



Energy Efficient Glazing



Buyer's Guide

Produced by **The Energy Managers Association (EMA)**

Energy Efficient Glazing - EMA Buyers' guide

Introduction

This EMA buyers guide provides some basic information on the glazing within buildings; explaining the key features to understand and what can be done if the glazing is not working for you.

Glass and Glazing Federation

The Glass and Glazing Federation (GGF) is the main representative organisation for companies involved in all aspects of the manufacture of flat glass and products and services for all types of glazing, in commercial and domestic sectors. We represent companies who make, supply or fit, glass and glass related products in the UK and internationally and have approximately 500 members who can be found in over 1,500 business locations throughout the UK.

Members of the GGF include companies that manufacture and install energy efficient windows, in homes and commercial buildings, the performance glass used in every type of building from houses to high-rise tower blocks and the components that are used to manufacture every type of glazing. The GGF's key focus is on improving the energy efficiency of households and commercial premises.

Representing the majority of the key companies in the industry, the GGF has been involved in helping the Department of Energy and Climate Change (DECC) to shape the Green Deal and ECO schemes from their inception and has fed into the various consultation exercises throughout. The GGF is supportive of the government's aim to increase the energy efficiency of the UK's housing stock and reduce consumer bills.

For more information on anything in this guide visit: <http://www.ggf.org.uk/>

Where to start - some questions to ask yourself

- Do you know what the glazing within your building is and how it operates?
- Does the glazing work for your business and members of staff? If not why not?
- Do you understand about the safety requirements of the glazing in your building?

Glazing Technology

Background.

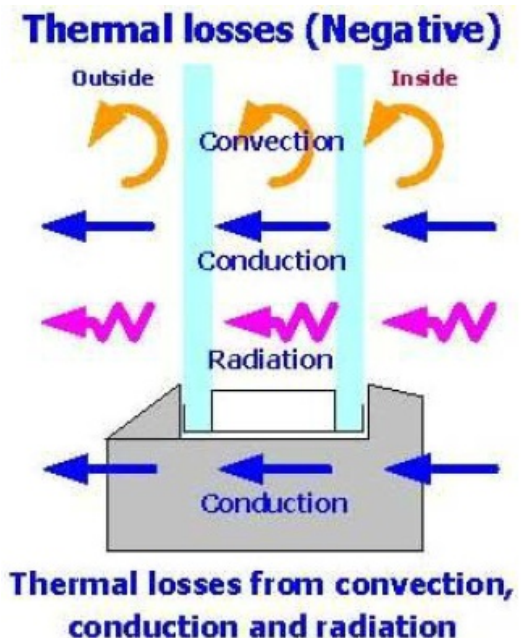
The external envelope to your building (roof, walls, windows, doors and floor) provide an essential function to keep the weather out of the building and to maintain a comfortable environment for the occupants. If the envelope has a good thermal efficiency this will mean the amount of energy needed to heat or cool the building will be reduced. This will provide cost savings to the occupants as well as reducing the impact on the environment and the amount of CO₂ produced, which improves your green footprint.

External glazing provides a unique function to the envelope to your building - good glazing can provide a fantastic environment for the users of the building - ensuring it is a comfortable environment (not too hot or too cold) and has natural lighting (for better health and wellbeing of occupants).

There are 2 key elements to glazing and its function within the external building envelope - thermal heat loss and solar heat gain.

Heat loss

The heat loss is by convection, conduction and radiation - the 3 ways heat moves from within the building to the outside. This is measured by the U



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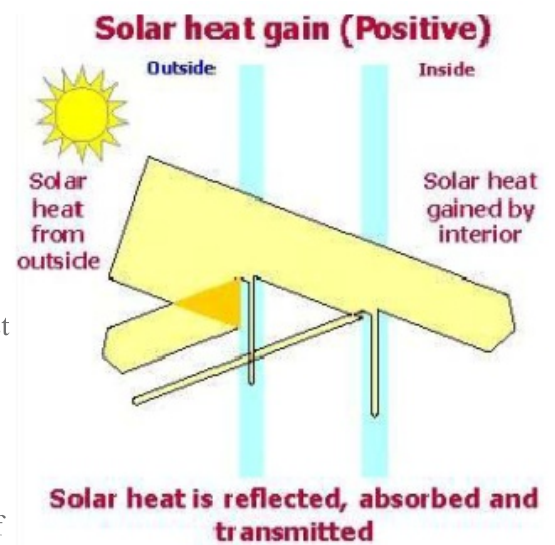
value of the glass, this will vary depending on the glass type and combination, typical values are:

- Single-glazing 5.0 W/m²K
- Double-glazing 3.0 W/m²K
- Triple-glazing 2.2 W/m²K
- Double-glazing with low-e coating 1.7 W/m²K
- Double-glazing with low-e coating and Argon filled 1.3 W/m²K
- Triple-glazing with multiple low-e coatings and Xenon filled 0.4 W/m²K

The lower the U value the better the thermal performance and less heat is lost from the building.

Solar heat gain

The solar heat gain is measured by the g value (this is the coefficient of the permeability of total solar radiation energy stated as %). This is composed of the direct transmission of energy and the secondary dispensation of heat of the glazed surface toward the interior, which occurs on the basis of absorbed solar rays. The sun can heat a room only by glass and thus also contribute to heating without any additional expenses; however what is welcome in winter can be unpleasant in summer, because gaining energy through solar radiation means heat.



The correct course is high thermal insulation, which means a low U value combined with a g value that is not too high.

So with the basic physics of heat loss and gain, if the correct glass is used an optimum environment can be achieved. However, life is not that simple!

Other things to consider

- Orientation of the building and façade – the north side of a building will gain considerably less solar energy than the sun-exposed south; likewise morning sun on the East elevation and evening sun on the West can have an impact on the building.
- The building's heating, ventilation and controls systems.
- External shading devices
- Internal shading devices (however, excessive heat has already entered the building)
- Use of the building – number of staff, what are they doing, what machinery are they operating.

What do I do if the glazing is not correct for the building?

If you are undertaking a building refurbishment program you might want to consider replacing the glazing systems to more energy efficient products which are available today.

If you do not have the budget to undertake this you may wish to consider the use of Adhesive Backed Polymeric Window Film (known as Window Film) to the glass to change the heat loss and solar gain.

Window Film can enhance your energy efficiency and provide thermal comfort

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Energy

Over the past twenty years the UK has had a 60% increase in air conditioned buildings. Cooling a building with the use of air conditioning often uses a lot more energy than heating the building. This is without allowing for the extra energy used by new technology systems, often found in homes and working environments.

The most obvious source of high temperatures in buildings is the energy from the sun, followed by internal heat generated by technology, people and poor ventilation. The Building Research Establishment (BRE) in the UK reported that 40% of the load placed on air conditioning in offices comes from direct solar gain through windows.

As companies make changes to improve their energy efficiency, window film is becoming one of the key options. Window film is a retrofit layer applied to the internal or external surface of existing glass, designed to enhance the performance of windows by reducing solar heat gain and glare.

"As an energy saving product, window film is ideal. It reduces the amount of heat coming into a building by blocking solar energy. This in turn reduces the load on air conditioning unit and will reduce energy bills. Technological advances have created a range of shades and even virtually clear window films to suit all building types. In many cases it can both upgrade the building's efficiency and improve visual appearance (or even blast protection utilising combination window films)."

With the global shift towards a greener way of thinking the members of the Window Film Group of the Glass and Glazing Federation consult with companies in their drive to reduce their carbon emissions along with their carbon footprint and energy costs. With the correct film installed it is possible to cut cooling loading by up to 30%. With Carbon Reduction Commitments by Government and Corporations there is an urgent need to act and Window Film can be a quick and very visible solution to help reach the target. With an approved energy calculator dealers can consult with clients about their type of glazing and required film. This then provides an idea of estimated savings.

Thermal

Commercial building owners, facilities companies and managing agents are tasked with maintaining a reasonable temperature to satisfy occupants whilst making every effort to control how much they spend on energy and other operating/maintenance bills.

In addition, UK businesses are asked by the EU Directive and Legislation such as Document 'L' of the Building Regulations to maintain comfort in the workplace for employees. This states that temperatures in the workplace should be optimum and not at extremes; this is typically around 21°C/70°F. To achieving this, energy is consumed to either raise or lower the temperature.

Window film, when applied onto existing glass, will help balance the temperature, minimising hot spots within the building. Window films can also provide the benefit of excellent glare control for screens, reduce the fading of interiors and with combination film can enhance the glazing to create blast mitigation.

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Solutions

What is Window Film?

Adhesive backed polymeric window film is a high clarity polyester film that has been designed for application to glass to improve its performance.

It is a glass treatment that can be professionally applied either in the factory to new glass or in situ to existing windows, glass doors and partitions.

The correct application of film onto glass can upgrade the original glazing to meet the requirements of Building Regulations, Health & Safety Regulations as well as British and European Standards.

Types of Window Film

Safety Film

When applied this type of film will transform ordinary annealed glass into a safety glass that can be classified by EN 12600.

Security Film

This type of film can enhance the performance of glass with respect to:

- Resistance to manual attack;
- Resistance to explosive pressure;
- Resistance to ballistic attack spall reduction

Solar Control Film

When applied this type of film will modify the spectrophotometric properties of the glass. These films can be coloured and/or highly reflective. They can also have low emissivity.

Low Emissivity Film

When applied this type of film will reduce the thermal transmittance (u value) of the glass.

Others Specialist films

Special Ultra Violet Reducing film;
RFI/EMF Shielding Film;
Privacy Film;
Decorative/Manifestation Film
Anti-Graffiti Film

Adhesive backed polymeric film should comply, in the future, with prEN 15752-1

Window Film is an additional coating added to existing or new glazing systems to enhance them in a vast number of ways.

These include:-

- Energy and CO₂ Reductions, including reduction of air conditioning use.
- Improving thermal comfort by reducing solar heat gain and winter heat loss.
- Compliance to Health and Safety Regulations.
- Reducing the effects of an explosion including terrorism.
- Improving safety against other Glass related situations including Spontaneous Breakage.
- Reducing the effects of the Sun including UV protection against Skin Cancer and Fading.

The Energy Managers Association

Aims

Improvement of the stand of the energy management profession and those working within it

Establishment of best practice in energy management

Put energy management at the heart of British business

Objectives

Representing energy managers across industries and protecting their interests

Developing energy management profession

Raising awareness of energy management and promoting energy efficiency opportunities

Promoting the exchange of knowledge, information and best practice

Initiatives to deliver strategy

Training Standards and Programmes: Low Energy Company (LEC) Initiative; Energy Savings Opportunity Scheme (ESOS) Lead Assessor; Schools' Course; Compliance Course

Utilities Compliance Assurance Body (UCAB): Assurance of Transparency in Utilities' Selling

Energy Efficiency Policy Development: DECC, BIS, OFWAT, OFGEM, European Commission, Transparence

Membership Engagement: Members' meetings, Topical Conferences, EMEX, Working Groups

Public Engagement: Articles, Conferences, Forums

Contact information

For more information visit www.theema.org.uk or for expert advice on energy reduction and business energy plans and strategy contact:

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