Energy Efficiency

- Use high performance glass
- Use glass in appropriate orientation
- Smartly design building with shades, inclination etc. to reduce direct heat ingress
- Use IGU, if building design requires
- Use rated frames

Climate Response | Orientation & Design | Façade Design | Material used

Design factors impacting Glass Selection

Climate Analysis : -

Climatic condition of the location is important to select type of glazing as different weather impacts differently.

Optimum Orientation of Building: -

Before selecting any glazing material, study of building orientation is must, if rightly oriented, we may get energy efficiency without using high performance glass. (according to Indian context, South West orientation is responsible for maximum heat gain)

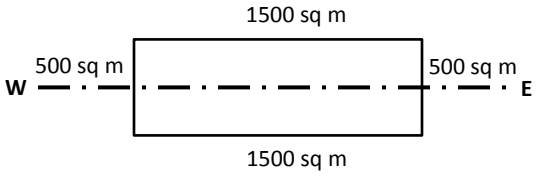
Shadow Analysis: -

Shadow of the building as well as surrounding also impacts heat ingress (direct & defused), hence changes the glazing requirement.

Daylight Analysis : -

Study of available lux level, window size and other passive design should be consider before defining the required VLT of a glass.

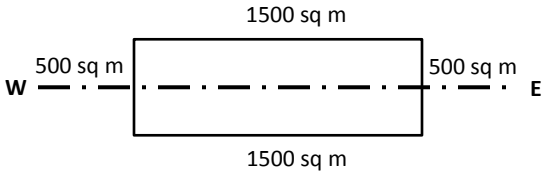
Case Study



* *Image is placed only for representational purposes*

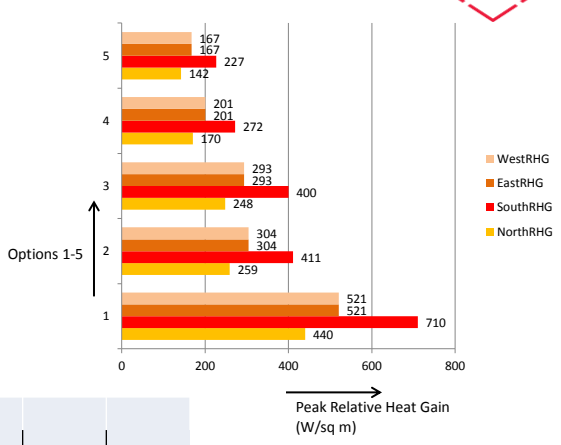
Project Details
Location: Mumbai
Orientation: East-West (longer sides facing North South)
WWR-100%
Glazing Area:
North – 1500 sq m
South – 1500 sq m
East – 500 sq m
West – 500 sq m

Case Study



Relative Heat Gain Assumptions
ΔT – 4.5 deg C
Peak Radiation for
North – 518 W/ sq m
South – 856 W/ sq m
East – 619 W/ sq m
West – 619W/ sq m

Case Study



Relative Heat Gain Calculations

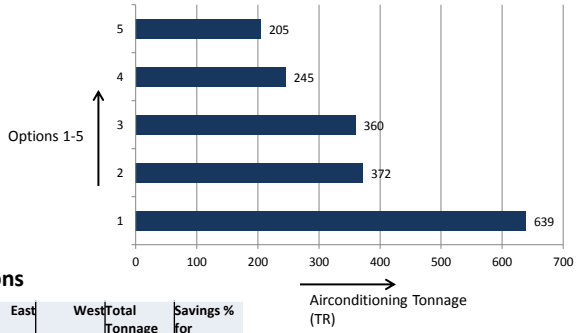
for Peak Load

Calculations are representative of 1 hour only

Detailed Calculations include 8760 hours

W/sq m Peak	uvalue/SHGC	NorthRHG	SouthRHG	EastRHG	WestRHG
Option 1	5.7/0.8	440	710	521	521
Option 2	5.7/0.45	259	411	304	304
Option 3	3.3/0.45	248	400	293	293
Option 4	3.3/0.3	170	272	201	201
Option 5	2.8/0.25	142	227	167	167

Case Study

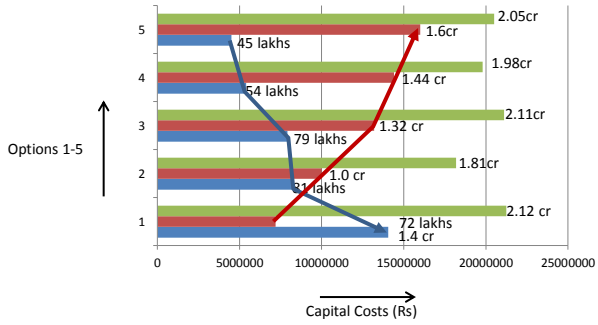


Airconditioning Tonnage Calculations

Peak	uvalue/SHGC	North	South	East	West	Total Tonnage	Savings % for tonnage
Option 1	5.7/0.8	188	303	74	74	639	base
Option 2	5.7/0.45	110	175	43	43	372	42
Option 3	3.3/0.45	106	171	42	42	360	44
Option 4	3.3/0.3	73	116	29	29	245	62
Option 5	2.8/0.25	61	97	24	24	205	68

- Airconditioning Tonnage Calculations are based only on Peak Relative Heat Gain from the Glazing. These values do not include People, Equipment and Lighting

Case Study



Energy Savings

Operating Hours – 8 hours per day
250 days in a year
Electricity Rate: Rs 12/unit
AC type: Air cooled Chiller

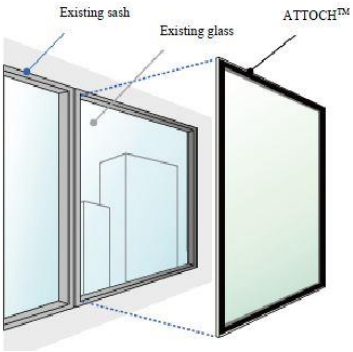
Annual Electricity Consumption	Annual Electricity Cost	Annual Electricity Cost Savings	Capital Costs(AC)	Capital Costs(Glazing)	Total Capital Costs	Payback
14.7 lakh units	1.76 cr	base	1.4 cr	72 lakhs	2.12 cr	base
8.55 lakh units	1.02 cr	73.6 lakhs	81 lakhs	1 cr	1.81 cr	instantaneous
8.27 lakh units	99.3 lakhs	77 lakhs	79 lakhs	1.32 cr	2.11 cr	instantaneous
5.64 lakh units	67.7 lakhs	1.08 cr	54 lakhs	1.44 cr	1.98 cr	instantaneous
4.71 lakh units	56.53 lakhs	1.19 cr	45 lakhs	1.6 cr	2.05 cr	instantaneous

3.3%
67.88%

Retrofitting

Façade Retrofitting for better energy performance:

"ATTOCH" an Ecoglass product that is ideal for energy-saving window renovations



How is it installed?

This product converts an existing windowpane into Ecoglass simply by applying high performance glass to the inside of the window.

Before installation

After installation

Facts and Figures :

- Installation takes only 30 to 60 minutes per window.
- The existing glass continues to be used, and so does not require disposal.

Product features:

- 1. A measure Against summer Heat – A measure for power saving and against the heat in summer
- 2. A measure against winter cold – Excellent heat insulation in winter
- 3. No need for Scaffolding for the installation – A short installation period (30 to 60 minutes per window) and low cost with the indoor installation.
- 4. The existing glass continues to be used, so its disposal is not required.
- 5. Energy Saving – Environment-friendly and energy saving throughout the year.
- 6. Easy Maintenance – No need for regular replacement of membrane.
- 7. Unlike a heat shield film, periodic replacement is not needed.
- 8. Reduction in dew condensation – Significant reduction in dew condensation.
- 9. Easy to clean – Simple maintenance of a glass product.

WILD ATTOCH™

WILD ATTOCH™, external Installation Low-E Glass, enables single-story retail shops to do energy-saving reform without disrupting store operations.

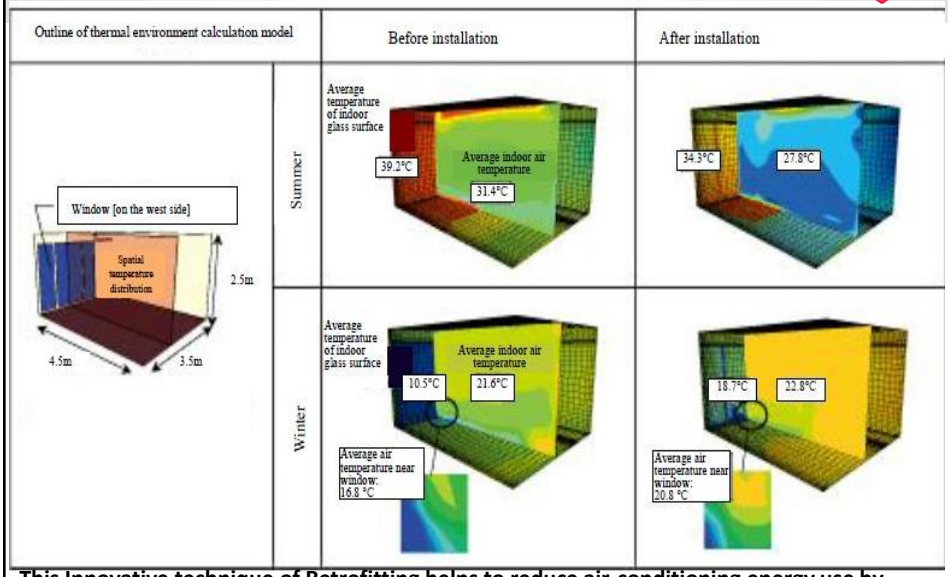
Product features:

A. Simple “External” installation
・External installation enables store renovation without disrupting business operations.
・No curing required inside the store

B. Excellent heat insulation/shielding performance
・Low-E glass alleviates summer heat and winter cold.
・Heat insulation prevents dew condensation in winter.
・37.7% reduction in annual air-conditioning use

C. Solar control, UV blocking, etc.
・Excellent solar control that eliminates the need for window shade
・UV blocking function protects products from sunburn and color fade-out.
・Large-sized glazing available
・No need to remove/dispose existing window glass

Effect of ATTOCH :



This Innovative technique of Retrofitting helps to reduce air-conditioning energy use by about 30% a year