3M™ Daylight Redirecting Film

Daylighting

Let the Daylight in, Naturally Brighten your Day

Optimizing natural light in buildings provides a better experience for all of us.

Daylight Redirecting Film is a simple, effective daylighting solution which comfortably brings natural light deeper into buildings.

Buildings with abundant natural light have been shown to:

- Increase employee productivity
- Improve student test scores
- Improve patient recovery times
- Boost retail sales
- Decrease rates of absenteeism
- Reduce energy costs

ARCHITECTURAL RECORD
Record Products 2014
WINNER

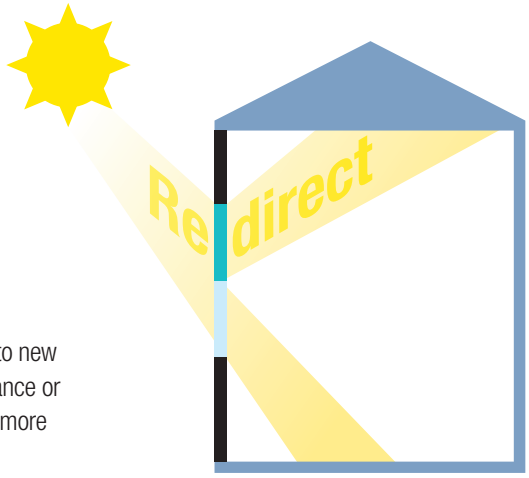
3M

3M™ Daylight Redirecting Film installed in Clerestory Glass — Sacramento, CA.

Naturally Brighten Your Day

Daylight Redirecting Film is designed to move excess light close to the window and redirect it deeper into the building to increase the daylighting penetration. Bringing natural light deeper into the building provides the many benefits of *natural* light for more occupants as well as reducing the need for artificial lighting which saves energy. In addition, Daylight Redirecting Film:

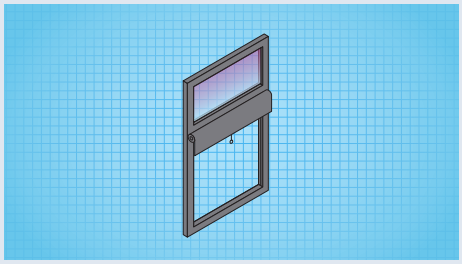
- Reduces glare and discomfort caused by direct sunlight on occupants
- Redirects natural light as much as 40 ft or more into the building
- Extends daylight zone up to 8 ft into the interior for every 1 ft of treated window
- Can provide up to 52% lighting energy savings compared to baseline usage
- Can provide savings of up to 1.5 kwh/sq ft of floor area



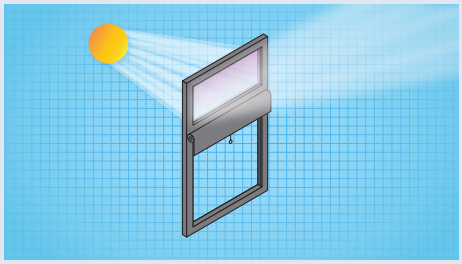
Simple, Effective, Daylighting Solution

Compared to existing light reflecting strategies, Daylight Redirecting Film is easily integrated into new or existing windows. It requires no extra hardware or infrastructure, and no additional maintenance or special cleaning. It works at all times of the day, even when the sun is at a low angle. Plus, it's more cost effective than many existing daylighting solutions.

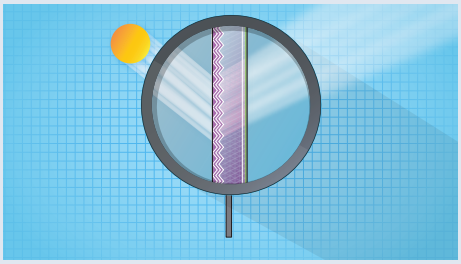
How it Works



Daylight Redirecting Film is installed in the upper portion of the window.



Daylight is redirected upwards towards the ceiling allowing natural light to comfortably penetrate deeper into the building.



Made of micro-structured prisms, the film optically redirects over 80% of the daylight upward and diffuses light to be more evenly distributed.

Increase Natural Light & Comfort

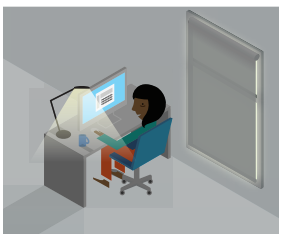
Clear Glass Windows

When Shades are Open*

Direct sunlight can beam into the space at low angles, causing glare and discomfort.

When Shades are Closed*

Shades are closed to block uncomfortable direct sunlight, which also decreases natural light in the space.



3M™ Daylight Redirecting Film

Installed in Upper Clerestory Windows

When Shades are Open*

The light from the upper glass is redirected to the ceiling, increasing natural light and decreasing glare in the space caused by direct sunlight.

When Shades are Closed*

Even when the vision glass shades are drawn, natural light continues to penetrate into the space through the clerestory glass with Daylight Redirecting Film.

*Simulated images

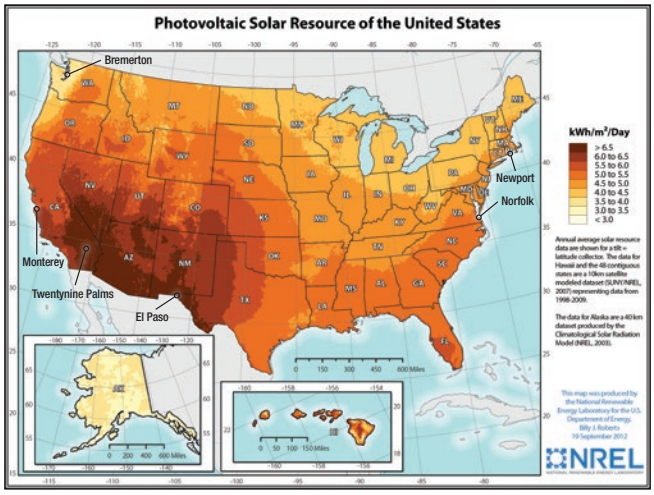
Case Study 1: US Department of Energy ESTCP Program

Locations
- Washington, California (2), Texas, Virginia, Rhode Island
- Analysis and report by TRC, formerly HMG
- Measurements taken Solstice to Solstice

Results
- Increased Illuminance up to:
  - 250 footcandles 8.5 ft from window
  - 50 footcandles 22 ft from window
  - 20 footcandles 35 ft from window

Average spatial daylight autonomy increase of 11%, as high as 25%

Average peak demand lighting energy reduction of 13%



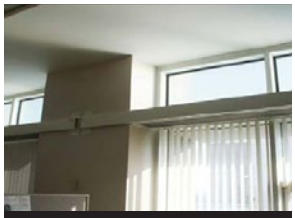
Source: www.NREL.gov

Case Study 2: Sacramento Municipal Utilities Department

Location
- Sacramento, California
- Analysis and report by TRC, formerly HMG

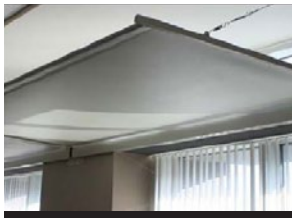
Comparison
- 3M™ Daylight Redirecting Film
- Daylight Redirecting Blinds
- Light Shelf

Results
- Of the 3 products tested, Daylight Redirecting Film brought more light deeper in the building



3M™ Daylight Redirecting Film (Daylighting Zone)

Daylight Redirecting Blinds (Daylighting Zone)



Light Shelf (Daylighting Zone)

Daylit Zone	Illuminance (footcandles)	% of 30 footcandles setpoint	Illuminance (footcandles)	% of 30 footcandles setpoint	Illuminance (footcandles)	% of 30 footcandles setpoint
1	**74.0**	**100+%**	57.5	100+%	58.9	100+%
2	**45.1**	**100+%**	36.4	100+%	37.0	100+%
3	**26.7**	**89%**	23.9	80%	16.0	53%

Handheld illuminance readings on a sunny, winter day with electric lighting entirely off (Jan. 7th, 2012, 11:30 am).

Evaluate the Performance

We know every building is different. Many factors affect daylighting performance, such as building design, time of day and year, weather, location, and orientation. Daylight Redirecting Film can be modeled and evaluated using software, so you can determine how it will perform for your project.

For more information including photos and videos, links to reports and case studies, and additional technical information visit:

www.3M.com/daylighting

3M Renewable Energy Division
Window Films
3M Center, Building 235-2S-27
St. Paul, MN 55144-1000
3M.com/daylighting