solutions, sliding doors and curtain walls provide exceptional insulation and create buildings with excellent energy performance.

With our high-insulation range, in combination with triple glazing, an Energy Performance Ratio (EPRINC) of up to 0.36 can be achieved. This results in 6 BREEAM credits.





ENE4 Low carbon design

max. **3** credits

1 1 1 1

Aim

- To encourage the adoption of design measures, which reduce building energy consumption and associated carbon emissions and minimise reliance on active building services systems

Assessment criteria

- Passive design (2 credits)
 - Passive design analysis (1 credit)
 - Achieve HEA4 Thermal comfort
 - Perform passive design analysis
 - Implementation of passive design measures
 - Free Cooling (1 credit). Implementation of natural ventilation through operable windows
- Low and zero carbon technologies (1 credit)
 - Feasibility study

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Our high insulating range of operable windows create natural ventilation and help attain the Free Cooling credit.

Our building integrated photovoltaic solutions for curtain walls and sun shading systems provide excellent performances which meet the aim of this issue. All photovoltaic (PV) technologies can be used. However, the type of PV cells and the available PV area will affect the amount of energy produced. With our RB 10 Solar, the solar panels can be integrated in the balustrade. For BS 100 Solar, we create a combined advantage with HEA1, because it is a controllable shading system. Due to the integration of PV panels, the CO₂ reduction can be reduced by 10% to 20% because part of the energy consumption of the building is produced on site in the roof, façade, shading system or balustrade, contributing to the ideal of a zero-energy building.



Materials (MAT)

Architect: Stride Treglown Architects

MAT1 Life cycle impacts

max. **6** credits

3 3 3 2

Aim

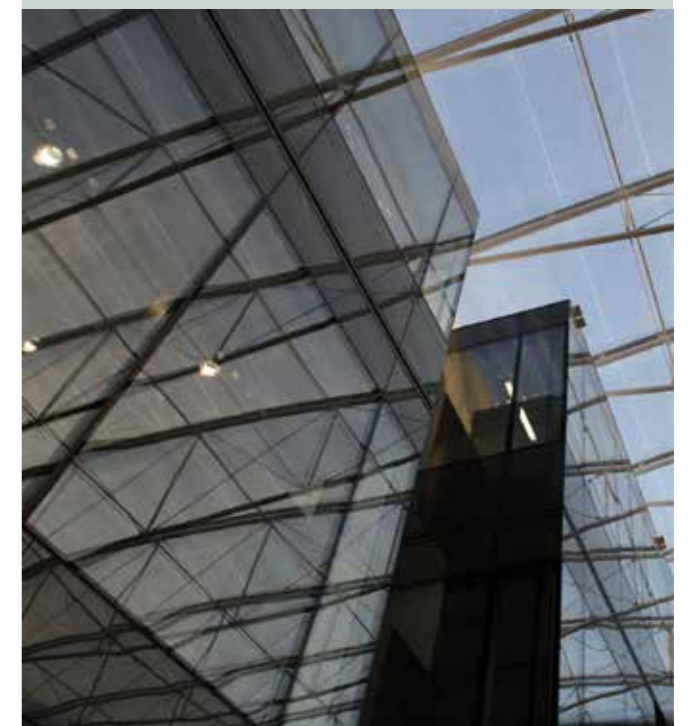
- To recognise and encourage the use of robust and appropriate life cycle assessment tools and the specification of materials with low environmental impact over full building life cycle

Assessment criteria

- Measuring the life cycle environmental impact of building elements
 - Building fabric, services & landscaping
 - Evaluating a range of material options for the building with a Life Cycle Assessment (LCA) tool => BREEAM MAT1 Calculator required (5 credits)
- EPD - Environmental product declarations (1 credit)

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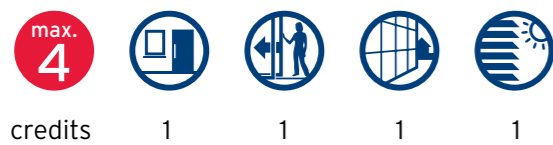
The full life cycle assessment of materials used for the construction of a building will provide the environmental impact of the building. Environmental Product Declarations (EPD's) are available for a wide range of our windows, doors, sliding systems and curtain walls.





MAT3

Responsible sourcing of construction products



Aim

- To recognise and encourage the specification and procurement of responsibly sourced construction products.

Assessment criteria

- Using materials with responsible origin (3 credits)
 - An Environmental Management System (EMS) is needed for example ISO 14001 certificate
 - Output BREEAM MAT3 Calculator required



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To create a full cycle of responsible sourcing, the whole process must be taken into account, from the production of aluminium billets, to the manufacturing of the finished elements. Therefore, Reynaers Aluminium has incorporated the ISO 14001 certificate in its processes and looks for suppliers with this certification to ensure responsible sourcing. To complete the cycle, it is also important that the manufacturer initiates an Environmental Management Scheme (EMS). A total of 80% of the building elements must be responsibly sourced to gain credits, with Reynaers Aluminium systems achieving one BREEAM credit for this issue.



POL5

Reduction of noise pollution



Aim

- To reduce the likelihood of noise, arising from fixed installations on the new development, affecting nearby noise-sensitive buildings

Assessment criteria

- Sufficiently low external noise levels
- Noise impact study by qualified acoustician required
- Credit automatically awarded if no noise sensitive buildings are in the area



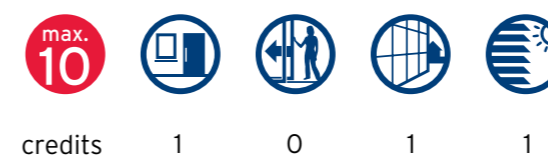
Pollution (POL)

Reynaers Aluminium

All Reynaers Aluminium systems achieve acoustic results (Rw) ranging from 40dB up to 60dB, depending on the frame system and the glass specifications. In most situations, we can offer an appropriate acoustic insulating system to achieve low external noise levels, in line with the BREEAM credit.

INN1

Innovation



Aim

- To support innovation within the construction industry through the recognition of sustainability related benefits which are not rewarded by standard BREEAM issues

Assessment criteria

- Exemplary performance in existing BREEAM issues AND/OR
- Innovation application(s)
- For each application: assessment of BRE required



Innovation (INN)

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Reynaers' mission statement is to develop innovative and sustainable solutions that increase the architectural value and enhance the living and working environment of buildings. Thus we are dedicated to providing solutions with exceptional performance, offering features such as burglary and bullet protection, fire and smoke protection, earthquake proofing, PV cells in sun screening and glass, PV cells in sun screening and glass, Minergie® or Passive House® product certification, etc. Cradle-to-cradle certification is available for a number of Reynaers Aluminium solutions. These specific features can help gain this BREEAM credit.

REYNAERS ALUMINIUM CAN HELP YOU TO ACHIEVE BREEAM CREDITS.

Using Reynaers Aluminium solutions, in combination with other building components, up to 22 BREEAM credits can be achieved. The feasibility to obtain these credits were analysed and confirmed by an independent and qualified expert engineering company, ENCON, specialised in optimising energy consumption.

To help you achieve these credits, Reynaers Aluminium specialists can assist you in selecting the most appropriate solutions for your project and provide you with the necessary documents, required for the BREEAM assessment. This will include the general documents and certificates, but also project specific information to increase your BREEAM score.

Some Reynaers Aluminium references with BREEAM certificates:

- V&D Distribution centre (NL) - Good
- Duetto (BG) - Good
- Premium Business Center (LT) - Good
- Lidl (LT) - Good
- BC 2000 (LT) - Good
- Bulgaria Mall Sofia (BG) - Good
- Twin city block ABC (CZ) - Good
- Malmo Office Tower (RO) - Good
- Mediacité (BE) - Very Good
- St. Mary Axe (UK) - Very Good
- St. David's Hospice (UK) - Very Good
- The Cooperative Supermarket - Very Good
- Airport Plaza (BE) - Very Good
- Onyx (BE) - Very Good
- Jersey Esplanade (UK) - Very Good
- Great Marlborough Street (UK) - Very Good
- Oregon Park (RO) - Very Good/ Excellent
- Severn Trent HQ (UK) - Excellent
- Selby War Memorial Hospital (UK) - Excellent
- Radisson Blu Hotel, East Midlands Airport (UK) - Excellent
- Kendal College (UK) - Excellent
- Eleven Brindleyplace (UK) - Excellent
- Trowbridge County Council (UK) - Excellent
- Finchley Memorial Hospital (UK) - Excellent
- Derby Council (UK) - Excellent
- 1 Aldermanbury Square (UK) - Excellent
- Greenwich Square (UK) - Excellent

For more information, visit www.reynaers.com to find your local Reynaers Aluminium contact.