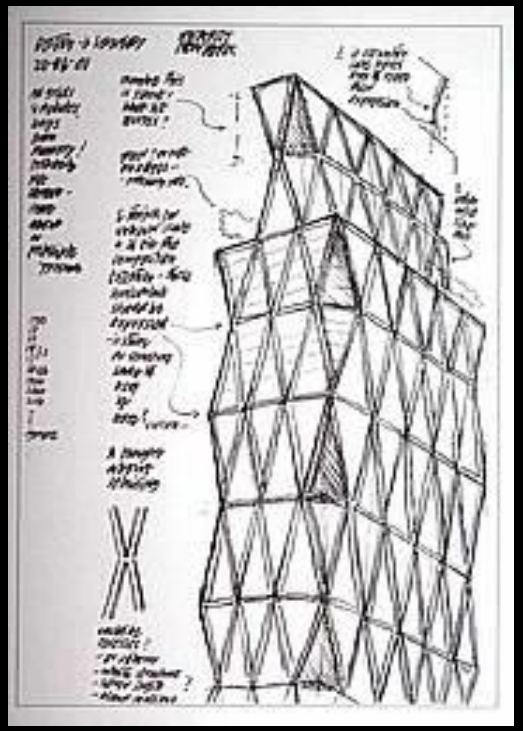


From Rendering To Reality:

Principles of Glass Selection for Facades

Sourabh Kankar Gujarat Guardian Ltd AIGMF

THE ALL INDIA GLASS MANUFACTURERS' FEDERATION

www.aigmf.com

Agenda

Glass Selection Criterion

Solar Spectrum vis Performance and Design

Architectural Glass Developments.

Delaware Welcome Center
Wilmington, DE
SN 654 on Green
Environetics (Cubellis)

Glass Selection Criterion

Rendering To Reality

Allure
Las Vegas, NV
NU 40 on Clear
EDI Architecture
Photo: KHS&S

Performances of Glass

* Design : Visual aspect

Color

* Functions : Security

Acoustic

Thermal insulation

Solar control

Glare ……

Light Transmission

Higher Transmission

68%

1331 L Street
Washington, DC
SN 68 on Clear
SmithGroup

Lower Transmission

18%

Ivy Hotel + Residences
Minneapolis, MN
Silver 20 on Clear
Walsh Bishop Architects
Photo: Blue Photography

Reflectivity

Lower Reflectivity

11%

Lofts @ 655 Sixth Avenue
San Diego, CA
SN 68 on Clear
Public Architecture
Photo: Loopnet.com

Higher Reflectivity

31%

Reckson Executive Park
Melville, NY
Silver 20 on Clear
Reckson Associates

Aesthetics - Color Perception

Perception depends on:

1) Light (outside and inside)

2) Object (and background)

3) Observer (angular dependence)

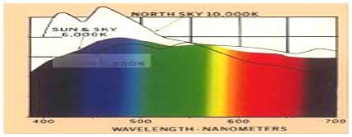
SN54-CrystalGray outboard

Color Rendering Index (CRI)

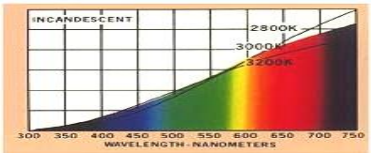
- The color rendering index defines the spectral quality of glasses in transmission.
- Examples
  - Tungsten bulb & Sunlight/Blue Sky = 100
  - High Quality Fluorescent = 90
  - Green Glass = 80
- Between 80-90 -> Good
- 90-100 -> Very Good
- Museums typically specify 95 or higher.

Product	CRI
Clear Insulating	97
Clear Insulating Low-E	95
Blue Insulating	85
Bronze Insulating	95
Gray Insulating	95
Green Insulating	88
Light Gray Insulating	93

100



100



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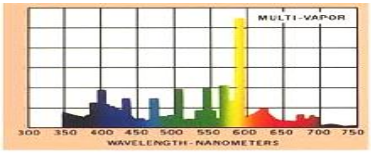

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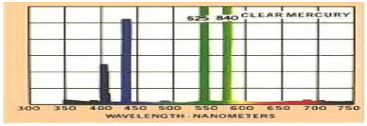
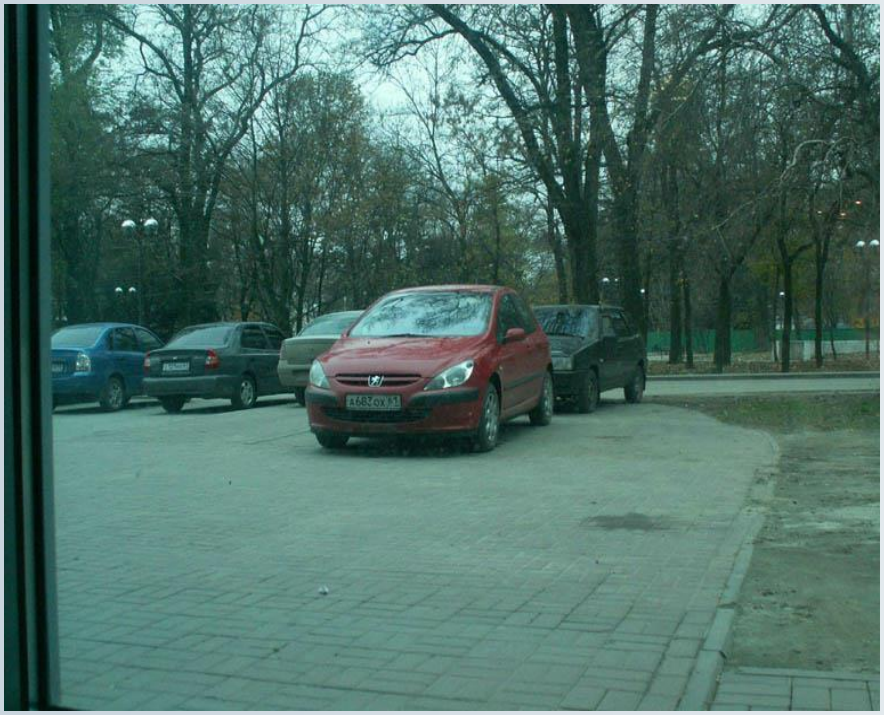


Color Rendering Index

Example



View through body tinted blue glass

View through Guardian blue reflective glass, coated on clear glass

Performances of Glass

* Design : Visual aspect

Color

* **Functions : Security**

Acoustic

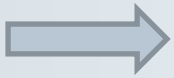
Thermal insulation

Solar control

Glare ……

Performances of Glass

One of the most important function is the :

Solar control  Energy saving

Internal comfort

What is Solar Control Glass?

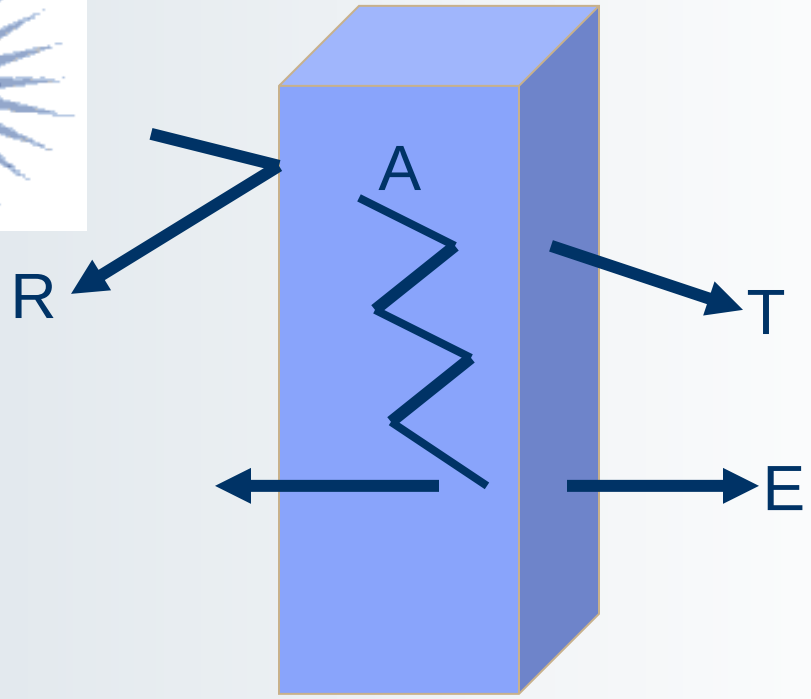
- Solar control glass protects the facade interior from solar heat gain (SC-value ,g-value or solar factor) and provides thermal insulation (U-value)

- Two effects are responsible for the reduction of energy transmission through glazings:

  Energy Absorption

  Energy Reflection

RAT Equation



R- Reflection

A- Absorption

T- Transmission

E- Emissivity

Solar Spectrum vis Performance and Design

Solar Energy and Visible Light

- One important issue for modern architecture is transparency in order to provide the end user maximum comfort while increasing natural daylighting.
- Solar control glass must be evaluated for energy transmission (SF, SC, SHGC) and daylighting (visible light transmission).
- The ratio of light and energy transmission is the **Spectral Selectivity (S)** of a glazing also LSG

$$S = \frac{\textbf{Visible Light transmission}}{\textbf{Total energy transmission}}$$

Higher is better

Clear float glass: S ~ 1

Physical maximum: S = 2.4

Performances of Glass

How do I recognize a performant solar control glass ?

Check out performances of the coated glass by reading the light transmission and total energy transmission (SF , SC or SHGC).

The higher the LSG , the better the performances of the glass.

	LT%	SF%	LSG
Clear float glass	80	80	1
Reflective coating	20	18	1,1
Single silver layer	50	30	1,6
Double silver layer	50	28	1,8
Triple silver layer	60	28	2,1

Architectural Glass Developments

Architectural Glass Development

- Clear monolithic glass
- Tinted heat absorbing: green, bronze etc
- Clear and tinted insulated units
- Pyrolitic coatings
- Sputter Coatings
- Post-temperable coatings
- Hybrid, coatings
- Low-iron float glass

Coated Glass Technologies

PYROLYTIC

- On line method applies metallic coatings during the float glass making process.

SPUTTER COATINGS

- Coatings applied in a vacuum allowing multiple thin metallic coatings to be applied to glass in a very uniform manner.

POST TEMPERABLE COATINGS

- Sputter coated glass which can be further fabricated after coating.

The Evolution of Glass
And High Performance Coatings

Thank You!