



Green Building Index for Malaysia – How NSG Group products can help to achieve points

INFORMATION SHEET

Introduction

The Green Building Index (GBI) is Malaysia's industry recognised green rating tool for buildings to promote sustainability in the built environment and raise awareness of these issues among relevant stakeholders such as developers, architects, and contractors.

The assessment of commercial and residential properties under the GBI rating tool is based on six main criteria: energy efficiency, indoor environment quality, sustainable site planning and management, materials and resources, water efficiency and innovation.

This information sheet summarises how products from the NSG Group can help to gain points for buildings against each criterion. An informative annex provides a description of the products mentioned in the main text.

For more information about the Green Building Index, please visit: www.greenbuildingindex.org

Rating system

Buildings are divided into the following categories: Non Residential Existing Building (NREB), Non Residential New Construction (NRNC), Residential New Construction (RNC) and Residential Existing Building (REB).

The rating system for all 4 building categories is as follows:

Points	GBI Rating
>86	Platinum
76 to 85	Gold
66 to 75	Silver
50 to 65	Certified

The points indicated in brackets in the next section depend upon the building category. For more details, please refer to the GBI documents for each category.

Assessment criteria

ENERGY EFFICIENCY (EE)

Improve energy consumption by optimising building orientation, minimising solar heat gain through the building envelope, harvesting natural lighting, adopting the best practices in building services including use of renewable energy, and ensuring proper testing, commissioning and regular maintenance.

EE 1 – Minimum energy efficiency performance

(1- 3 points available)

Aim: Building envelope to achieve minimum performance to reduce energy consumption and CO₂ emissions.

This aim is to encourage high performance glazing such as low emissivity (Low-e) and/or solar control glass. Low-e glass such as Pilkington **K Glass**[™], Pilkington **Energy Advantage**[™] and Pilkington **Optitherm**[™] can help provide high levels of thermal insulation. To minimise overheating in hot climates and reduce CO₂ emissions associated with air conditioning, there is an extensive range of products available offering various levels of solar control performance. These include Pilkington **Reflite**[™], Pilkington **SunShade**[™], Pilkington **Arctic Blue**[™], Pilkington **Emerald Green**[™], Pilkington **EverGreen**[™], Pilkington **Optifloat**[™] Tinted glass, Pilkington **Solar-E**[™] and Pilkington **Eclipse Advantage**[™].

As the manufacturer should provide the performance of glass such as shading coefficient, U-value and visible light transmittance, performance data can be obtained from Pilkington Spectrum, which can be accessed via the following link: www.pilkington.com/spectrum

EE 3 - (Residential) Advanced or improved energy efficiency performance

(2-10 points available)

Aim: Achieve Building Energy Intensity (BEI) <150kWh/m²/yr or demonstrate energy savings over 3 years.

EE 5 - (Non-residential) – Advanced or improved energy efficiency performance

(2- 15 points available)

Aim: Establish energy efficiency performance to reduce dependence on energy to keep indoor environment at satisfactory comfort level.

The aim can be met with high performance glazing such as low-emissivity (Low-e) and/or solar control glass. Low-e glass such as Pilkington **K Glass**[™], Pilkington **Energy Advantage**[™] and Pilkington **Optitherm**[™] can help provide high levels of thermal insulation. To minimise overheating in hot climates and reduce CO₂ emissions associated with air conditioning, there is an extensive range of products available offering various levels of solar control performance. These include Pilkington **Reflite**[™], Pilkington **SunShade**[™], Pilkington **Arctic Blue**[™], Pilkington **Emerald Green**[™], Pilkington **EverGreen**[™], Pilkington **Optifloat**[™] Tinted glass, Pilkington **Solar-E**[™] and Pilkington **Eclipse Advantage**[™].

EE 4 – Renewable energy

(Up to 5 points available)

Aim: Encourage use of renewable energy. Building Integrated Photovoltaic (BIPV) is highly recommended for generating renewable electricity in non residential buildings in Malaysian climate.

This aim can be met by the use of renewable energy sources such as solar water heating and photovoltaic modules. We manufacture a range of glass for these applications, including NSG **TEC**[™] and Pilkington **Sunplus**[™].

INDOOR ENVIRONMENT QUALITY (EQ)

Achieve good quality performance in indoor air quality, acoustics, visual and thermal comfort. These will involve the use of low volatile organic compound materials, application of quality air filtration, proper control of air temperature, movement and humidity.

EQ 2 - (Residential) EQ 8 - (Non-residential) – Day lighting

(2 points available)

Aim: Provide good levels of day lighting for building occupants

Increased glazed areas can help to achieve this aim. We manufacture several glass products with high light transmittance to maximise daylight, including Pilkington **Optifloat™** Clear, Texture Glass **Mistlite™** Clear and Texture Glass **Nashiji™** Clear. Particularly in internal partitions, these products can help to optimise the use of day lighting in deep office interiors. Where enhanced noise control is also required in such applications, the use of Pilkington **Optiphon™** can be beneficial.

The use of Pilkington **Activ™** in vertical glazing, rooflights and skylights can help to ensure high levels of daylight transmittance, through ensuring that the external surface of the glazing is free from dirt for longer periods than is the case for ordinary glass.

EQ9 - Daylight glare control

(1 point available)

Aim: Reduce discomfort of glare from natural light.

The use of solar control glass such as Pilkington **Reflite™**, Pilkington **SunShade™**, Pilkington **Emerald Green™**, Pilkington **Arctic Blue™**, Pilkington **EverGreen™**, Pilkington **Optifloat™** Tinted glass, Pilkington **Solar-E™** and Pilkington **Eclipse Advantage™** can help to meet this aim.

EQ12 – External views

(Up to 2 points available)

Aim: Reduce eyestrain for building occupants by allowing long distance views and provision of visual connection to the outdoors.

This aim can be achieved through increased glazed areas incorporating glass products with high light transmittance to maximise daylight, including Pilkington **Optifloat™** Clear, Texture Glass **Mistlite™** Clear and Texture Glass **Nashiji™** Clear.

EQ3 - (Residential) and EQ13 (Non-Residential) – Internal noise levels

(1 - 2 points available)

Aim: Maintain internal noise levels at an appropriate level.

Although points are only available for internal noise or walls separating dwellings, insulating glass units incorporating our products can provide enhanced sound insulation to dwellings from external noise sources such as road traffic and noise from neighbouring dwellings.

Thicker versions of Pilkington **Optifloat™** Clear can also offer acoustic benefits. Even higher levels of sound insulation can be achieved by specifying Pilkington **Optiphon™**.

SUSTAINABLE SITE PLANNING AND MANAGEMENT (SM)

Selecting appropriate sites with planned access to public transportation, community services, open spaces and landscaping. Avoiding and conserving environmentally sensitive areas through the redevelopment of existing sites and brownfields. Implementing proper construction management, storm water management and reducing the strain on existing infrastructure capacity.

SM2 – Building exterior management

(Maximum 1 point available)

Aim: Use non-polluting methods for cleaning building exterior.

The use of Pilkington **Activ™** to reduce the frequency of cleaning of the façade can help to meet this aim. In general, glass can be adequately cleaned with a wide range of non-polluting cleaners.

MATERIALS AND RESOURCES (MR)

Promote the use of environment-friendly materials sourced from sustainable sources and recycling. Implement proper construction waste management with storage, collection and re-use of recyclables and construction formwork and waste.

MR1 – Material reuse and selection

(Maximum 1 point available)

Aim: Reuse building materials.

As a material that is durable and can generally be reused, glass can help to meet this aim.

MR2 – (Non-residential) MR4 – (Residential) Recycled content materials

(1 – 2 points available)

Aim: Post consumer recycled+1/2 pre-consumer content x% of project material cost.

If suitably segregated, glass is 100% recyclable at the end of its product life. However, the use of inadequately segregated waste glass (cullet) will lead to poor quality flat glass.

We currently recycle all internally generated, pre-consumer cullet in order to minimise energy and raw material consumption. It is not currently possible to recycle post-consumer cullet due to the risk of contamination.

MR3 – Regional materials

(Maximum 1 point available)

Aim: Use materials that are extracted and manufactured within the region: supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation. Use products that have been extracted, harvested, recovered and manufactured within 500km of project site for 20% material cost.

This aim can be met by a range of products that are manufactured locally, including Pilkington **Optifloat™** Clear, Pilkington **Optifloat™** Green, and Pilkington **Dark Grey™**, Pilkington **Emerald Green™** as well as Pilkington **Arctic Blue™**. Other products manufactured in Malaysia are the Pilkington **Reflite™** range and Texture Glass **Mistlite™** Clear, Texture Glass **Nashiji™** Clear and Texture Glass **Karatashi™** Dark Grey.

MR5 – Facilitate reduction of waste to landfill generated during construction and during building occupancy

(Maximum 1 point available)

Aim: Need to ensure that there is sufficient but minimal returnable/ recyclable packaging.

MR3 – (Residential) MR6 – (Non-residential) – Construction Waste Management

(Up to 2 points available)

Aim: Recycle construction debris.

We aim to eliminate or minimise the amount of packaging used to deliver products to customers. All domestic deliveries in West Malaysia are uncased. Recyclable metal racks and stands are used. Rubber spacers can be returned and reused.

WATER EFFICIENCY (WE)

Rainwater harvesting, water recycling and water-saving fittings.

WE4 – Water efficient fittings

(Up to 4 points available)

Aim: Encourage reduction in potable water consumption through use of efficient devices.

A BRE report¹ quantifies the potential operational benefits from using Pilkington **Activ**[™] self-cleaning glass, taking into account social, economic and environmental aspects. The report quantifies the annual and lifetime savings in water for a range of buildings.

For domestic dwellings, the anticipated annual water saved through the reduced washing frequency associated with the Pilkington **Activ**[™] results in between 76 to 270 litres of water (depending on the type of dwelling and corresponding m² of glazing area).

This can be quantified as:

- i) 0.5 to 1.7 days of an average UK persons daily water consumption; or
- ii) 0.9 to 3.4 average baths; or
- iii) 2 to 7.2 average showers.

Over the life time of the building (60 years), the anticipated quantity of water saved is between

4,554 to 16,236 litres (depending on the dwelling type and corresponding m² of glazing area). This can be quantified as:

- i) 30 to 100 days of an average UK persons daily water consumption; or
- ii) 57 to 203 average baths; or
- iii) 121 to 433 average showers.

Although the report was specifically focused on the UK, the general conclusions from the report can be considered universal. In summary, the use of Pilkington **Activ**[™] self-cleaning glass can help to reduce the amount of mains water used for cleaning windows.

¹BRE Report 'Pilkington **Activ**[™] Research Project: The quantification and evaluation of the benefits of self-cleaning glass – Final Report –Issue 2' Client (Report number 229724, September 2006)

INNOVATION (IN)

Innovative design and initiatives that meet the objectives of the GBI.

IN 1 – Innovation in design & environmental design initiatives

(1 point each, up to a maximum of 6)

Aim: To recognise exceptional performance above the requirements set by GBI rating system, in terms of innovation and environmental design initiative.

This aim can be achieved through recognised innovations such as solar thermal technology, which could include NSG **TEC**[™] and Pilkington **Sunplus**[™], and self cleaning facades, for example incorporating Pilkington **Activ**[™] self-cleaning glass.

INFORMATIVE ANNEX

Description of NSG Group products:

Pilkington **Activ™** is a coated glass with a unique dual-action that allows the forces of nature to help keep the glass free from organic dirt, giving you not only the practical benefit of less cleaning, but also clearer, better-looking windows.

Pilkington **K Glass™** and Pilkington **Energy Advantage™** are pyrolytic, low-emissivity coated glasses which are easily stocked, processed and installed. They usually form the inner pane of an insulating glass unit. The coating reflects heat back into the room whilst also letting in free heat from the sun known as passive solar gain.

Pilkington **Optifloat™** Clear is a high quality clear float glass offering high light transmittance for a range of applications. The same process is also used to manufacture tinted solar control glass such as Pilkington **Optifloat™** Green. Higher performance tints Pilkington **Arctic Blue™**, Pilkington **Emerald Green™**, Pilkington **Dark Grey™**, and Pilkington **EverGreen™** are also manufactured by this process.

Pilkington **Optilam™** is a laminated glass that is ideal for providing both impact resistance and security. In the event that it should break on impact, the glass is held in place thus preventing injury or intrusion. Pilkington **Optilam™** is produced by combining two or more sheets of glass with one or more plastic interlayer's. Its performance can be varied by changing the number and thickness of each of the glass panes and the polyvinylbutyral (PVB) interlayers to give the specifier a wide choice of products depending on application, whether it be for safety or security, noise control, solar control, UV screening, bullet and blast resistance or privacy and decoration.

Pilkington **Optiphon™** is a laminated glass with a special interlayer that provides enhanced sound insulation. It can be single glazed or incorporated into an insulating glass unit to provide high levels of noise control.

Pilkington **Optitherm™** is an off-line coated neutral-coloured, low-emissivity glass that provides high thermal insulation when used in an insulating glass unit.

Pilkington **Reflite™** is a hard, on-line coated, solar control glass, available in a range of colours, for use in both residential and commercial applications. It can be used in single glazing applications (with the coating on surface 2) as well as in insulating glass units.

Pilkington **Sunplus™** is a high technology low iron glass designed to maximise solar energy collection through very high light and solar transmission. The high solar energy transmission of Pilkington **Sunplus™** makes it an ideal choice for photovoltaic solar cells.

Pilkington **SunShade™** is an off-line coated solar control glass with a highly durable coating applied to clear and tinted float glass. The durability of Pilkington **SunShade™** means it can be handled, cut, laminated, toughened, heat-strengthened, bent and made into insulating glass units using standard processing techniques.

NSG **TEC™** is an electrically conductive glass used in a wide range of markets including CRT/computer flat panel display, heated glass (i.e. refrigeration, heated mirrors, etc.) and oven door markets. It is increasingly used in a range of renewable energy applications such as photovoltaics.

Pilkington Texture Glass such as Texture Glass **Mistlite™** Clear, Texture Glass **Nashiji™** Clear, and Texture Glass **Karatachi™** Dark Grey, are patterned glasses manufactured by passing a continuous molten glass ribbon between two rollers, one of which has a pattern that creates a permanent impression. They are intended for applications requiring obscuration and privacy without sacrificing any natural light.

For more information on the Group's extensive range of glass, please refer to our website:

<http://www.pilkington.my/products>