

Retrofitting buildings with LLumar® window film can help with the Energy Savings Opportunity Scheme

Specifying LLumar® window film as part of an Energy Savings Opportunity Scheme audit can help to save money (payback typically in less than five years¹, comparable to technologies such as LED lighting) and can help to meet requirements to consider materials with low lifecycle costs.

This document sets out how window film can be considered by those undertaking audits as part of the Energy Savings Opportunity Scheme² (ESOS), which was predicted by The (then) Department of Energy & Climate Change (DECC)³ in its impact assessment to lead to 1.6bn net benefits to the UK, the majority of which will be directly felt by businesses as a result of energy savings⁴.

LLumar window film is manufactured by Eastman Performance Films, LLC. The Company has sought out the expertise and knowledge of an energy consultant⁵ to gain evidence on how window film can help in an ESOS context. Andrew Cooper is a director at EVORA EDGE, the engineering division of EVORA GLOBAL. He is an Incorporated Engineer, a MEI Chartered Energy Manager and a CIBSE Low Carbon Consultant and Energy Assessor to Level 5 (the highest level of accreditation). Andrew is recognized as an expert in his field: he sits on several advisory panels and writes for several trade and technical journals on energy and sustainability.

“ About ESOS

ESOS is the UK Government's approach to implementing Article 8 of the EU Energy Efficiency Directive. The scheme has been implemented in phases, there are four phases – each lasting for four years, and we are now in Phase Two. The first phase covered the period 17 July 2014 to 5 December 2015⁶. The second phase covers the period 6 December 2015 to 5 December 2019. The qualification date for the second phase is 31 December 2018.

ESOS covers energy consumed by buildings, processes and transport and is a mandatory energy assessment and energy savings identification scheme for large enterprises operating in the UK. Organizations affected by ESOS will need to demonstrate compliance with the scheme: if you are a large enterprise you must participate in ESOS and notify the Environment Agency you are ESOS compliant by 5 December 2019, or face fines.

The scheme applies to any UK undertaking that meets either one or both of the following conditions:

- It employs 250 or more people
- It has annual turnover of more than 50 million euro (£38,937,777) and an annual balance sheet total in excess of 43 million euro (£33,486,489)

¹ <http://glassmagazine.com/news-item/commercial/study-confirms-solutia-products-deliver-positive-environmental-impact-117806>, details available on request

² The UK's Energy Savings Opportunity Scheme is mandatory for qualifying organizations, as determined by the Environment Agency's qualification criteria. To determine whether your organization qualifies, please consult the regulations at http://www.legislation.gov.uk/ukxi/2014/1643/pdfs/ukxi_20141643_en.pdf, and other guidance from the UK government.

³ DECC has been replaced by the Department for Business, Energy and Industrial Strategy (BEIS). The Scheme Administrator for ESOS is the Environment Agency (EA).

⁴ <https://www.gov.uk/government/consultations/energy-savings-opportunity-scheme>

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⁶ The external consultant has been financially compensated for his knowledge and expertise.

⁶ The ESOS Regulations came into force on 17 July 2014. The first compliance period can only be specified as starting from the date of the regulations coming into force. However, energy audits and alternative compliance routes conducted up to 4 years before the first compliance date (i.e. since 6 December 2011) could be used towards compliance for the first compliance period.

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The conversion rate for euro to sterling for Phase One was set on 31 December 2014. We understand that the conversion rate for Phase Two will be reviewed and adjusted on 31 December 2018.

If a corporate group contains at least one UK undertaking which meets the qualification conditions, its entire UK operation must take part in ESOS. The highest UK parent will be responsible for ensuring the group as a whole complies by reporting on its total UK energy use.

Why specify window film?

Retrofitting window film can help to extend the life of existing window systems at a fraction of the cost of installing new, high-performance double glazing. Window film can help to save energy, reduce carbon emissions, improve comfort and staff productivity. It can also bring about other savings such as reduced energy loads for HVAC plant sizing. This helps reduce capital and operational costs (of plant) and helps free up valuable building space for other purposes. ”

Benefits of LLumar window film

LLumar window film upgrades standard glazing to provide:

- Energy efficiency: Resulting in energy savings on heating and cooling
- Solar protection: up to 80%* rejection of summer heat gain
- Glare reduction: up to 90%* reduction in glare
- UV protection glazing: up to 99%* UV protection
- Safety and protection: Impact protection, resistance to manual attack, blast mitigation, anti-graffiti
- Improved occupant comfort resulting from lower room temperatures
- Optimized working conditions

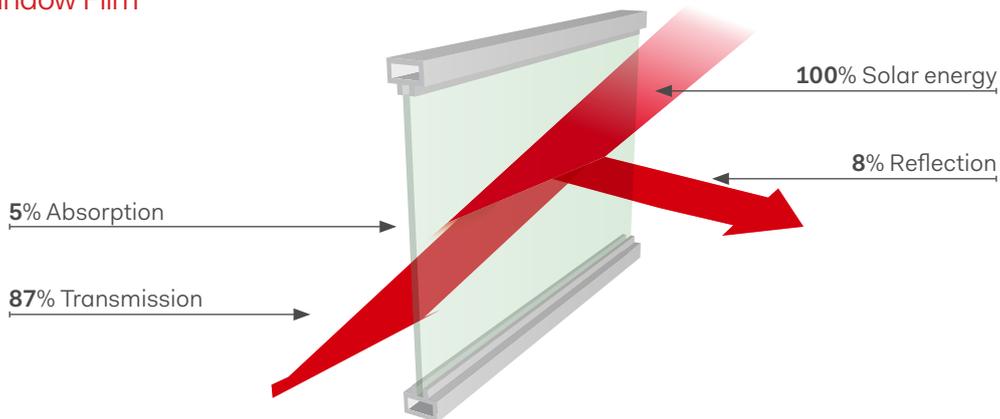
* best performance LLumar film applied to 4mm clear single glazing

How does LLumar window film work?

LLumar window films help reduce heat loss in the winter and solar gain in the summer. A wide variety of films are available, ranging from clear products to those that provide our best heat and glare rejection.

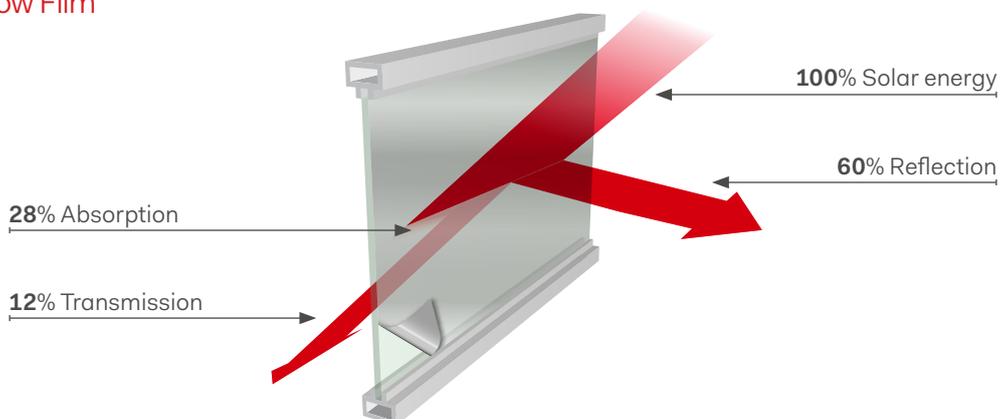
The following illustrations show how LLumar technologies work:

Without Window Film



Data has been calculated on 4mm clear glass to EN410 standard.

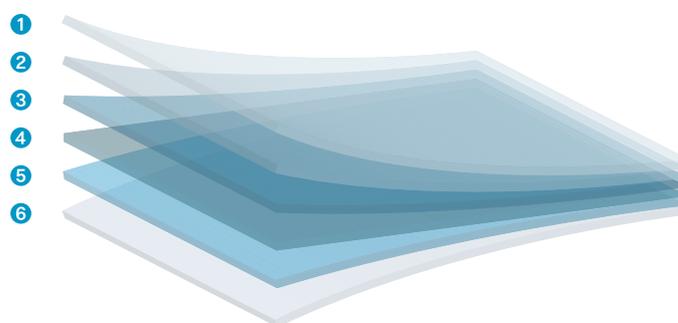
With Window Film



Data has been calculated on 4mm clear glass with LLumar RHE 20 SI ER HPR applied, to EN410 standard.



Typical Film Structure



Reflective Films

- 1 Release liner
- 2 Adhesive with UV absorbers
- 3 Clear or tinted polyester with UV absorbers
- 4 Metallised aluminium
- 5 Clear polyester
- 6 Scratch-resistant coating

What can window film achieve?

The table below outlines typical installation costs and payback periods for our leading films for a building with air conditioning.

Item	Film type	Typical Installed costs (per m ²)*	Typical Simple payback (years)
1	High Performance	£25	2-5
2	High Light Transmission	£60	9

* As the manufacturer of LLumar window films, Eastman does not control installed costs. These costs are indicative only and will depend on a variety of on-site factors, such as **wastage ratios, access and out of hours installation.**

What do we offer?

Our technical team provides the technical data you would expect when evaluating a new glazing system (such g-value and other spectral performance values conducted in LBNL Window software, these calculations are specific to the underlying glazing system characteristics of each project). In addition, we can use whole building energy simulations (based on Energy Plus platform) to calculate potential savings. If you run your own building energy analysis, we can provide bespoke reports with the input data you need.

To learn more about how LLumar window film can help, please contact your LLumar representative.