



# Performance Film for Glass

LLumar Case Study Guide



## LLumar – high performance film for glass

Modern Glazing systems are key to the performance of buildings. LLumar® window films can provide a retrofit solution for existing Glazing systems, upgrading performance for energy efficiency, occupant comfort, safety & security, UV protection, design and privacy. Completely replacing the Glazing is an option, but this can be costly and disruptive. LLumar can help provide a solution.

### How can performance film solve problems?

- You need to **reduce the CO<sub>2</sub> footprint of a building**? Add one of LLumar's Energy Saving Window Films.
- Occupants complain about **too much heat or glare**? Upgrade the glass with LLumar Solar Control Window Film.
- **Costs for heating and cooling** a building **are increasing** and you are looking for a way to overcome this? Chose LLumar's low-e films and cut running costs.
- You want to **combine** various **benefits like design and energy savings**? Chose a combination of our films to meet your targets.
- **Performance** is needed, **but the look** of the building **should not change**? LLumar offers almost invisible energy saving films.

### What LLumar can do for you.

LLumar window film offers a retrofit solution to upgrade glass. With LLumar performance film you can quickly and easily change the properties of existing Glazing systems – for a fraction of the costs of new glass.



## About the manufacturer

Eastman is a global speciality chemical company; you will find Eastman materials in a wide a range of products, including paints, textiles and advanced Glazing systems.

In addition to providing state of the art performance in new windows, Eastman also offers a way to retrofit high performance with LLumar window film.

Significant investments into research and development are undertaken to ensure that LLumar window films are a step ahead and offer the best possible solutions for your project.

## Professional Installation

With our network for Authorized Fitment Centers (AFC) and certified installers we can help facilitate professional installation services.

## Specification Expertise

Eastman's specialists can help you evaluate the potential cost savings, return on investment and reduction of CO<sub>2</sub> emissions. LLumar's energy solutions services use similar calculation tools to those used by the Glazing industry. Also, LLumar films are tested and certified. They meet the requirements of various national and international standards. Please get in touch with Eastman to find out more. Just email [info@LLumar.eu](mailto:info@LLumar.eu) or call our specification support line +49 (0) 2173 993 5110.



## The Case Studies

### Overview

LLumar window films have proved their performance in various projects all over the world. This brochure gives you an overview of some of the cases where LLumar has upgraded glass.

### Department of Energy and Climate Change

London, United Kingdom

**Result** → Energy savings without affecting the aesthetics of the building.

### MG Tower

Padua, Northern Italy

**Result** → Energy Savings, comfort and glare reduction – proved in a long term study.

### City Clinic

Sofia, Bulgaria

**Result** → Aesthetics & privacy while saving energy.

### Woodlands School

Plymouth, United Kingdom

**Result** → Orientation by coloured zones.

Payback  
**4.7**  
years



## Energy savings without affecting the aesthetics of the building

### Case Study

<b>Project</b>	Department of Energy and Climate Change (DECC)
<b>Building</b>	8-storey office building (8,768 m <sup>2</sup> )
<b>Glazing</b>	Single primary & secondary (311 m <sup>2</sup> )
<b>Location</b>	London, United Kingdom
<b>Film</b>	LLumar VS 60 SR CDF
<b>Situation</b>	<ul style="list-style-type: none"><li>➔ Reduce energy consumption</li><li>➔ Meet with Carbon Reduction Plan targets</li></ul>
<b>Solution</b>	<ul style="list-style-type: none"><li>➔ Upgrade glazing to reduce heat gain without changing the appearance of the building</li></ul>
<b>Result</b>	<ul style="list-style-type: none"><li>➔ Attractive energy savings &amp; ROI</li><li>➔ Application of VS60 approved by Westminster City planning authority</li></ul>

” Whitehall Place is a listed building, we needed a solution to upgrade the glazing without impacting the aesthetics of the building“

“We expect the film to reduce cooling demand and energy consumption”

## Results

### Energy Analysis <sup>1</sup>

Payback	<b>4.7 years</b>
Cost Savings pa	<b>£ 4,274</b>
Carbon Savings (t CO <sub>2</sub> e) p.a.	<b>9.8</b>
Savings (Electricity/Gas)	<b>3%</b>

### Glazing Analysis <sup>2</sup>

Solar gain reduction	<b>53%</b>
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<sup>1</sup> Calculated using building energy simulation software before film installation.

<sup>2</sup> Calculated using glazing analysis software results before and after application of film.

## Key benefits

Energy Savings

Thermal Comfort

Glare Reduction

Design & Privacy



## Energy Savings, comfort and glare reduction – proved in a long term study.

### Case Study

**Project** MG Tower  
**Building** Office (3,125 m<sup>2</sup>)  
**Glazing** Modern solar/low e (1,000 m<sup>2</sup>)  
**Location** Padua, Northern Italy  
**Film** LLumar Helios (RHE 20 ER HPR)

**Situation** ➤ Despite being constructed with modern glazing (57% solar energy rejection) this building was suffering from excessive heat and glare.

**Solution** ➤ Application of a high performance exterior window film to significantly reduce heat gains and glare.

**Result**

- Thermal comfort improved, improving productivity
- Reduction of room temperature of up to 5° C
- Film proved more cost effective than HVAC upgrade
- No significant impact on lighting use

**Measurement & Verification** This project was part of a 3 years study conducted by the University of Padua. This included monitoring of energy consumption, internal temperatures, lighting and glare. Energy savings were calculated using IPMVP option D calibrated simulation.

### Results

Energy Analysis <sup>1</sup>		Glazing Analysis <sup>2</sup>	
Payback	<b>4-5 years</b>	Solar gain reduction	<b>65%</b>
Cooling savings	<b>42%</b>	Glare reduction	<b>77%</b>
Carbon Savings (t CO <sub>2</sub> e) p.a.	<b>46</b>		
Savings p.a.	<b>€ 12,800</b>		

<sup>1</sup> Calculated using building energy simulation software before film installation.

<sup>2</sup> Calculated using glazing analysis software results before and after application of film.

### Key benefits

- Energy Savings
- Thermal Comfort
- Glare Reduction
- Design & Privacy

Cooling  
**42%**  
 savings



Aesthetics  
meets Energy  
Savings



## Aesthetics & privacy while saving energy

### Case Study

**Project** City Clinic  
**Building** Cardiac Clinic, Health Care  
**Glazing** Modern Low-E-Glazing  
**Location** Sofia, Bulgaria  
**Film** LLumar Helios (RHE 35 SI ER HPR)

**Film details** Reflective films provide superior reduction of solar heat and glare.

Helios technology, designed for durability in exterior applications, allows even greater performance gains.

**Installation** LLumar's installation team overcame challenging deadlines, work at heights and adverse weather conditions.

**Situation** ➤ While refurbishing this building, formally an automotive showroom, the City Clinic wanted to achieve a modern look from the exterior and conceal internal partitions from view.

**Solution** ➤ Apply a exterior solar control window film, to create a reflective exterior look.

**Result**

- Created the desired modern look
- Concealed internal partitions from view
- Maintained view to the outside and necessary levels of natural light
- Added benefits of reduced solar gain, UV and glare

### Key benefits

- Energy Savings
- Thermal Comfort
- Glare Reduction
- Design & Privacy



## Orientation by coloured zones

### Case Study



<b>Project</b>	Woodlands School
<b>Building</b>	Specialist Education
<b>Glazing</b>	Modern
<b>Location</b>	Plymouth, United Kingdom
<b>Film</b>	Coloured Decorative and Reflective Films

- Situation** ➤ Woodlands provides a specialist education for children with physical and sensory difficulties. The headmaster was looking for a solution to help visually impaired pupils with their orientation and enhance the surroundings.
- Solution** ➤ Application of coloured film to windows and roof lights. LLumar Helios RHE 35 was installed as the top layer to seal in the coloured film beneath and provide solar control properties for keeping the building cool. The glazing was upgraded to reduce heat gain without changing the appearance of the building.
- Result** ➤ Created the desired 'islands of colour'  
➤ Added benefits of solar gain reduction, UV- and glare-protection from the co-installed exterior solar control film

” The children and staff love the new colours and we have been treated to a sunny day where they have shown the film at its best. Several children simply sat in a particular colour puddle on the floor and refused to move! It has made our school complete. There are now clear visual zones for our visually impaired pupils and this has helped greatly”

Combination  
of colour  
and solar  
control films

### Key benefits

Energy Savings Thermal Comfort Glare Reduction Design & Privacy

## Contact Details

CP Films Vertriebs GmbH  
a subsidiary of Eastman Chemical Company  
Katzbergstraße 1a  
40764 Langenfeld  
Germany

Tel. +49 (0) 2173 993 5110  
Fax +49 (0) 2173 993 5193  
info@llumar.eu  
www.llumar.de

Your LLumar Partner · [www.LLumar.com](http://www.LLumar.com)

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